

2026



REPORT CARD FOR ARIZONA'S INFRASTRUCTURE



ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

[INFRASTRUCTUREREPORTCARD.ORG/ARIZONA](https://infrastructurereportcard.org/arizona)



Cover photo: Ocean to Ocean Bridge, Yuma, Arizona; Tim Roberts Photography

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2026 REPORT CARD FOR ARIZONA'S INFRASTRUCTURE

Executive Summary

The Arizona Section of the American Society of Civil Engineers (ASCE) has released its 2026 Report Card for Arizona's Infrastructure, assessing eleven infrastructure areas: aviation, bridges, dams, drinking water, energy, levees, rail, roads, stormwater, transit, and wastewater. Arizona's infrastructure earned an overall grade of C, the same grade as the prior report card in 2020, indicative of infrastructure in mediocre condition that requires attention.

Arizona continues to experience rapid population growth, with projections indicating a 26% increase between 2026 and 2060. Much of this growth is driven by the expanding technology sector in Phoenix, the nation's fifth-largest city. However, across Arizona, critical infrastructure has not kept pace with increasing demand. Transportation, water, housing, and public service systems face significant unmet needs; challenges that are further compounded by persistent funding shortfalls across sectors. Additionally, a changing climate is greatly affecting the state with more high temperature days, increased wildfires, prolonged drought, and more intense storms resulting in flooding and erosion. Arizona's continued growth, coupled with the increasing frequency and intensity of extreme weather events, underscores the need for enhanced investment in infrastructure capacity, resilience, adaptation, and long-term sustainability.

The Infrastructure Investment and Jobs Act (IIJA) had helped closing gaps identified prior to 2021, by providing over \$11 billion to projects statewide as of January 2025. However, state transportation revenues are not expected to cover future needs, with an expected gap of over \$162 billion by 2050. Similarly, drinking water infrastructure needs are expected to exceed \$12 billion over the next 20 years due to Colorado River shortages, accelerated groundwater depletion, and new federal standards for per- and polyfluoroalkyl substances (PFAS). These funding issues do not end with transportation and drinking water; these issues persist within dams, levees, bridges, transit, aviation, and stormwater sectors as well. Without significant new investments and funding solutions, Arizona's infrastructure systems will struggle to meet the demands of a rapidly growing population and economy in the decades ahead.

Recommendations to Raise the Grade



INVESTMENT: Increased investment from the IIJA has begun to close the funding gap in Arizona. With the IIJA sunseting in 2026, continued investment is needed across all sectors of infrastructure to continue to make much needed improvements. Sustained funding will ensure our most critical systems, like drinking water, bridges, roads, dams, etc., can continue safe operations across Arizona.



MAINTENANCE: Maintaining existing infrastructure systems will be critical as the state's population continues to increase. With the focus on increasing capacity, Arizona's critical systems are aging and not receiving needed maintenance to fulfill their life cycle. Maintaining existing assets should be prioritized in future infrastructure planning.



INNOVATION: Modern technology has led to new innovations and can bring much needed updates to the state's infrastructure, such as different delivery methods, new materials, and smart technology. The public and private sectors will need to be open to new ideas to deliver projects more efficiently and cost effectively.



RESILIENCE AND ADAPTATION: Arizona is facing more environmental challenges than ever before. Prolonged heat and drought have led to more wildfires and intense flooding. Incorporating resilience and adaptation in design and maintenance of infrastructure assets is needed to keep up with growth.



GEOGRAPHIC PARITY: Funding is stretched across the state, but it is especially stretched in Arizona's rural communities. Investment and modernization of assets in rural communities is necessary to maintain safe infrastructure for its entire life cycle.

About The Report Card for America's Infrastructure

Every four years, America's civil engineers provide a comprehensive assessment of the nation's 18 major infrastructure categories in ASCE's *Report Card for America's Infrastructure*. Using a simple A to F school report card format, the Report Card examines current infrastructure conditions and needs, assigning grades and making recommendations to raise them.

The ASCE Committee on America's Infrastructure is made up of 52 dedicated civil engineers and infrastructure professionals from across the country, with decades of expertise in all categories, who volunteer their time to work with ASCE Infrastructure Initiatives staff to prepare the Report Card. The Committee assesses all relevant data and reports, consults with technical and industry experts, and assigns grades using the following criteria:

Methodology

CAPACITY

Does the infrastructure's capacity meet current and future demands?

CONDITION

What is the infrastructure's existing and near-future physical condition?

FUNDING

What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

FUTURE NEED

What is the cost to improve the infrastructure? Will future funding prospects address the need?

OPERATION AND MAINTENANCE

What is the owners' ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

PUBLIC SAFETY

To what extent is the public's safety jeopardized by the condition of the infrastructure and what could be the consequences of failure?

RESILIENCE

What is the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents? How able is it to quickly recover and reconstitute critical services with minimum consequences to public safety and health, the economy, and national security?

INNOVATION

What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?

In addition to this national Report Card, ASCE's sections and branches prepare state reports on a rolling basis. Visit [Infrastructurereportcard.org](https://www.infrastructurereportcard.org) to learn about your state's infrastructure.

About the Grades

The 2026 Report Card for Arizona's Infrastructure was written by a committee of more than 50 civil engineers across Arizona who volunteered their time to collect and analyze data, prepare and review their findings and present their conclusions. The committee worked with staff from ASCE National and ASCE's Committee on America's Infrastructure to provide a snapshot of our state's infrastructure, as it relates to us locally and on a national level. The Report Card Sections are graded based on the following eight criteria: capacity, condition, funding, future need, operation and maintenance, public safety, resilience and innovation. ASCE defines these grades as follows:



Exceptional, Fit for the Future



Good, Adequate for Now



Mediocre, Requires Attention



Poor, At Risk



Failing/Critical, Unfit for Purpose

The 2026 Report Card on Arizona's Infrastructure



Aviation

B-



Bridges

B+



Dams

C-



Drinking Water

C-



Energy

C



Levees

C



Rail

C



Roads

D+



Stormwater

C-



Transit

C



Wastewater

C



**OVERALL
GPA**

Aviation



GRADE
COMPARISON

AZ: B-
Nat'l: D+

Photo: Phoenix, Arizona; Leslie Rogers Ross



AVIATION

EXECUTIVE SUMMARY

Aviation is a major driver of Arizona's economy. The industry supports 19% of all jobs and 22% of wages statewide, totaling \$34.2 billion, according to the 2021 Arizona Airports Economic Impact Study. In 2019, airports contributed \$33.0 billion—10.2% of the state's gross product—and generated \$121.4 billion in total economic activity, a 215% increase since 2002. The 2021 Infrastructure Investment and Jobs Act (IIJA) provided substantial funding for Arizona airports, including \$351.2 million in Airport Infrastructure Grants, nearly \$87.5 million for terminal projects, and \$2.2 million for FAA contract towers through FY 2025. Airport pavement conditions also improved, with runways rated PCI 70 or higher increasing from 54% in 2018 to 81% in 2021 due to the Arizona Department of Transportation's (ADOT) Airport Pavement Preservation Program. However, average PCI declined slightly from 72 to 70 between 2021 and 2025. Arizona airports are projected to need about \$891 million in federal funding through 2030, with roughly half required by its three largest airports.

BACKGROUND

Arizona's aviation system provides safe and effective movement of people, goods and services throughout the state connecting them to the rest of the country and the world. An efficient and well-maintained airport system is critical to the economic growth of the state. Approximately 576,000 jobs are directly or indirectly related to the aviation industry, contributing

to approximately 10.2% of the state's gross domestic product. The system enhances the quality of life of Arizona's residents by accommodating business, recreational travel, health, welfare, and safety related services such as aerial firefighting activities, search and rescue missions, medical patient transport, and news reporting.

CAPACITY

The state's system consists of 67 public use airports that vary in size and function from large commercial service facilities to small rural general aviation airports. Arizona's largest airport, Phoenix Sky Harbor International Airport (PSHIA), is the 14th busiest (passenger wise)

airport in the country with nearly 24 million passengers (enplanements) in 2024. When considering overall aircraft operations for 2024, Arizona has 6 of the top 50 busiest airports in the country with PSHIA ranked 8th overall. Based on aircraft operations, Phoenix Deer

Valley Airport (DVT) is the busiest general aviation (GA) airport in the country followed by Falcon Field Airport and Prescott Regional Airport ranked second and fourth busiest GA airports respectively.

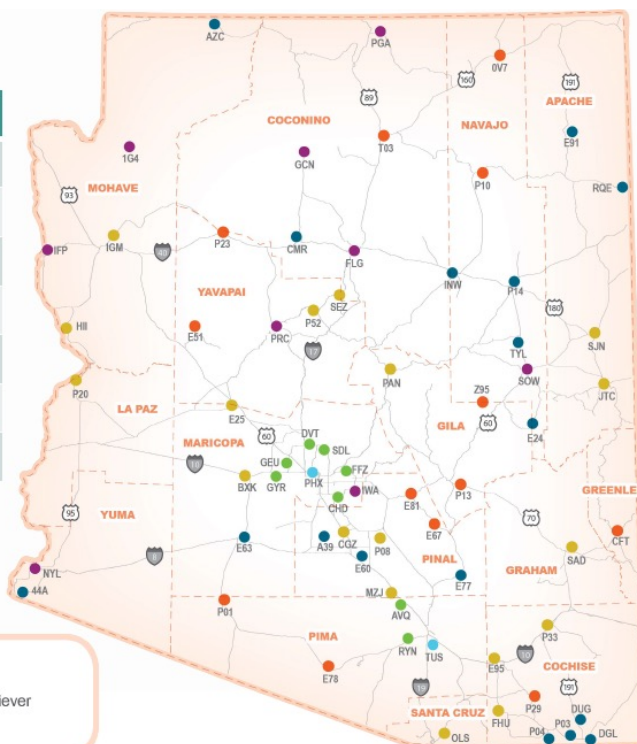
The Annual Service Volume (ASV) capacity of an airport is calculated based on airfield geometry, aircraft fleet mix, and instrument approach facilities. This capacity is compared to the actual operational demand to determine

the percentage of demand that can be accommodated by the airport. The FAA recommends that additional capacity be planned when the airport reaches 60% of its capacity. According to a 2018 report by the ADOT, there are ASV capacity concerns at 10 Arizona airports, including Phoenix Sky Harbor International Airport and Tucson International Airport. Updated data should be available in late 2026 when the next SASP is released.

Figure 1: 2018 Statewide Airports System Plan (SASP) System Airports

2018 SASP System Airport Roles

Airport Role	Number of Airports
CS-International	2
CS-National	9
Reliever	8
GA-Community	18
GA-Rural	17
GA-Basic	13
Statewide Total	67



Source: 2018 SASP

CONDITION, OPERATION & MAINTENANCE

Pavement is the largest asset and therefore receives the most amount of funding at airports. Other infrastructure also requires maintenance and rehabilitation, such as terminals, hangars, and vehicle roadways. Prior to IIJA funding, it was difficult for general aviation airports to allocate funding to infrastructure outside of the airfield due to the limitations on the use of AIP funding. Therefore, infrastructure was left with minimal maintenance activities, especially at smaller airports. Recent grants through IIJA have allowed airports to allocate funds to aging infrastructure at their airports such as terminals, hangars, and vehicle roadways. Example

projects include Access Road rehabilitation at H A Clark Memorial Field, terminal parking lot reconstruction at Casa Grande Municipal Airport, service road reconstruction at Safford Regional Airport, and a hangar reconstruction at Eloy Municipal Airport. Sky Harbor, Phoenix's main airport, is currently constructing a second north concourse to Terminal 3, which will add 6 new passenger gates, and renovating parts of Terminal 4. In addition, Sky Harbor is early in the planning process for the new West Terminal, a \$4 billion project, expected to be under construction around 2030.

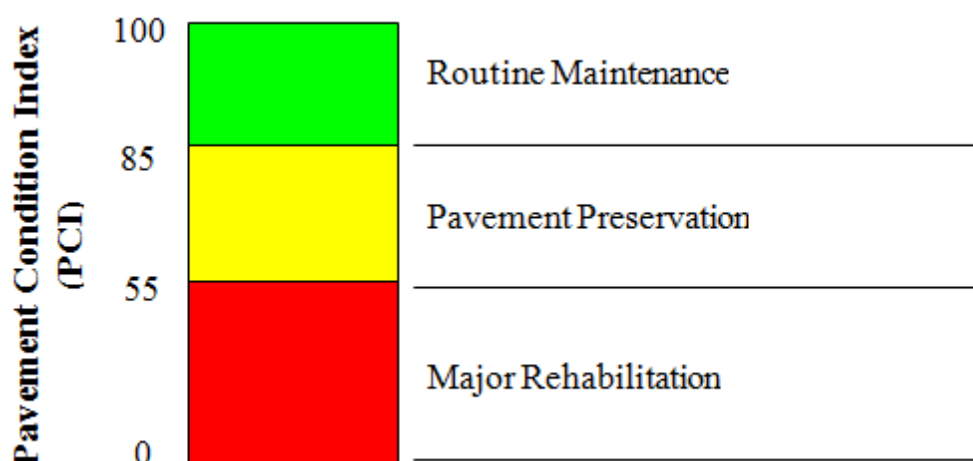
Pavement condition is essential for safe, efficient aircraft operations, and the industry relies on the PCI as its standard visual assessment tool. PCI surveys document visible pavement distresses (type, severity, and quantity) to evaluate structural integrity and functional performance. The results help engineers identify maintenance and repair needs, prioritize rehabilitation when resources are limited, and track deterioration over time. Repeated PCI evaluations also support forecasting when major rehabilitation is required.

Between 2018 to 2021, the percentage of airports having a runway pavement condition index of 70 or better (out of 100) increased from 54% to 81%, but still falls short of the state target of 97%. Although there aren't any specific targets, the percentage of airports having a taxiway with a PCI of 70 or greater is 57%, and

airports with a PCI of 70 or greater for all of their airfield pavement is 40%. These gains in the maintenance of the airport pavements have been made despite the funding shortfalls and thanks to the Airport Pavement Preservation Program (APPP). This program was established to assist in the preservation of the Arizona airport system infrastructure and help Arizona airports.

Although the state's airports experienced PCI gains between 2018 and 2021 construction costs between 2022 and 2025 increased significantly. As a result, the same budget of approximately \$5 million per year no longer funds as many pavement maintenance projects. The most recent ADOT Aeronautics Triennial Study, which is still in progress, has initial findings that indicate between 2022 and 2025 the overall PCI value for airport pavements in the APPP program fell from 72 to 70.

Figure 2: PCI Scale vs. Treatment Recommendation



Source: ADOT Aeronautics Triennial Study

FUNDING

Traditionally, Arizona airport capital funding comes from two main entities, the FAA and the ADOT. Table 1 below details approximate funding amounts allocated toward airport development projects to Arizona airports over the last three years. For State fiscal years 2025 and 2026 the combined federal and state investment for Arizona airports totals \$177.6 million and \$165.4 million

respectively which is higher than the historic \$149 million due to the additional funds from the IIJA funding. In State FY 2025 \$83.9 million of the funding went to Mesa Gateway and Tucson International airports, both currently undertaking large runway projects. In state FY 2026 \$97 million of the \$165.4 million is expected to be awarded to PSHIA, Mesa Gateway and Tucson International.

Table 1. Recent Arizona Airport Development Funding Allocations

State Fiscal Year	Calendar Year	FAA Grants	ADOT Match to Federal Grants	ADOT State / Local Grants	ADOT APMS Grants
2024	2023	\$106.6M	\$5.4M	\$16M	\$5.2M
2025	2024	\$119.0M	\$7.5M	\$9.0M	\$5.0M
2026	2025	\$145.7M	\$7M	\$0	\$5.0M

Source: FAA and ADOT

Federal Funding

The primary funding mechanism at the federal level is the Airport Improvement Program (AIP), which distributes money from the Airport and Airway Trust Fund (AATF) to airports in the National Plan of Integrated Airport Systems (NPIAS). Additional federal funding was made available in the IIJA through the Airport Infrastructure Grants (AIG) program (a formula program similar to AIP), and the Airport Terminals Program (ATP), which is a competitive program. Since 2022 the FAA has awarded approximately \$441 million to Arizona Airports. Most of which was AIG funding (\$351 million), however a few of the state's airports successfully competed for ATP funding. PSHIA received \$71 million to replacing aging infrastructure in their Central Utility Plant, Mesa Gateway received \$14.4 million for a terminal expansion, and Yuma International received \$2 million for terminal flooring replacement.

State Funding

At the state level, the primary grant funding source for Arizona airports is the State Aviation Fund (SAF). Monies from the SAF are managed through a tentative five-year Airport Development Program (also referred to as the Airport Capital Improvement Program [ACIP]) that is managed by the ADOT Aeronautics Group. The main objective of the program is to maximize the use of state and federal dollars for airport development. Money is collected from various sources including aircraft registration fees, aviation fuel sales taxes, a flight property tax paid by airlines operating in the state, and other user dues and fees that support the SAF. ADOT Aeronautics allocates money from the SAF into several programs for statewide and airport-specific improvements.

Airport Self- Funding

In addition to federal and state resources, local funding mechanisms are available to airports as well. Funding sources that commonly fall into this category include Passenger Facility Charges (PFC), Customer Facility Charges (CFC), bonds, local user fees, tenant rents, and general funds. PFCs and CFCs are federally regulated fixed fees levied on airline passengers and rental car users and are typically included in the price of a ticket or cost of a rental car. At airports with commercial airline service, PFCs and CFCs can provide an additional funding mechanism for airport improvements. Municipal bonds and/or securities are another common financing mechanism used to fund airport development projects. State and local governments can issue several different types of bonds that are secured by local taxes or future revenues from airport tenants and businesses. Airports sponsors can also provide funding through a city or county's general fund. Most municipalities that own an airport also manage a general fund to operate the various departments under its jurisdiction. However, most municipal general funds are relatively small, and, given they must be used to operate all departments in the city or county, many times they cannot support the large capital needs to complete airport improvements.

Non-Traditional Funding Sources

The constraints of both federal sources and the SAF to adequately fund airport improvements have led many airports to seek alternate funding opportunities wherever available. Many airports have collaborated with private businesses such as airlines, hangar developers, and logistics providers to establish public-private partnerships (P3s) to fund specific improvements. For example, Scottsdale

Airport expects most future hangars to be constructed through P3s, working with private developers, in order to keep construction costs low.

Another non-traditional funding option that has become available after a decade long hiatus is Congressionally Directed Spending (CDS), also known as congressional

earmarks. Glendale Regional Airport and Phoenix-Mesa Gateway, among other airports in the state, have been recipients of earmarked grants in recent years. Phoenix-Mesa Gateway received \$7 million and Glendale Regional Airport received \$2,070,000 through FY2023 appropriations.

FUTURE NEED

According to the 2025-2030 NPIAS report, Arizona airports require approximately \$891 million in federal funding over five years with roughly half of the funds needed by the state's three largest airports (PSHIA, Mesa Gateway, and Tucson International). Ultimately there is an annual shortfall of approximately \$48 million between available funding and funding needs, with the small rural airports being the most impacted. Additionally, some rural Arizona communities depend on the federal Essential Air Services (EAS) program to subsidize commercial carriers including Page Municipal Airport, Prescott Regional Airport and Show Low Regional Airport. Lastly, although funds were added to the SAF in fiscal years 2022 and 2023, during the last 25 years, over \$100 million dollars were diverted away from the SAF to other state budget items with \$15 million in funds diverted in 2025.

Further, there is a rural air service initiative backed by the Arizona Air Service Development Consortium (AASDC) consisting of nine-member airports: Flagstaff Airport, Grand Canyon National Park Airport, Grand

Canyon West Airport, Kingman Airport, Lake Havasu Airport, Laughlin Bullhead International Airport, Safford Airport, Sedona Airport, and Yuma International Airport. AASDC is working to establish a funding mechanism to support rural air service which would provide more commercial service opportunities to communities located outside of Maricopa County. The total amount of annual funding to support this initiative has not yet been published. Ultimately there is not enough funding to meet future improvement needs.

Ultimately there is an annual shortfall of approximately \$48 million between available funding and funding needs, with the small rural airports being the most impacted.

PUBLIC SAFETY AND RESILIENCE

Arizona's aviation infrastructure links the state to the global marketplace, facilitating local, national and international commerce and military aviation which provides economic stability and safety in case of a disaster. The network of public-use general aviation airports provides for the needs of rural residents who are dependent on aviation for emergency medical transport, fire suppression support, air cargo, agricultural support, and business aviation.

The FAA has published standards for airport development and safety. Two standards of particular importance are related to the specific areas adjacent to runways. The Runway Safety Area (RSA) provides

an unobstructed area of land adjacent to the usable runway that is suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or unintended excursion from the runway. The second area is the Runway Protection Zone (RPZ) that is an area at ground level extending beyond the end of the runway for the purpose of enhancing the safety and protection of people and property on the ground. Currently, 79% of Arizona's airports fully meet the RSA standards which is below the state's target of 100%. Additionally, 94% of Arizona airports have an established RPZ with only 42% of the airports owning 100% of the established RPZ. The goal is 100%.

Access to an airport is a very important metric in public safety. As of 2025, 87% of Arizona's population is within a 30-minute drive of an all-weather runway giving easy access in case of a disaster. This is down from the 2016 data which was 93% of Arizona's population. Medical flights offer access to patients in need of specialized or emergency medical care, as well as transport of healthcare personnel to rural areas to provide care. Providing a network of airports to connect medical professionals with patients is an important function an aviation system can provide. As of 2025, 69% of Arizona's airports are capable of supporting medical operations, which is an increase from 40% reported in the on-going update to the State Airport System Plan, scheduled to be published in summer 2026.

Airports with accessible fuel 24 hours per day, seven days per week allow planes to fly at non-peak hours and add a layer of safety for pilots when immediate refueling is required. Sixty nine percent of Arizona's airports provide this service. The benefits of 24/7 fuel also extend to community safety and resiliency, as aircraft can refuel during times of disaster when they are needed to transport people, goods, and services. Our airports are a crucial part of our emergency plan with all the Arizona airports having a written emergency response plan.

Airspace safety is a critical component to airport safety and a controlled airspace helps enhance safety for the flying public. In order to address long standing airspace safety concerns Marana Regional Airport (AVQ) and Pinal Airpark (MZJ), both located in Marana, AZ are two of the newest airports to be accepted into the Federal

Contract Tower Program.

Although Arizona airports are working towards providing safer environments with adequate facilities for the flying public there are still safety metrics and facility requirements that have not yet been met.

- 20% of airports still need to meet the Runway Safety Area standards
- 40% of airports do not provide instrument approaches
- 12% of airports do have hangar spaces for tenants
- 52% of airports do not have enough hangar spaces for interested tenants
- 19% of airports need more apron parking areas for transient aircraft
- 24% of airports cannot support jet aircraft operations

As Airports in Arizona face resilience challenges in the form of extreme heat, drought, and high winds. The 2023 State of Arizona Hazard Mitigation Plan identified instances of high heat at airports in the state, including a nine-day period in June of 2021 with high temperatures between 106 and 119 degrees Fahrenheit (8-13 degrees above normal temperatures). Extreme heat can cause delays or closures at airports, due to lack of air density needed to generate lift. ADOT is in the process of developing a Resilience Improvement Plan (RIP) to address risks identified in the state's Hazard Mitigation Plan, including risks to airports.

INNOVATION

The type of flying vehicles utilizing the public airspace is evolving. Dozens of companies have initiated operations in the Advanced Air Mobility (AAM) market, including specialized AAM Original Equipment Manufacturers (OEMs) such as Joby Aviation, Archer, and BETA Technologies, as well as traditional aircraft builders like Boeing and Airbus. Given that AAM describes a general concept of operations, these companies are pursuing a variety of aircraft designs and configurations that are meant to fill a specific role in the AAM market. With a Boeing facility located in Mesa, Arizona, plans for the implementation of AAM within the state is imminent.

Therefore, being proactive with AAM and keeping up with electrical demands are the key to the state's aviation system staying on top of aviation innovation.

As of May 2025, a Senate Bill revised the Arizona Revised Statutes Section 1, Title 28, Chapter 25 to add new article titled "Article 9. Advanced Air Mobility Infrastructure". The Article provides direction to ADOT to develop a statewide plan for the construction of vertiports, electric aircraft charging stations, and any other infrastructure needed to support advances in aviation technology.

Two uses are expected to account for early AAM operations: air cargo and short-range passenger transport. OEMs have established partnerships or received orders to conduct such operations once aircraft are certified. Short distance parcel delivery using aircraft has already begun, as Amazon Prime Air launched a drone (unmanned aerial system [UAS]) delivery service from its Tolleson, Arizona facility in April 2025. The service

uses electric Vertical Take Off and Landing (eVTOL) drones to provide one-hour delivery of packages up to five pounds to customers within a seven-mile radius. Passenger operations are likely to follow cargo as eVTOL aircraft enter service. Multiple OEMs have indicated their intent to either sell their aircraft to existing airlines or to provide their own air taxi service.

By the time the industry reaches maturity, vertiports are expected to be built at a much greater density than airports to allow better first- and last-mile connectivity within an urban area. This will likely include placement of vertiports on top of buildings in city centers, at transit centers (bus and rail stations) and as part of multimodal transportation hubs (MTHs), integrating AAM into a larger transportation system.

Vertiports

To facilitate the safe and efficient travel of AAM aircraft, specialized takeoff and landing facilities called vertiports are anticipated to be developed. Given the cost and complexity of developing aeronautical facilities, early AAM operations are expected to occur from existing airport facilities using either designated vertipads or conventional helipads. Once vertiport designs and concepts have been established and the industry matures, it is anticipated that a larger network of standalone vertiports will be constructed to support AAM operations. By the time the industry reaches maturity, vertiports are expected to be built at a much greater density than airports to allow better first- and last-mile connectivity within an urban area. This will likely include placement of vertiports on top of buildings in city centers, at transit centers (bus and rail stations) and as part of multimodal transportation hubs (MTHs), integrating AAM into a larger transportation system.

Arizona is prepared to be on the forefront of this development and is positioned to become one of the first

states to establish a statewide AAM program with a plan to provide implementation direction to communities and municipalities across the state. Starting in September 2026 there will be increasingly more emphasis for the construction of vertiports for eVTOL aircraft operations.

Electricity Demand and Grid Capacity

Electricity demand in Arizona is rising due to population growth, higher temperatures, expanding industry, and the increasing electrification of aircraft, ground vehicles, and airport operations. As electric aircraft and eVTOL technologies advance—from early use at GA airports to eventual adoption in regional air travel—airports will face significantly higher power needs. To strengthen resilience and meet growing demand, microgrids provide a self-sufficient system for on-site power generation, storage, and, when connected, the ability to sell excess energy back to the grid. Arizona already hosts several microgrid installations, including a 25-MW system powering Marine Corps Air Station Yuma, illustrating the scale that major airports like Phoenix Sky Harbor may ultimately require.



RECOMMENDATIONS TO RAISE THE GRADE

- **Improve airport service levels.** The aviation industry is vital to Arizona’s economy and serves important functions such as medical transport and firefighting. Projected funding levels do not maintain airports at their current levels, and based on identified needs, the airports require an improvement to their service levels. One way to help support the commercial service airports is to increase the federal cap on local PFCs. Increasing the amount of funds airports with scheduled service can collect from passenger tickets, provides an opportunity for those airports to invest in their infrastructure demands.
- **Increase federal and state funding for aviation infrastructure and stop diverting aviation funds away from aviation.** Airports that do not have scheduled air service receive far less funding for their infrastructure needs. Changes to current policy and legislation are required to prevent diversion of funds from the State Aviation Fund to the General Fund. During the last 25 years over \$100 million dollars has been diverted away from the state’s aviation system. Although some funds were returned to the State Aviation Fund in 2022 and 2023, the fund experienced another diversion in 2025. The consistent reallocation of funding continues to limit Arizona airport’s ability to make crucial safety improvements, perform routine maintenance, and expand capacity.
- **Develop legislation for safe operating procedures for mixed airspace use.** As technology advances and autonomous flying vehicles begin to enter the airspace, safe operating conditions are a key to the systems wellbeing and the perceived safety for the flying public. Arizona Senate Bill 1307 authorized budgets for studies and education for AAM within Arizona. As the studies finalize and implementation plans begin, it will be important that appropriate policies and laws are in place to ensure safe operating conditions for all manned and un-manned flying vehicles.

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Bridges



GRADE
COMPARISON

AZ: B+
Nat'l: C

Photo: Steel Arch Highway Bridge over Red Rock Canyon in Arizona; Stephan Langhans



BRIDGES

EXECUTIVE SUMMARY

Arizona relies on a network of 8,587 bridges that collectively span over 64.5 million square feet and support over 100 million crossings each day. The Arizona Department of Transportation (ADOT), along with other bridge owners, have demonstrated strong stewardship in maintaining this infrastructure. As of 2025, only 137 bridges—just 1.6% of the total—were classified in poor condition, unchanged since 2019, but well below the national average of 6.8%. However, underlying needs remain substantial. ADOT has identified 1,632 bridges in need of repair or rehabilitation, with an estimated cost of \$1.46 billion. While this marks progress from 1,789 bridges in need of repair in 2019, the existing backlog and rising construction costs present a long-term funding challenge. Looking ahead, Arizona must confront the growing pressures of aging infrastructure, rapid population growth, and increasingly extreme climate conditions—all of which pose risks to the resilience of its surface transportation network and the sustainability of its funding sources.

BACKGROUND

Bridges play a vital role in the nation's infrastructure, economic growth, and quality of life for its citizens. Federal law requires regular structural inspections of bridges by state transportation departments, guided by standards established by the Federal Highway Administration (FHWA). States submit inspection data and other findings to the U.S. Department of Transportation for inclusion in the National Bridge Inventory (NBI).

A current challenge for the bridge community is the implementation of the 2022 FHWA Specifications for the National Bridge Inventory (SNBI), which makes sweeping changes to the way that structures are inventoried and how data is recorded. As a result, numerous updates have been made to existing data, and additional information will need to be gathered for every

structure. For example, supplementary bridge geometry and clearance details are now required, and bridge components like bearings, joints, and railings will now be assigned their own numeric condition ratings.

At its core, the SNBI establishes uniform data requirements for bridge inspections nationwide and defines what information must be reported to the National Bridge Inventory (NBI). It will improve overall bridge safety and decision-making by providing more detailed, standardized, and reliable data on bridge condition, load capacity, and risk factors, but it comes at a cost. Implementing the SNBI will require significant upfront investment from state and local agencies, as they must modernize data systems, retrain inspection staff, and transition from legacy reporting formats to more complex, standardized data structures.

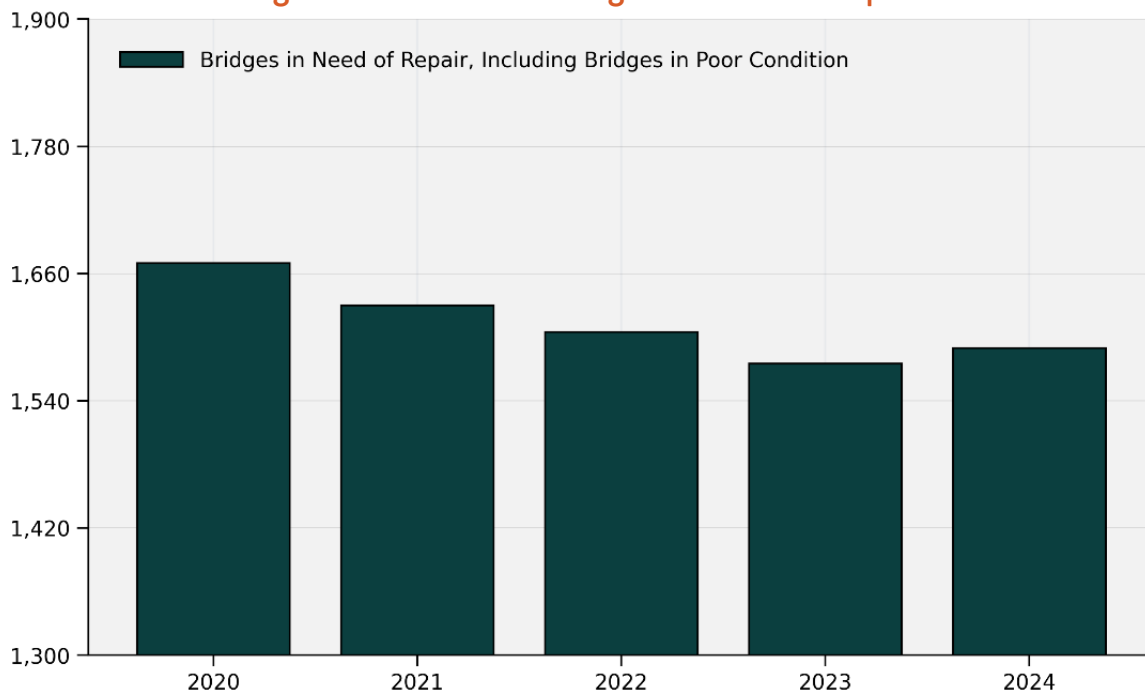
CONDITION AND CAPACITY

According to the National Bridge Inventory, only 1.6% of Arizona’s bridges are rated in poor condition—placing Arizona third, just behind Nevada and Texas (both at 1.3%) in national rankings based on U.S. Department of Transportation data. Similarly, ADOT reports that less than 1% (0.9%) of state highway bridges fall into the poor condition category, indicating strong overall system health.

A “poor” rating doesn’t necessarily mean there is a safety risk, but rather that at least one of the bridge’s key structural components—deck, superstructure, or substructure—has a condition rating of 4 or less on the 0-9 scale. In practical terms, it has serious deterioration or damage that requires priority repair, rehabilitation, or replacement.

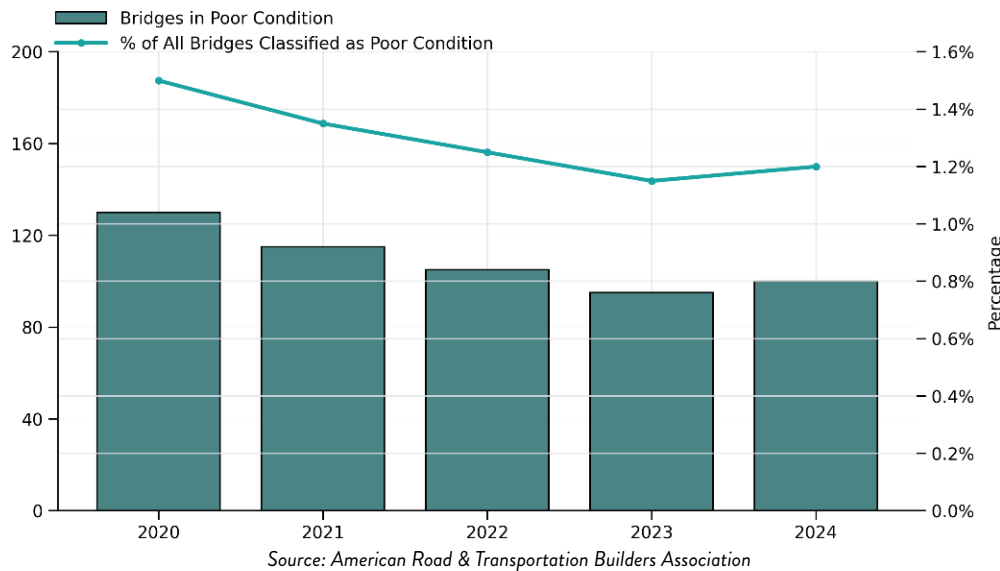
Arizona consistently ranks among the top five states for overall bridge condition. Of ADOT’s 4,824 state highway bridges, only 43 are currently classified as poor—the lowest number in over a decade. Approximately half of Arizona’s bridges are more than 40 years old, meaning a significant portion of the inventory is approaching or has exceeded its original 50-year design life. The national average bridge age is approximately 44 years. Arizona’s aging inventory underscores the urgency of sustained preservation investment to avoid more costly replacements. Of the 8,587 bridges statewide, 95 (1.1%) are currently classified as requiring repair due to poor condition in at least one key element, and the deck area of those bridges accounts for approximately 1.0% of total statewide bridge deck area.

Figure 1: Number of Bridges in Need of Repair



Source: American Road & Transportation Builders Association

Figure 2: Number of Poor Bridges



Locally owned bridges in Arizona total approximately 2,753 and generally exhibit more variable conditions and lower structural capacity than state-owned bridges. As a result, local bridges carry a disproportionate share of condition and capacity challenges, making them a critical focus for system resilience. While many of these structures carry lower traffic volumes than state highway

bridges, they remain essential for local connectivity, emergency access, and last-mile freight movement. As a result, their condition and capacity limitations represent a growing risk to system reliability and public safety, particularly in rural and underserved areas where alternate routes may be limited.

OPERATION AND MAINTENANCE

The ADOT Bridge Group oversees statewide bridge operations and maintenance through its Bridge Preservation Program, which focuses on preventive maintenance, rehabilitation, and replacement to ensure structural integrity. Mandated by the Federal Highway Administration (FHWA), the program ensures continuous monitoring and timely intervention based on inspection data.

The Bridge Preservation Program is organized into four core subprograms targeting key aspects of bridge performance and risk. The Bridge Replacement and Rehabilitation Subprogram focuses on bridges in poor condition or with sufficiency ratings below 80, leveraging a 94.4% federal / 5.6% state funding split and a base annual allocation of approximately \$10 million. The Bridge Inspection and Repair Subprogram supports routine inspections, emergency repairs from collisions or flooding, and compliance with

FHWA's National Bridge Inspection Standards, with approximately \$5–6 million allocated annually. The Bridge Deck Rehabilitation Subprogram addresses accelerated deck deterioration—particularly in northern Arizona due to deicing chemicals—with a backlog exceeding \$75 million and annual funding of roughly \$3–4 million. The Bridge Scour Retrofit Subprogram targets erosion risks at bridge foundations using a risk-based prioritization approach, with the long-term goal of eliminating scour-related deficiencies within a 20-year timeframe.

Collectively, ADOT's 2025–2029 Five-Year Transportation Program dedicates about \$500 million annually to pavement and bridge preservation, including approximately \$237 million for interstate bridges and \$112 million for other state routes, reflecting a sustained, systemwide commitment to infrastructure reliability and public safety.

While Arizona has maintained fewer than 2% of its bridges in poor condition, the number of bridges requiring repair has grown to approximately 1,632. Several underlying factors are driving this trend:

- Aging infrastructure: 46 of the 4,824 bridges on state highways were constructed before 1970, contributing to increasing maintenance demands
- Rising vehicle impacts: Collisions from oversized and over-height vehicles have increased, causing more frequent structural damage
- Legacy design limitations: Older bridges reflect outdated design standards, leading to higher operations and maintenance (O&M) needs
- Environmental exposure: In northern Arizona, the use of de-icing chemicals continues to accelerate deck deterioration
- Escalating maintenance backlog: More frequent failures in expansion joints, bearings, barriers, and deck surfaces—combined with project delays—are increasing repair costs over time

FUNDING & FUTURE NEED

Arizona's bridge funding relies primarily on a mix of federal and state sources, with federal aid—especially from the Infrastructure Investment and Jobs Act (IIJA)—making up the bulk of capital investment. Between 2022 and 2026, over \$5 billion in federal funding was apportioned to Arizona, a significant increase from previous years.

At the state level, the Highway User Revenue Fund (HURF)—supported by fuel taxes, vehicle license fees, and registration revenue—remains Arizona's primary transportation funding source. However, HURF growth has been modest and is not keeping pace with long-term infrastructure needs. Arizona's gasoline tax is currently 18 cents per gallon, a rate unchanged since 1990. As a result, it is now one of the lowest in the nation and significantly below peer states such as California (62.9 cents), Pennsylvania (57.6 cents), and Washington (49.4 cents). After more than three decades without adjustment, the purchasing power of Arizona's fuel tax has eroded substantially due to inflation. If indexed to inflation since 1990, the tax would need to be

Major project upgrade and replacements (Since 2020):

- The US 60 Pinto Creek Bridge was replaced in 2022. The modern structure spans 695 ft with 10ft shoulders and heavier load capacity, and earned a regional innovation award
- The I10 Broadway Curve Improvement Project (2021–2025):
- Expansion of I10 Salt River bridges to 8 general purpose lanes plus 2 HOV lanes (six GP + one HOV currently open; final HOV lanes opened spring 2025)
- Replacement of 48th Street and Broadway Road bridges to improve traffic flow and safety
- Construction of two new multi-use bridges (pedestrian/cyclist) with design features integrating local art, completed spring 2025
- New Ina Road overpass on I-10 in Tucson
- I40 bridge deck improvements over I17 in Flagstaff
- New Ruthrauff Road overpass in Tucson
- I17 interchange replacements at Happy Valley and Pinnacle Peak roads

approximately 40 cents per gallon today to maintain its original value. This structural funding gap has limited the state's ability to keep pace with rising construction costs, increasing maintenance demands, and system expansion, making it a key driver of Arizona's growing bridge repair backlog.

Despite increased federal support, Arizona faces a projected \$162.3 billion funding gap over the next 25 years for all roads and bridges combined, as outlined in the 2023 Long-Range Transportation Plan. ADOT has prioritized preservation, dedicating 78% of resources to maintaining existing infrastructure. Annual bridge-specific preservation funding averages \$60 million, a figure that—while contributing to the number of state-owned bridges—falls well short of the long-term condition and falls short of the long-term need. Over the 2025–2029 Five-Year Program, total programmed bridge funding reaches approximately \$893.6 million (~\$179 million per year), which still leaves a repair backlog gap of at least \$560 million statewide.

ADOT's 2025–2029 Five-Year Transportation Construction Program allocates approximately \$500 million annually for pavement and bridge preservation. This includes \$237 million for bridge work on interstate corridors and \$112 million for bridge work on other state routes—totaling \$349 million per year dedicated to bridges, separate from the \$60 million annual routine preservation budget. As shown in Table 1, 1,632 bridges currently require repair or replacement, representing

approximately 19% of Arizona's 8,587 bridges, with an estimated total cost of \$1,458 million. Of these, 1,120 bridges require full replacement at an estimated cost of \$1,038 million alone. Despite the Five-Year Program's \$893.6 million in total programmed bridge funding, significant backlogs remain, and many maintenance needs fall outside federal grant eligibility, leaving critical gaps in coverage.

Table 1: Arizona Bridges Needing Repair - 2025

Type of Work (Needed)	Number of Bridges	Estimated Cost (Millions USD)	Daily Crossings	Bridge Area (Sq. Feet)	Remarks / Description
Bridge Replacement	1,120	\$1,038 M	20,850,000	8,019,300	Bridges rated “poor” requiring full replacement; includes high-priority interstate and county bridges.
Widening & Rehabilitation	214	\$129 M	4,640,000	960,149	Bridges requiring capacity expansion and substructure repair, primarily in Maricopa and Pima counties.
Rehabilitation	156	\$158 M	860,000	1,073,169	Structural repair, fatigue mitigation, and joint or bearing replacement.
Deck Rehabilitation / Replacement	42	\$39 M	130,000	109,793	Bridge decks need resurfacing or replacement due to spalling, cracking, or wear.
Other / Preventive Maintenance	100	\$94 M	3,320,000	649,081	Low-traffic and rural bridges with minor deterioration or scour issues.
Total Bridges Needing Repair (2025)	1,632	\$1,458 M (est.)	29,800,000	10,811,362	Reflects 2025 statewide repair backlog, approximately 19% of Arizona's 8,587 bridges.

Source: ARTBA 2025 Bridge Report, FHWA NBI 2025, ADOT Five-Year Program, 2025-2029

Table 2: Arizona Bridge Programmed Funding by Source, 2025-2029

Type of Work	No. of Projects	Federal Funds (USD)	State Funds (USD)	Local Funds (USD)	Total Programmed (USD)	Notes / Description
New Construction	4	\$3,800,000	\$7,200,000	\$29,000,000	\$40,000,000	Includes bridge additions on SR-30 and new overpasses along I-17 and US-93 corridors.
Bridge Replacement	38	\$506,000,000	\$19,600,000	\$58,000,000	\$583,600,000	Major replacements supported by federal Bridge Formula Program (BFP).
Bridge Preventive Maintenance	27	\$86,000,000	\$25,000,000	\$0	\$111,000,000	Includes deck sealing, crack repairs, and preventive treatments under ADOT maintenance contracts.
Bridge	90	\$114,000,000	\$13,000,000	\$32,000,000	\$159,000,000	Structural rehabilitation and strengthening of bridges on I-10, I-17, and US-191 corridors.
Total (FY 2025–2029)	159 Projects	\$709,800,000	\$64,800,000	\$119,000,000	\$893,600,000	Reflects ADOT’s total programmed bridge funding for 2025–2029.

Source: ADOT Five-Year Program 2025-2029, FHWA Bridge Formula Program Allocations 2025

Local bridges in Arizona—primarily owned and maintained by counties, cities, and towns—are funded through a combination of state-shared revenues (particularly the HURF), federal aid programs, and limited local funding sources. HURF distributions provide the foundation for ongoing maintenance, while federal programs such as the Bridge Formula Program and Bridge Investment Program are critical for major rehabilitation and replacement projects, with at least 15% of federal

bridge funding reserved for locally owned “off-system” bridges. However, like the state system, local bridge funding is constrained by declining gas tax purchasing power and limited local revenue capacity, particularly in rural areas. As a result, many jurisdictions face growing backlogs and increasing reliance on competitive federal funding, highlighting a need for more sustainable, long-term funding solutions to maintain safety and system performance.

PUBLIC SAFETY

Most of Arizona’s bridges are open and operating without restrictions, reflecting a system that is generally safe and reliable for daily travel.

As of 2025, 163 bridges are posted for load, accounting for about 1.9% of the statewide inventory. These postings

are precautionary, limiting vehicle weights to ensure safe operation when a bridge’s capacity has declined due to age or deterioration. While not indicative of immediate safety risk, load-posted bridges introduce operational challenges across multiple users of the transportation system. On

designated freight corridors, weight limits can require trucks to detour to longer routes, increasing travel time, costs, and congestion on alternate roadways. Similarly, school buses—particularly when fully loaded—may exceed posted limits, forcing districts to reroute buses, reduce passenger loads, or deploy smaller vehicles, which can lengthen student travel times and complicate route planning.

These impacts are magnified in rural areas, where alternate crossings may be limited. Load restrictions

can also affect emergency response by requiring fire, medical, and law enforcement vehicles to take indirect routes, potentially increasing response times during critical situations. Although load-posted bridges represent a relatively small share of the system, many are locally owned and reflect broader funding and maintenance challenges. Continued investment in preservation and rehabilitation will be essential to reduce these restrictions and maintain a safe, efficient, and resilient bridge network as Arizona continues to grow.



RESILIENCE AND INNOVATION

ADOT continues to modernize Arizona's bridge infrastructure through innovative construction methods and resilient design strategies. The agency has adopted Accelerated Bridge Construction (ABC) techniques, including the use of polyester polymer concrete overlays on bridge decks, which cure faster and reduce long-term maintenance costs.

To enhance resilience, ADOT integrates climate forecasting, hydrology modeling, and risk assessments into bridge planning, especially in flood-prone and high-temperature regions. Projects like the US 160 Laguna Creek Bridge and St. David Bridge feature erosion-resistant foundations and flood-control measures. ADOT's Resilience Program also uses GIS-based hazard tracking and collaborates with USGS for real-time flood data.

Innovation extends to materials and inspection methods. ADOT employs carbon-fiber composites (CFRP) for structural strengthening and uses drones for safer, more efficient inspections. Alternative delivery methods, such as design-build and Construction Manager at Risk (CMAR), encourage contractor creativity and speed up project timelines. The Pinto Creek Bridge replacement exemplifies these approaches, with a custom foundation designed for rugged terrain.

ADOT also emphasizes sustainability and community engagement, incorporating local art and multimodal features into new bridge designs to support long-term durability and inclusive infrastructure.



RECOMMENDATIONS TO RAISE THE GRADE

Arizona's bridge infrastructure has shown consistent improvement, but long-term sustainability and resilience require continued focus and strategic action. The following recommendations aim to address funding gaps, aging infrastructure, climate resilience, and innovation adoption:

Strengthen Funding Mechanisms

- Index fuel taxes to inflation to restore lost purchasing power.
- Explore alternative funding sources such as mileage-based user fees and public-private partnerships.
- Reduce diversions from transportation-related revenues to ensure funds are reinvested in infrastructure.

Prioritize Preventive Maintenance

- Expand ADOT's Bridge Preservation Program to include more county and rural bridges.
- Invest in lifecycle-based asset management to optimize repair schedules and reduce long-term costs.

Accelerate Innovation

- Continue using Accelerated Bridge Construction (ABC) and advanced materials like polymer concrete and carbon-fiber composites.
- Adopt smart inspection technologies such as drones and AI-based defect detection to improve efficiency.

Enhance Resilience

- Integrate climate modeling and hazard tracking into bridge design and rehabilitation.
- Retrofit vulnerable bridges with scour mitigation treatments and flood-control features.

Promote Equity and Accessibility

- Ensure bridge projects support multimodal access and prioritize underserved communities.
- Engage local stakeholders in planning to align infrastructure with community needs.



Photo: Jeanne Jensen



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Dams



Photo: The Bartlett Dam on Verde River in Arizona; Wirestock Creators

GRADE
COMPARISON

AZ: C-
Nat'l: D+



DAMS

EXECUTIVE SUMMARY

There are 380 dams in Arizona listed in the National Inventory of Dams (NID), of which 166 are high hazard dams. Regular dam inspections and condition assessments are critical for public safety. In Arizona, 64% (106) of high-hazard dams have documented condition ratings, with about 73% deemed satisfactory. However, as of 2025 12% of these high-hazard dams remain in poor condition, according to the U.S. Army Corps of Engineers. In Arizona, the responsibility for the safe operation and maintenance of dams lies with the dam owners whether state regulated or federally regulated. The Association of State Dam Safety Officials (ASDSO) estimated in 2025 that rehabilitation of non-federal dams in Arizona will cost \$460 million. Although there are multiple federal funding streams for dam repairs, the federal resources are insufficient to fully support needed maintenance, repair, and rehabilitation of aging dams in Arizona.

CONDITION & CAPACITY

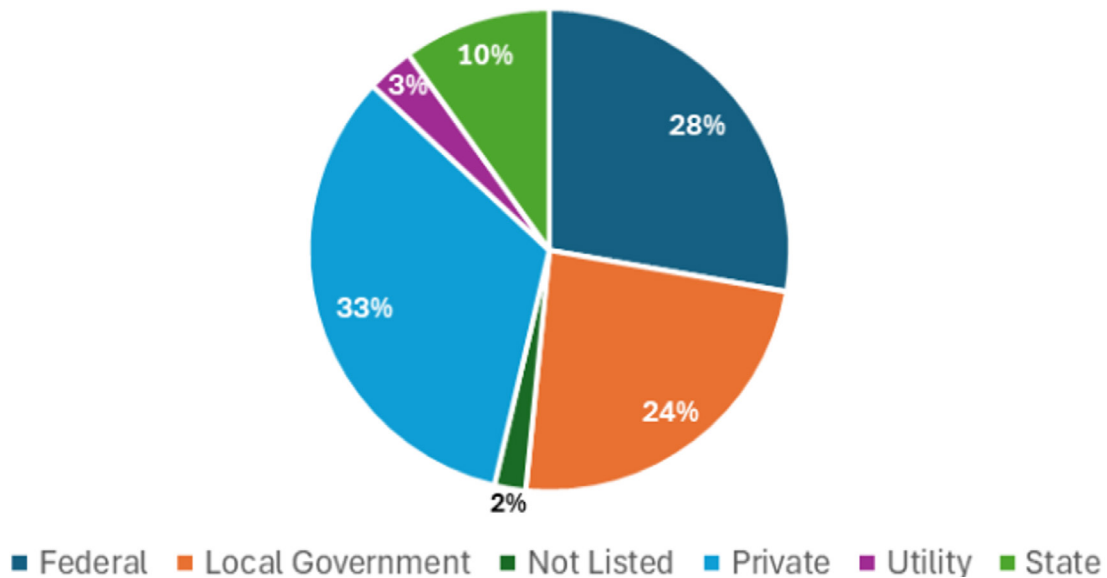
Water is a critical resource throughout the southwestern United States, particularly in Arizona. Dams are a vital component in managing this resource, whether to provide drinking water and irrigation, control flood waters, or generate power. A prominent example, Theodore Roosevelt Dam (see Photo 1), is located northeast of Phoenix in the Salt River Valley. Originally constructed from 1905 to 1911 by the Bureau of Reclamation, the multipurpose Theodore Roosevelt Dam provides flood control, water storage, and hydroelectric power generation. The Roosevelt Dam and other noteworthy Arizona dams, such as Hoover Dam and Glen Canyon Dam, form lakes that provide various opportunities for recreation and habitat for wildlife while controlling storage and distribution of water throughout the southwest.

According to the U.S. Army Corps of Engineers' National Inventory of Dams (NID) and the Arizona Department of Water Resources (ADWR), there are 254 state regulated dams, 112 federally regulated dams, and 14 dams without listed regulator for a total of 380 dams in Arizona. Dams classified as having a very low hazard potential are not included in this inventory. Note, the total number of dams includes eight dams under state regulation that are designated with Protected Critical Infrastructure Information (PCII) status which means information on these dams is protected from public disclosure under the Freedom of Information Act and, therefore, accompanied by no publicly available data. Flood risk reduction is the primary purpose for 22% of all Arizona dams, the highest percentage of any primary dam purpose in the

state. Other dam purposes include irrigation, fish and wildlife, hydroelectric, debris control, mine tailings impoundment, water supply, recreation, and fire protection, to name a few.

Federally owned dams and privately-owned dams comprise the majority of dams in Arizona, with 106 and 127 respectively. The State owns just 10% of all dams. Dam ownership is summarized in Figure 1.

FIGURE 1: DAM OWNERSHIP – 380 DAMS TOTAL



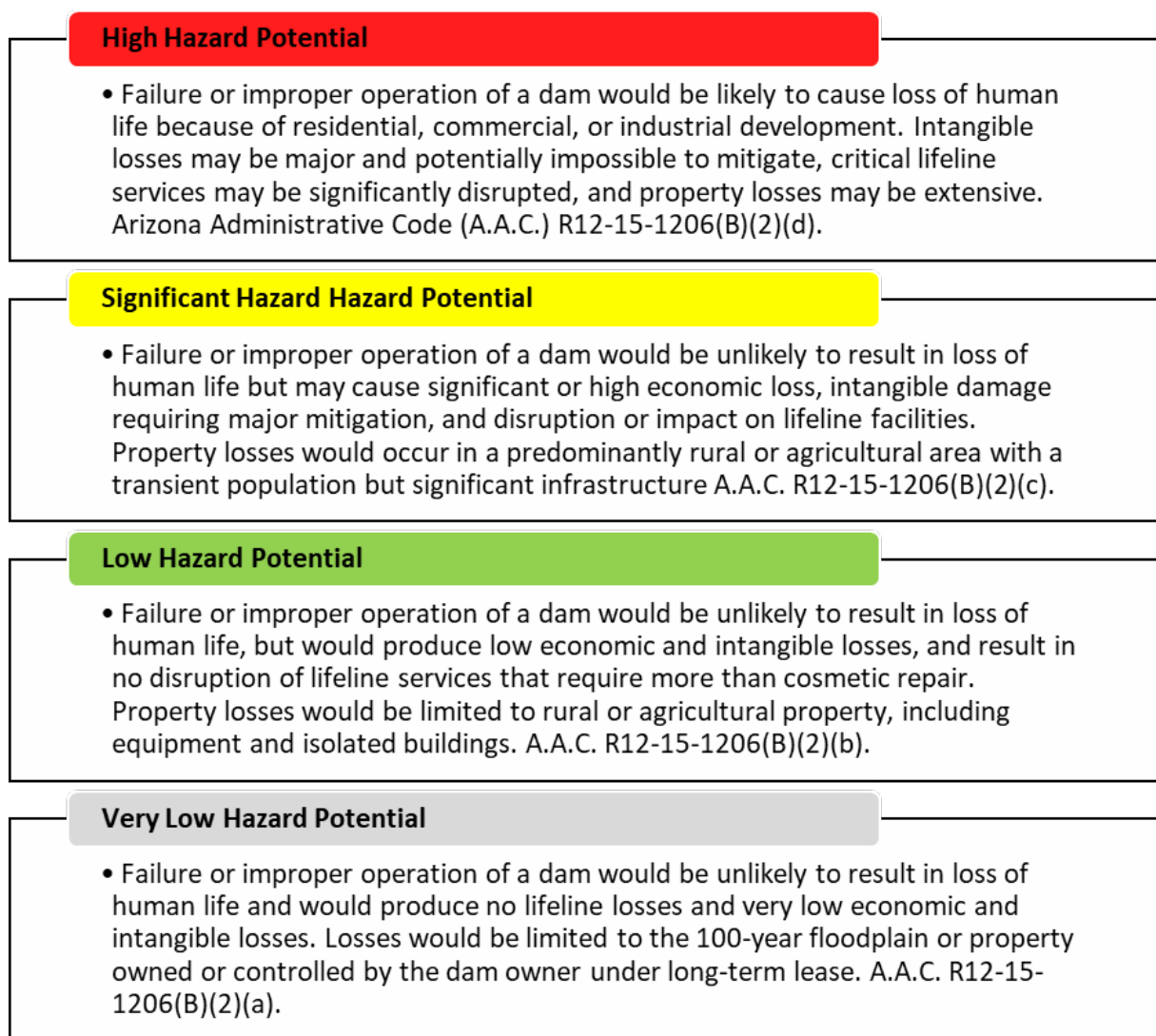
Source: USACE, NID, 2025



The federally owned dams in Arizona are managed and regulated by several agencies including the Army Corps of Engineers, Bureau of Reclamation, U.S. Forest Service, Bureau of Land Management, Mine Safety and Health Administration, and the Bureau of Indian Affairs. State regulated dams are under the jurisdiction of the ADWR. ADWR and federal owners/regulators report dam information to the NID, including dam height,

construction, total storage, owner, and hazard rating. The hazard rating is based on the potential for loss of life and downstream property damage in the event a failure occurs. Hazard ratings are updated as needed based upon development and changes in downstream population, as these factors affect the impact of a potential dam failure. There are four levels of hazard rating in Arizona, as indicated in Figure 2 below.

FIGURE 2: ADWR Dam Hazard Potential Classifications

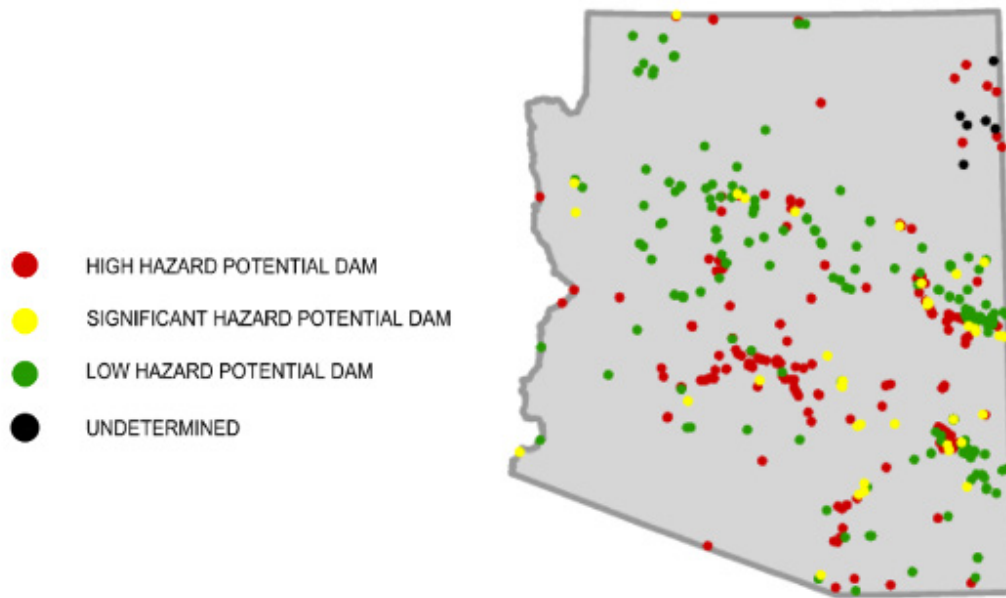


Source: Arizona Administrative Code, Title 12, Chapter 15, Suppl. 24-4

Figure 3 shows dam locations in Arizona and hazard ratings and does not include very low hazard dams. There are 166 dams in Arizona with a high hazard rating, 38 with a significant hazard rating, and 168 with a low hazard rating. The remaining 8 dams are categorized as

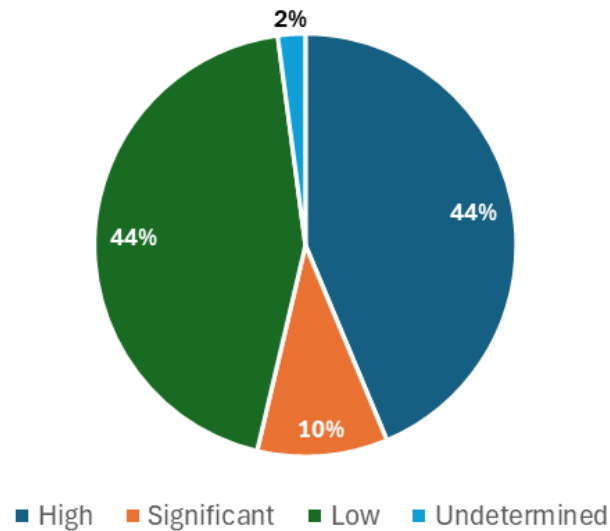
undetermined as information was not available. Two of the undetermined hazard dams have PCII status and are not included in Figure 3. Figure 4 shows the percentage of dams in Arizona based on hazard classification.

FIGURE 3: DAM LOCATION BY HAZARD POTENTIAL



Source: USACE, NID, 2025

FIGURE 4: HAZARD CLASSIFICATION – 380 DAMS TOTAL



Source: USACE, NID, 2025

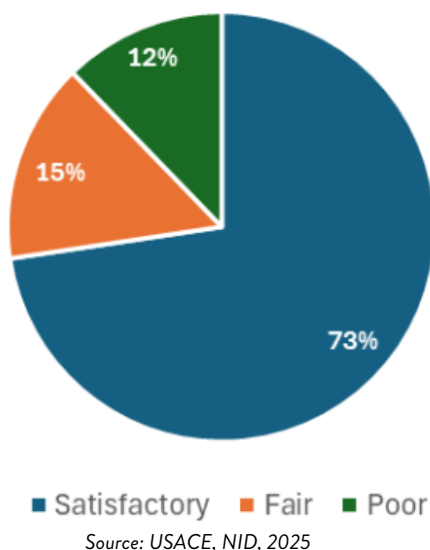
Many dams have a 50-year design life, and the average age of dams nationwide is 64 years. In Arizona, the average age of state jurisdictional dams is over 69 years. Federally regulated dams have an average age of about 73 years. The oldest dam in Arizona was completed in 1881, Walnut Canyon Dam (USACE, NID, 2025).

Regular inspection and rehabilitation/maintenance are critical components to ensure the ongoing safe operation of existing dams. The ADWR Dam Safety program is tasked to inspect and rate the condition of state jurisdictional dams. The frequency of inspection depends on the downstream hazard potential rating. The NID provides information on the condition

rating of dams. Sixty-four percent of high hazard potential dams in the state (106 of 166 dams) have a condition assessment rating available in the NID, with 60 federally regulated dams having no condition

assessment rating listed. As shown in Figure 5, of the 106 high hazard dams with condition ratings available, 73% have a satisfactory rating, 15% rate fair, and 12% rate poor.

FIGURE 5: CONDITION OF HIGH HAZARD DAMS – 106 DAMS TOTAL



OPERATION & MAINTENANCE AND PUBLIC SAFETY

Routine inspections and proper operation and maintenance (O&M) can improve the safety of existing dams. In Arizona, the safety and O&M of dams is the responsibility of the dam owners. In addition, ADWR inspects State jurisdictional dams periodically. ADWR's inspections are performed on 1-year, 3-year, and 5-year cycles for high, significant, and low and very low hazard dams, respectively. When conducting inspections of jurisdictional dams, ADWR seeks to identify any adverse conditions, including those resulting from inadequate O&M. Most dam owners participate in the ADWR inspections and rely on the findings documented in the ADWR dam safety inspection reports.

In Arizona, each owner of a high or significant potential hazard dam is required to prepare, maintain, and exercise a written emergency action plan (EAP). EAPs identify conditions at a specific dam and outline pre-planned actions to be followed in the event of a dam safety emergency. The EAP also specifies actions for the owners to take regarding moderating or mitigating potential issues at their dam prior to a potential or actual failure. State officials work with local entities

and dam owners to prepare new and update existing EAPs. Among the 106 state-jurisdictional high hazard potential dams in Arizona, approximately 93% have EAPs in place, which is above the national average of approximately 76%.

ADWR's dam safety budget is approximately \$1 million annually with a small portion of the budget being funded by the National Dam Safety Program (NDSP) via a State Assistance grant from Federal Emergency Management Agency (FEMA). These grant funds are available to conduct inspections, dam safety training for State staff, and maintain adequate staff to manage the Dam Safety Program for the inventoried and State regulated dams. From 2020 to 2025, ADWR's dam safety program increased full-time staff equivalents (FTE) from 5.9 to 6.7. ADWR's dam safety budget per state-regulated dam and per high hazard dam both continue to be above the national average.

Additionally, public safety can be enhanced by using federal and state funds to provide dam safety repairs and rehabilitation by the owners if the owners and dams meet eligibility criteria for the grants.

FUNDING & FUTURE NEED

Despite the majority of Arizona's high hazard potential dams having a satisfactory rating, the 2025 ASDSO report *"The Cost of Rehabilitating Dams in the U.S."* estimates that rehabilitation of non-federal high hazard potential dams in Arizona will cost \$170 million and that rehabilitation of all non-federal dams in the state will cost \$460 million.

At the State level, ADWR has limited funding available for dam repairs. ADWR provides limited funding through the Dam Repair Fund which is funded with monies appropriated by the State legislature, dam safety inspection fees, filing fees, and principal and interest collected from dam repair loans. The Dam Repair Fund is used to make emergency repairs to high hazard potential, unsafe dams when needed. The Dam Repair Fund is also used to provide grants and loans to owners of high hazard potential dams to analyze and rehabilitate or repair dams that are designated as unsafe but are not considered emergency repairs.

At the Federal level, funding is available from the FEMA, United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and USACE for rehabilitating non-federal dams. Laguna Dam Settling Basin also received \$4 million from the Infrastructure Investment and Jobs Act (IIJA) in fiscal year 2023 in accordance with the U.S. Bureau of Reclamation (USBR), 2023. FEMA's High Hazard Potential Dam Rehabilitation Program is one of the primary sources of federal funding for Arizona to improve its non-federal dams, providing grants for high hazard potential dam repairs, rehabilitations, and removals. Additionally, FEMA's NDSP provides funding for states to improve their dam safety programs. Annual NDSP funding for Arizona generally ranges from \$50,000 to \$65,000, with other funds available based on owners' eligibility, cost share, and project specific criteria.

Although there are multiple federal funding streams for dam rehabilitation and repair, the federal resources have not been made available to fully support needed maintenance, repair, and rehabilitation of aging dams. Without additional funding opportunities to help dam owners to inspect, repair, rehabilitate, and maintain their facilities, the risk of a dam failure will continue to exist and will generally increase with time.

Although there are multiple federal funding streams for dam rehabilitation and repair, the federal resources have not been made available to fully support needed maintenance, repair, and rehabilitation of aging dams. Without additional funding opportunities to help dam owners to inspect, repair, rehabilitate, and maintain their facilities, the risk of a dam failure will continue to exist and will generally increase with time. The most recent dam failure in Arizona was the Millet Swale Dam breach during a monsoon rain event in July 2021 (Photos 2 and 3). This dam was previously classified as high hazard potential and unsafe by the ADWR. The dam breached under a relatively low reservoir level. According to Navajo County officials, no fatalities or injuries were reported, and property damage from the dam breach was not significant.

Photo 2: MILLET SWALE DAM FAILURE, JULY 25, 2021



Credit: Navajo County Sheriff's Office Facebook Page (2021)

Photo 3: MILLET SWALE DAM POST-FAILURE, JULY 2021



Courtesy ADWR, 2025

RESILIENCE

The 2023 Fifth National Climate Assessment states that the Southwest Region of the United States is expected to face climate change driven impacts, such as increased storm intensities and increased drought, which exacerbate overall flooding conditions.

As discussed in the 2023 State of Arizona Hazard Mitigation Plan, an increase in winter storm intensities is anticipated with a greater percentage of winter precipitation being in the form of rain rather than snow. The shift in rain patterns also includes less frequent but more intense monsoon-related thunderstorms.

A consequence of increasing temperature is intensified drought, leading to an increased frequency of dust storms and large wildfires. Severe wildfire activity can stress vegetation recovery growth, further intensifying overall flooding conditions. In addition, wildfires within dam watersheds may increase the transport of

sediments to dam reservoirs and consequently decrease dam safety by reducing available dam storage capacity.

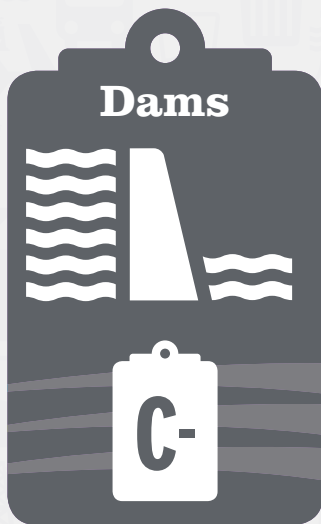
Consideration of effects that climatic hazards have on dams is imperative, especially for dams with existing deficiencies. A combination of both factors can lead to dam failure, as was the case of the Millet Swale Dam failure in July 2021. Heavy monsoon activity combined with a partially eroded embankment caused by a continuous leak caused major damage to the high hazard potential dam. Fortunately, no lives were lost from this incident.

Nationwide, states including Arizona are currently updating scientific methodologies, tools, and models to better assess climate change impacts in order to make dams more resilient. However, there is still uncertainty regarding the availability of funding toward these scientific studies.

INNOVATION

Some dam owners are implementing newer technologies to increase dam safety. Some flood control dams are being monitored with flood sensing systems with automated alerts. Interferometric Synthetic Aperture Radar (InSAR) is being used by some dam owners to understand and monitor groundwater extraction related land subsidence and earth fissure risk at dams. Many dam owners are utilizing remote operated vehicles for inspections of conduits and drain systems. Some owners are utilizing drone imagery and survey data to aid inspections, a technology with great potential for advancement aided by recent development in artificial intelligence. At flood control dams in remote areas

or dams that may fill quickly during intense flood events, on-site cameras have been installed by some dam owners to provide visual confirmation of on-site conditions prior to personnel arriving on site. Lastly, consideration of potential failure modes, risk analysis, and risk-informed decision making (RIDM) have become common practice for many dam owners within the state during dam safety assessments, including for non-federal dams, where owners are beginning to explore and embrace RIDM to identify priority projects and actions, and to achieve cost-effective improvements to dam safety.



RECOMMENDATIONS TO RAISE THE GRADE

- Increase funding for dam safety improvements such as repairs and rehabilitation of deficient dams and maintenance of aging dams, including full funding for federal dam repair programs such as the High Hazard Potential Rehabilitation Program.
- Develop and routinely update Emergency Action Plans for all High and Significant Hazard Dams that currently don't have EAPs by 2030.
- Encourage improved land use planning at the local level by considering the ways that dams can impact local areas downstream.
- Improve procedures and methods of estimating probable maximum precipitation for engineers to use in dam design and development of resiliency measures.
- Improve dam safety management by providing financial and educational support to dam owners and operators on risk analysis and RIDM. Risk analysis supports identification and understanding of dam safety risks, and application of RIDM aids cost-effective use of the finite amount of available funding and resources for dam safety operations, maintenance, and repair/modification projects.

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Drinking Water



Photo: Lake Roosevelt

GRADE
COMPARISON

AZ: C-
Nat'l: C-



DRINKING WATER

EXECUTIVE SUMMARY

Every Arizonan depends on safe, reliable drinking water. Between 2020 and 2025, the state grew by nearly 400,000 residents to reach 7.6 million and continues to rank among the fastest growing states nationally. With continued growth in the foreground, many foundational challenges remain, including: Colorado River shortages, accelerating groundwater depletion outside Active Management Areas, and new federal standards for per- and polyfluoroalkyl substances (PFAS). These challenges are driving substantial new investment needs. EPA estimates more than \$12 billion in drinking water infrastructure needs statewide over the next 20 years, not including Tribal systems. Arizona's larger utilities are responding with asset management, financing, and innovative water supply programs, but many small and rural systems remain financially and technically constrained. At the same time, the state has seen strong performance in urban centers, real progress on reuse and conservation, and persistent gaps in rural infrastructure, workforce, and funding.

BACKGROUND

Arizona's drinking water future is shaped by three intersecting forces: a hotter, drier climate; a rapidly growing and industrializing population; and a policy environment in the middle of significant change. Since 2020, Arizona has experienced its first-ever federally declared Colorado River shortage reductions, including a Tier 1 shortage in 2022 and a Tier 2 shortage in 2023, representing successively deeper mandatory cuts to Arizona's Colorado River allocation as Lake Mead

levels fell below established elevation thresholds. The state has also created the Douglas Active Management Area (AMA), convened the Governor's Water Policy Council (GWPC) to modernize the 1980 Groundwater Management Act, and in 2025 authorized direct and indirect potable reuse statewide. Collectively, these shifts move Arizona from hypothetical shortages to real, sustained reductions, and from pilot-scale reuse to a regulated pathway for Advanced Water Purification.

CAPACITY

Arizona serves roughly 7.6 million people through approximately 1,500 public water systems, ranging from multi-city utilities in the Phoenix-Metro area to small community and Tribal systems. The statewide supply portfolio has remained relatively stable for five years: about 52% surface water, 45% groundwater, and 3% reclaimed water. Per-capita use (GPCD) in Arizona reflects the hot, arid climate and outdoor water demand, but decades of conservation have held statewide total use essentially flat since the 1950s despite tenfold population growth. Utility level impacts reflect this impact, Tucson Water reduced residential use from 121 GPCD in 1996 to 76 GPCD by 2022. Population growth and industrial expansion continue to drive demand.

Arizona reuses approximately 93% of its municipal wastewater, making it a national leader in reuse efficiency primarily for landscape irrigation, industrial cooling, and aquifer recharge.

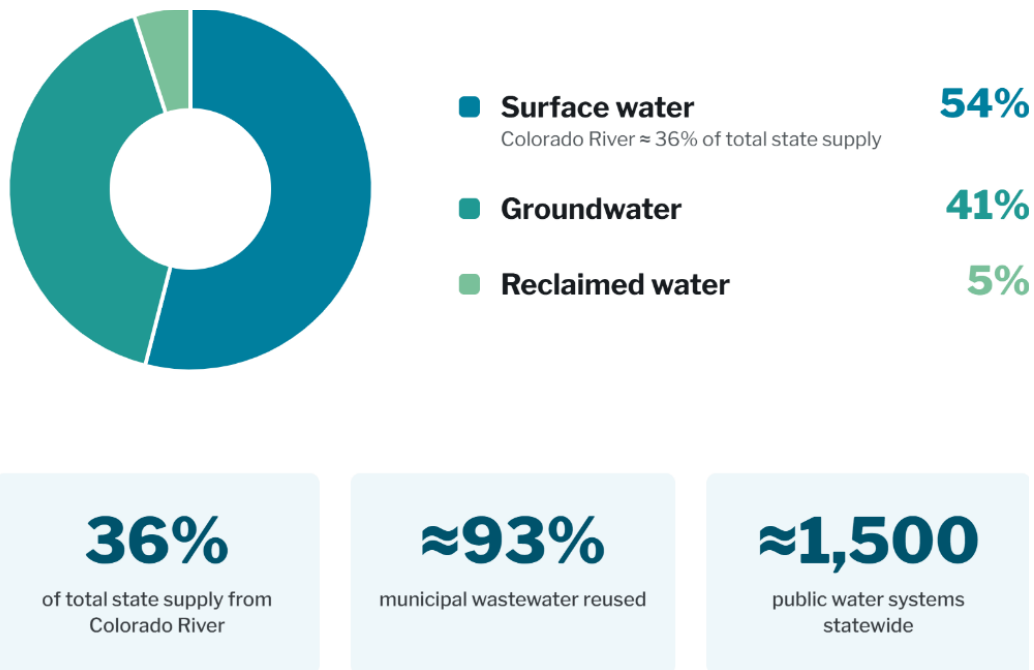
Surface water. The Colorado River provides about 36% of Arizona's supply via the Central Arizona Project (CAP) and direct withdrawals. The state's in-state surface water comes primarily from the Salt, Verde, Gila, and Agua Fria River systems. More than two decades of basin-wide drought have left Lake Mead and Lake Powell at historically low levels, and Arizona has absorbed Tier 1 (2022) and Tier 2 (2023) shortage reductions. Federal agreements have temporarily stabilized the river by

compensating farmers and Tribes for reduced withdrawals, but this funding expires after 2026, and the current management framework expires the same year. If a post-2026 agreement is not reached among the seven basin states, the federal government has authority to impose unilateral cuts on Lower Basin states. Either outcome is expected to permanently reduce Arizona's allocation.

Groundwater. Groundwater is Arizona's most widely used and flexible supply. Within the state's Active Management Areas Phoenix, Tucson, Pinal, Prescott, Santa Cruz, and the newly designated Douglas AMA the 1980 Groundwater Management Act requires new subdivisions to demonstrate a 100-year assured water supply, and intentional recharge has banked approximately 25 cubic kilometers of groundwater since 1989. Outside AMAs, however, withdrawals are largely unregulated, and depletion has accelerated. USGS and satellite data show the Lower Colorado River Basin has lost roughly 45 cubic kilometers of total water storage since 2002, about 60% of its groundwater more than Lake Mead's full capacity. In rural basins including La Paz, Mohave, and Cochise counties, groundwater-level decline rates have roughly doubled in the last decade, from about 5 millimeters per year (2002–2014) to about 12 millimeters per year (2015–2024). In the Willcox Basin, annual overdraft exceeds 100,000 acre-feet, more than 70 wells have gone dry in the past decade, and subsidence has reached 11 feet, producing more than 50 miles of earth fissures. Forecasts for the Hualapai and Kingman subbasins project well-level declines of 44–210 feet by 2050 if current pumping continues.

Reclaimed water. Arizona reuses approximately 93% of its municipal wastewater, making it a national leader in reuse efficiency primarily for landscape irrigation, industrial cooling, and aquifer recharge. In 2025, ADEQ revised the Arizona Administrative Code to authorize both direct and indirect potable reuse statewide, clearing a regulatory pathway for Advanced Water Purification (see Innovation & Resilience).

Figure 1: Arizona's Drinking Water Portfolio



CONDITION, OPERATION & MAINTENANCE

Arizona's drinking water infrastructure is extensive and, in many places, aging. Tens of thousands of miles of distribution mains, thousands of pumps and valves, and hundreds of treatment facilities serve communities ranging from Phoenix to single-operator rural districts. Much of the distribution network was installed during the post-war growth era of the 1950s–1970s. While well-designed water mains can function for 80–100 years, hot and corrosive soil conditions, freeze-thaw cycles in the north, and the age of certain materials (notably cast iron and early-generation ductile iron) accelerate wear. Utilities are working to extend performance through asset management, but the data show a widening gap between system needs and available resources.

Arizona's largest utilities have invested in systematic asset management and are actively replacing mains at or near end-of-life. Phoenix replaces approximately 150,000 feet of water main each year, supported in part by WIFIA financing. Tucson continues a multi-decade program to replace aging cast iron pipe. Scottsdale and Flagstaff use risk-based prioritization tools that weigh probability and consequence of failure to target renewal spending. These practices align with national best

practices and demonstrate what a funded, data-driven program can accomplish.

Small and rural systems face a different reality. Asset inventories are often incomplete, capital reserves are thin or nonexistent, and many systems remain reactive, repairing after failure because they lack the staff, data, and financing to plan preventively. Over 95% of Arizona's 1,508 regulated public water systems are classified as small systems serving fewer than 10,000 people and nationally, systems of this size account for 93% of federal drinking water compliance violations despite representing only 81% of all public water systems. Preventive maintenance pays back: every dollar spent on proactive replacement avoids roughly three to five dollars in reactive repair, but systems without planning capacity rarely capture that return.

Technology investment for operations in Arizona's water sector continues to lag industry best practices. Many utilities have SCADA coverage at treatment plants and pump stations but not throughout distribution. Flow and pressure instrumentation in secondary and tertiary mains is often sparse. Advanced Metering Infrastructure (AMI) deployment is uneven, with larger utilities such

as Flagstaff, Tucson, and portions of the Phoenix-metro implementing AMI but with water utilities nationally trailing electric utilities in smart-meter penetration. Data integration across SCADA, AMI, GIS, and asset management platforms is inconsistent, limiting predictive maintenance and digital-twin applications. As these digital systems expand, cybersecurity has become an operational priority, with all community water systems serving more than 3,300 people subject to risk and resilience assessment requirements under America's Water Infrastructure Act (AWIA).

Arizona's water systems depend on a shrinking pool of experienced operators. Approximately 3,890 water and wastewater treatment plant and system operators work statewide, with only about 250 serving non-metro areas regions that already struggle to recruit and retain

talent. National signals point to mounting pressure: EPA and industry sources estimate 30–50% of the water workforce will retire in the next 5–10 years, and national projections anticipate roughly 10,700 operator openings per year nationwide, almost entirely to replace retirees. ADEQ administers Arizona's operator certification program, but no statewide public dataset tracks certification counts, time-to-hire, or vacancy duration information utilities consistently report informally as problematic, particularly for small systems. EPA's 2024 Interagency Water Workforce report identifies effective practices (paid training pathways, structured progression, partnerships with community colleges), but adoption is uneven and often resource-constrained.

FUNDING

Sustainable funding remains among the most critical challenges facing Arizona's drinking water utilities. Large urban providers Phoenix, Tucson, Mesa, Chandler, Scottsdale, and others have diverse customer bases and can issue debt, adjust rates, and access federal and state financing. Rates in these cities typically run \$40–\$55 per month for a residential customer, or roughly 1.0–1.5% of median household income (MHI), well under the 2.5% affordability threshold commonly used nationally.

Smaller and rural utilities face a different financial picture. Limited customer bases make modest rate increases disproportionately burdensome; bond market access is constrained; and compliance costs per customer are higher because fixed costs spread over fewer ratepayers. In rural systems across Arizona, monthly water bills can reach 3% or more of local median household income, with the burden most acute in small communities where aging infrastructure and thin customer bases drive higher per-connection costs. Tribal systems, often dependent on grant funding, face additional challenges securing stable long-term financing for upgrades. Communities with declining or stagnant populations must also spread

fixed costs over shrinking customer bases.

Federal and state funding has substantially increased since the 2020 Report Card. The Infrastructure Investment and Jobs Act (IIJA), enacted in 2021, provided approximately \$55 billion nationally for water infrastructure over five fiscal years, including supplemental Drinking Water State Revolving Fund (DWSRF) capital, dedicated lead service line replacement funds, and a \$4 billion emerging-contaminants set-aside targeting PFAS. Arizona's share represents roughly a four-fold increase over pre-IIJA DWSRF levels. For FY2025, Arizona's base DWSRF capital grant is approximately \$19 million, supplemented by appropriations for general projects, lead service line replacement, and emerging contaminants. Over the past decade, Arizona communities have received more than \$400 million in low-interest DWSRF loans. IIJA supplemental funding expires in 2026, and regular DWSRF appropriations have historically been much lower meaning the state's current pace of investment is not assured.

FUTURE NEED

Arizona's population grew from 7.16 million in 2020 to 7.58 million in 2024 (5.9% growth) and is projected to continue expanding across Maricopa and Pinal counties and the Tucson region. Planning projections assume net increases in total demand even as per-capita use declines, and ADWR and utility planners routinely plan for 10.5 million residents by 2050 under central scenarios.

Future need in Arizona is shaped by three concurrent pressures. First, utilities must expand capacity for new customers in fast-growing metro areas and for industrial users with continuous, high-quality water demands. Second, utilities must renew or replace aging assets mains, pumps, tanks, and treatment at a scale commensurate with the \$12 billion EPA 20-year needs estimate (not including Tribal systems), with approximately \$7.5 billion of that total for distribution, \$2.2 billion for treatment,

and the balance for storage. Third, utilities must augment supply through reuse, aquifer recharge, conservation, and in some cases desalination and long-haul transfers, to offset reductions in Colorado River deliveries and groundwater availability outside AMAs.

Regional pressures differ. The Phoenix-metro faces the largest absolute Colorado River exposure after 2026 and is leaning heavily into Advanced Water Purification, expanded reclaimed water integration, and proposed storage projects such as Bartlett Dam expansion. Tucson and southern Arizona continue to grow but with tighter groundwater constraints and strong reliance on Central Arizona Project recharge. Rural and Tribal systems often face the compounding challenges of thin margins, lower climate resilience, and ongoing overdraft risk.

Table 1. Arizona population and per-capita water use, historical and projected

Year	Arizona population	Per-capita use (GPCD)**
2000	5,131,000	150
2010	6,392,000	140
2020	7,158,000	138
2025	7,600,000	137**
2050 (proj.)	10,500,000	130**

* Per-capita values are approximate, interpolated across Active Management Areas
 ** Based on Active Management Area projected demand declines

Source: ADWR, University of Arizona MAP Dashboard

PUBLIC SAFETY

Protecting public health is the foremost responsibility of Arizona's drinking water systems. Arizona utilities operate under the federal Safe Drinking Water Act (SDWA) with oversight from the Arizona Department of Environmental Quality (ADEQ). Most Arizona systems maintain compliance with federal standards; in any given year, a small number of small and rural systems report violations, typically related to monitoring and reporting rather than acute health-based exceedances. Core compliance areas include lead and copper monitoring

(particularly in distribution systems serving older housing), microbial monitoring (total coliform and E. coli), disinfection byproduct management (made more challenging by Arizona's warm climate), and routine residual disinfectant, sanitary survey, and emergency response protocols. Lead service lines are comparatively rare in Arizona as the state's building stock is newer than in older industrial regions, but utilities are completing service line inventories as required under the revised Lead and Copper Rule.

Emerging contaminants. Per- and polyfluoroalkyl substances commonly known as PFAS, a family of long-lasting synthetic chemicals in use since the 1930s have become the dominant emerging-contaminant concern for Arizona’s water suppliers. Scientific studies link PFAS exposure to cancer, immune-system effects, and developmental and reproductive effects. EPA has finalized federally enforceable Maximum Contaminant Levels (MCLs) for six PFAS compounds, with compliance required by 2029. Utilities exceeding the new limits will need to implement treatment such as granular activated carbon, ion exchange, or reverse osmosis, each requiring significant capital and ongoing operating costs; nationwide compliance is projected to cost more than \$50 billion over 20 years. Arizona has taken a proactive approach: ADEQ launched a screening program targeting wells near high-risk areas, and in 2022 announced a \$3 million WIFA-funded effort to test every public water system in the state. Initial results were encouraging 94% of public water systems tested at non-detect or below EPA Health Advisory Levels. Other emerging contaminants microplastics, pharmaceuticals and personal care

products, cyanotoxins from harmful algal blooms, and endocrine-disrupting compounds are present in trace amounts but are generally well controlled by conventional treatment (coagulation, flocculation, sedimentation, and filtration) and/or advanced treatment technologies.

Equity and public trust. Public health accessibility and experience vary significantly across Arizona. Small and rural systems often lack the funding, certified staff, or technical capacity to meet growing testing and treatment requirements. Tribal systems face unique jurisdictional and funding challenges. Lower-income households disproportionately bear the cost of bottled water when trust in tap systems falters a dynamic that reinforces the importance of clear, timely Consumer Confidence Reports, proactive communication during contamination events, and sustained community engagement. Closing equity gaps requires targeted financial support (DWSRF disadvantaged-community set-asides, WIFA programs, USDA and Indian Health Service funding) and technical assistance, paired with communication practices that maintain public trust.

Public health accessibility and experience vary significantly across Arizona. Small and rural systems often lack the funding, certified staff, or technical capacity to meet growing testing and treatment requirements.

INNOVATION & RESILIENCE

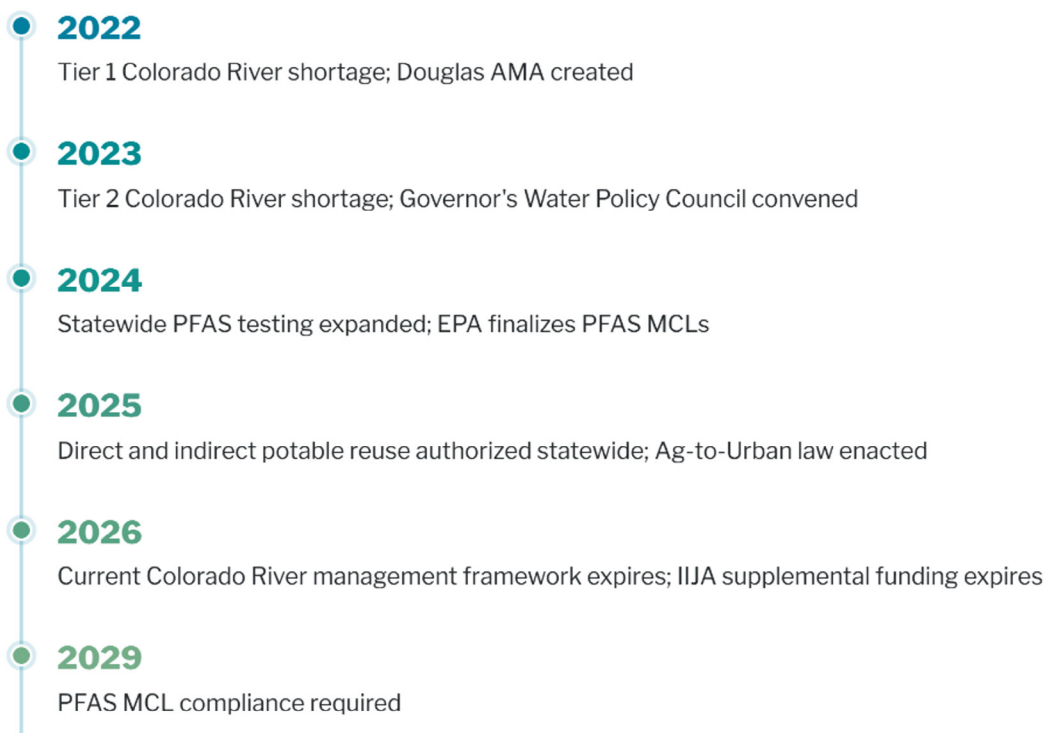
Warming temperatures (approximately 3.3°F since 1970, with another 5–10°F projected by 2100 depending on emissions pathway), a 20+ year Colorado River megadrought, Tier 1 and Tier 2 shortages, groundwater decline in rural basins, more frequent and severe wildfire in northern Arizona watersheds, and sustained population and industrial growth all reinforce the same message: innovation and resilience planning are now core business, not optional.

State-level leadership. The most consequential policy change of this reporting cycle came in 2025, when ADEQ revised the Arizona Administrative Code to authorize both direct and indirect potable reuse statewide moving Advanced Water Purification from pilot-scale to a clear regulated pathway under the SDWA. Scottsdale’s indirect potable reuse program and Phoenix’s demonstration projects now have a defined route for expansion, positioning Arizona as

a national leader in potable reuse with Tucson Water having advertised and selected a design-builder for their AWP facility. The Governor’s Water Policy Council, convened in 2023, continues work to modernize the 1980 Groundwater Management Act with particular focus on rural basins outside AMAs. The 2025 “Ag-to-Urban” law allows developers in AMAs to retire irrigated agricultural land to secure assured supplies for new subdivisions, paired with enhanced aquifer recharge requirements. WIFA has prioritized projects with resilience benefits PFAS treatment, aquifer recharge wells, and innovative conservation projects and alternative project delivery (CMAR, progressive design-build) is now broadly authorized for water projects, supporting faster adaptation.

Local and regional innovation. Arizona utilities are actively piloting and scaling innovative approaches. Phoenix has expanded aquifer recharge, financed main replacements through WIFIA, and deployed advanced SCADA for pump optimization. Tucson Water operates one of the largest groundwater recharge programs in the Southwest and a nationally recognized Pipeline Protection Program. Scottsdale was among the first U.S. cities to operate an indirect potable reuse facility and is now expanding toward direct reuse demonstrations. Flagstaff pairs proactive watershed protection through the Four Forest Restoration Initiative (4FRI) with strong public engagement around reuse. Rural communities are building resilience through shared services, cooperative operator staffing, and ADEQ and Rural Water Association partnerships.

ARIZONA DRINKING WATER KEY POLICY MILESTONES 2020-2029



Drinking Water



RECOMMENDATIONS TO RAISE THE GRADE

- **Sustain and grow DWSRF capacity.** Preserve IJJA-level funding beyond 2026 through continued federal appropriations and/or a renewed state match, with emphasis on disadvantaged-community forgivable principal.
- **Close the rural groundwater gap.** Advance GWPC recommendations to extend management tools to rural basins outside AMAs, including monitoring, reporting, and where warranted withdrawal limits.
- **Accelerate asset management in small systems.** Expand targeted technical assistance (ADEQ, Rural Water Association, WIFA) to bring asset inventories, risk-based renewal planning, and financial stress-testing to small and Tribal systems.
- **Build the workforce pipeline.** Scale paid training pathways, community college partnerships, and structured operator progression statewide; publish annual data on certifications, vacancies, and time-to-hire.
- **Complete PFAS compliance on schedule.** Fund PFAS treatment at impacted systems, prioritizing disadvantaged communities, to meet the 2029 MCL deadline without bill shock.
- **Scale Advanced Water Purification.** Move from pilot to full-scale potable reuse in the Phoenix and Tucson metros, using the 2025 regulatory authorization as a springboard.
- **Modernize digital operations.** Expand SCADA to distribution, accelerate AMI deployment, integrate data platforms, and meet AWIA cybersecurity and resilience-assessment requirements in all covered systems.



Photo: Frederick Tack

Drinking Water



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Energy



GRADE
COMPARISON

AZ: C
Nat'l: D+



ENERGY

EXECUTIVE SUMMARY

Arizona's energy infrastructure is defined by strong electricity generation capacity, growing renewable resources, and nationally significant assets such as the Palo Verde Nuclear Generating Station. The state now produces more electricity than it consumes, allowing it to continue exporting power to neighboring states. However, aging infrastructure, rising demand, and weather events present ongoing challenges in this field. Natural gas remains a reliable primary fuel for electricity generation making up 45% of all electricity generation, supported by an extensive pipeline network, and renewable resources, particularly solar which make up 13% of electricity generated. Population growth, rapid industrial expansion, and the surge in data centers are placing new strains on the grid, putting stress on the need for modernized systems, expanded storage, sustainability and resilience-focused investments. If the state continues to focus on upgrading aging assets, strengthening reliability, supporting innovation (renewables and storage), and aligning funding with future needs, which are supported by ongoing investments such as the \$2 billion in annual Arizona Public Service utility spending and the \$183 million dollars in recent federal grid resilience grants, Arizona is well positioned to maintain a secure, adaptable, and sustainable energy system for decades to come.

CONDITION AND CAPACITY

According to the U.S. Energy Information Administration in 2024, 52.4% of Arizona's energy usage was devoted to transportation, 12.2% to industry, 18.7% to residential, and 16.6% to commercial uses. Despite being a net exporter of electricity, Arizona is a net importer of energy; it uses about four times more energy than it produces. In-state production is almost completely via nuclear energy and renewables; no coal has been produced since 2019.

Natural Gas

In Arizona, natural gas and oil reserves are small. Natural gas was the primary fuel used for electricity generation in 2024, with 6 of the 10 power plants in Arizona being natural gas-fired generating over 45% of the state's electricity. Electricity generation consumes over 80% of natural gas delivered to the state of Arizona. Besides being a large part of the electricity generation, natural gas is also used for heating and cooking in one out of

every three homes in the state. Most customers are served by one of two distribution utilities, Southwest Gas Corporation and UniSource Energy. Overall, Arizona's usage of natural gas was ranked as 36th in the nation.

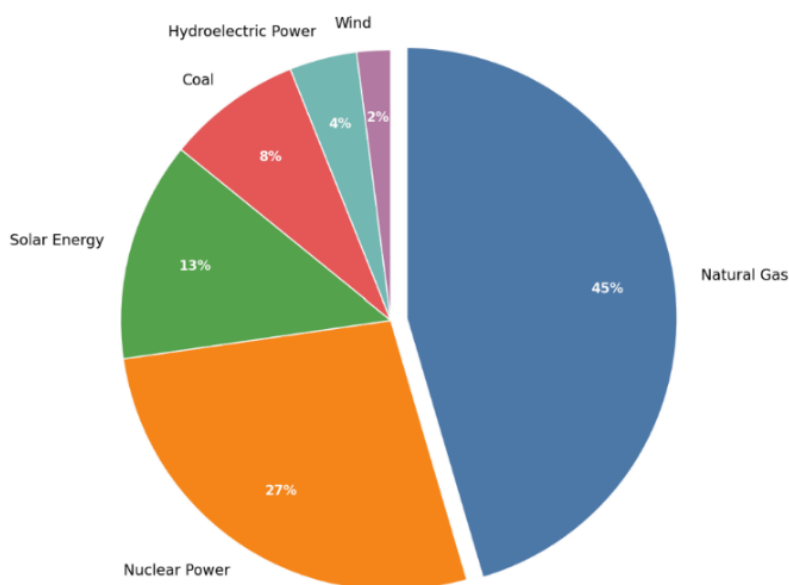
An extensive network of interstate natural-gas pipelines, about 44,000 miles crosses the state to serve distribution networks within the state, transported from supply basins located in Texas and New Mexico and continuing on to serve California and other neighboring states, and Mexico. Much of system was built in the 1950's and 1960's. Existing interstate natural gas pipelines are 100% subscribed, and interstate pipeline companies Transwestern Pipeline and El Paso Natural Gas (EPNG), owned by Kinder Morgan, both have planned expansion projects. Except for one small liquefied natural gas (LNG) storage facility owned by Southwest Gas Corporation in the Tucson area for distribution peak shaving, there is

no natural gas storage in Arizona. Kinder Morgan is also exploring interest in its Arizona Energy Storage (AES), with potential capacity of 4 BCF of working storage in bedded salt dome caverns near Eloy, Arizona.

Electric

The Arizona Corporation Commission (ACC) lists 16 regulated electric utility companies located throughout the state. The three largest providers in the state are Arizona Public Service (APS), Salt River Project (SRP) and Tucson Electric Power (TEP). SRP, which is one of the top three providers, is government owned and not regulated by the ACC. In 2024, Arizona's total in-state electricity was generated mainly from 6 sources: natural gas (45%), nuclear power (27%), solar energy (13%), coal (8%), hydroelectric power (4%), and wind (2%) (see Figure 1). Arizona ranks #15 in total net electricity generation at 7,447 kilowatt hours.

Figure 1. Energy Mix by Source

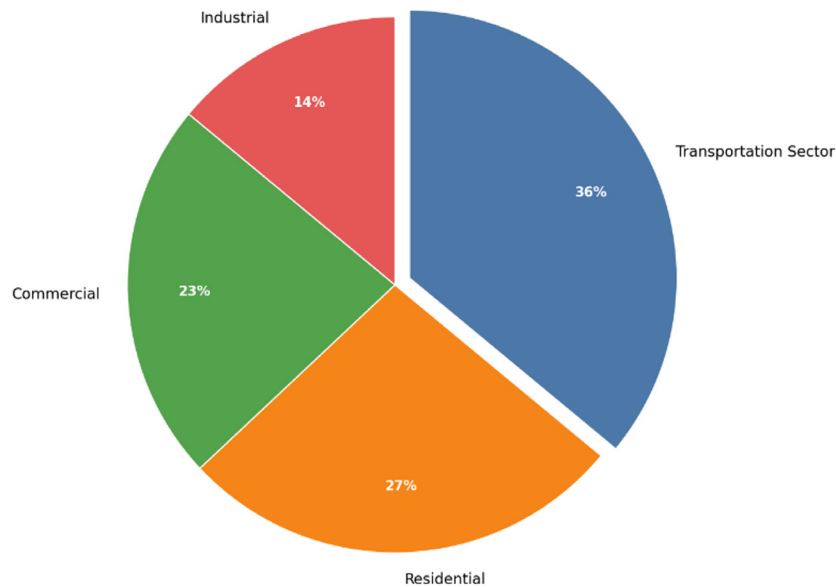


Source: U.S. Energy Information Administration

In 2023, the transportation sector consumed 37% of electricity produced, compared to residential (27%) commercial customers (23%), industrial customers (14%) (see Figure 2). In addition, Arizona has 4,736

public electric vehicle charging stations as of July 2026. Arizona provides out of state consumers one-fifth of what the state produces via the regional grid connected to adjacent states.

Figure 2. Arizona Electricity Consumption by Sector



Source: U.S. Energy Information Administration

Arizona's electrical infrastructure consists of tens of thousands of miles of high-voltage transmission lines and localized distribution circuits. This grid serves as the energy corridor for the American Southwest, which provides high-voltage paths that export and trade power between California, New Mexico, Utah, and Nevada. These vast majority of these transmission systems are owned and maintained by APS, SRP, and TEP. This bulk transmission system heavily relies on 500 kV, 345kV and 230 kV overhead transmission lines, with vital corridors originating from the Palo Verde Generating Station to move energy loads across state lines.

The state's utility landscape varies and is tailored to regional urban and rural populations. Arizona Public Service manages over 35,000 combined miles of transmission and distribution infrastructure to serve more than 1.25 million customers. Salt River Project maintains an extensive 500 kV AC network connecting the Phoenix metropolitan area to regional generation plants, supplying power to over 1 million customers. In Southern Arizona, Tucson Electric Power relies heavily on 138 kV and 345 kV lines to serve over 400,000 customers. Rural and agricultural regions are heavily supported by cooperatives like Arizona G&T Cooperatives (AEPKO), which operates 852 miles of high-voltage transmission lines and 37 substations to provide wholesale power

to multiple distribution cooperatives. The distribution voltages for all providers vary from 69 kV to 4 kV.

WAPA's (Western Area Power Administration) Desert Southwest Region operates and maintains approximately 3,100 miles of high voltage transmission lines along this region, which includes southern California, southern Nevada and Arizona which contains the majority of these assets.

Nuclear

The Palo Verde Nuclear Plant, owned by APS, is the second largest in the United States. Even though this is the only operating plant in Arizona, it produces a major portion of the state's power. Earlier this year, APS, SRP, and TEP, announced a collaboration to pursue new nuclear facilities potentially by 2040. A joint application for a grant was submitted to the U.S. Department of Energy. No decision has been announced as of early 2026, which introduces uncertainty regarding available federal funds for nuclear infrastructure in the state.

Renewables (Solar, Wind, Hydropower and RNG)

In 2024, approximately 20% of electricity generation came from renewable resources. The breakdown is approximately: 13% solar energy, 4% hydroelectric power, and 3% wind.

The state's achievements in solar-powered electricity ranked fourth among the nation, only behind California, Texas and Florida. These sources were large scale photovoltaic facilities (61%), rooftop solar panels (34%) and the remaining (5%) came from utility scale solar thermal installations. Hydroelectric power had some struggles, as 2024's production was the lowest in two decades due to lack of rainfall. The two main sources of hydroelectric power in Arizona are Glen Canyon Dam and Hoover Dam reservoirs. Wind power is expanding in Arizona; the state ranks among the top five in wind energy potential and currently has nine large-scale wind farms.

Finally, Renewable Natural Gas (RNG) is an emerging and expanding resource in the state. Currently, the state of Arizona has six operational RNG facilities. Southwest Gas Corporation operates four of these facilities, including three located at dairy farms and one associated with a wastewater treatment facility. In addition, Ameresco Inc. operates an RNG plant located in Phoenix, AZ and Chevron USA, in partnership with Brightmark, opened an RNG plant in Eloy, AZ. According to the American Gas Association, the state of Arizona has the potential to produce 43 trillion BTU of RNG per year by 2040.

OPERATION AND MAINTENANCE (O&M)

The majority of Arizona's electric and natural gas infrastructure is owned, operated, and maintained by regulated utility companies through oversight of compliance with state and federal requirements by the ACC. Exceptions include publicly owned energy entities (i.e. SRP). However, across the state, energy infrastructure management relies on continuous data-driven monitoring of facilities' health, condition, capacity and performance. Maintenance practices are largely preventive in nature through inspections, predictive analytics, etcetera; however, reactive maintenance is necessary in some instances due to failures, system deficiencies, etc.

Although Arizona currently only has one nuclear plant in operation, Palo Verde Generating Station, it has the second largest nuclear generation capacity nationwide producing approximately 3,937 GW. Its associated costs for O&M are relatively low per unit due to its scale. This nuclear plant is unique in that it is not located near a large water source; instead, it recycles 20 billion gallons of wastewater annually for cooling. According to the World Nuclear Association, the cost of handling nuclear waste is relatively low compared to the cost of generating nuclear energy. In Arizona, there is not a designated site for radioactive waste, so waste is stored on-site, consistent with current practices across the United States, which requires long-term monitoring and safety challenges.

FUNDING AND FUTURE NEED

The funding of energy infrastructure in Arizona is broken down into four main categories: federal funding, state level/ local funding, regulated utilities and private investments. Arizona has a diverse portfolio of funding avenues to support its energy infrastructure, seeking to improve grid resiliency, energy efficiency and clean energy.

Federal Funding

Federal funding for Arizona's energy infrastructure flows primarily through the Departments of Energy and Transportation. Within the past few years, significant federal dollars have been committed to Arizona through the Infrastructure Investment and Jobs Act (IIJA), which is focused on improving physical infrastructure and grid

resilience. As of January 2025, \$183 million in grid resilience funding had been announced in Arizona through the IIJA. For example, Kohler was awarded \$51.2 million for its Electric Boiler and Microgrid System project, which will install electric boilers and a microgrid to reduce carbon dioxide emissions by an estimated 7,865 metric tons annually. The project will also demonstrate the feasibility of using renewable energy and microgrid systems to decarbonize process heat emissions across a broad range of manufacturing operations.

Additionally, a \$477 million award is going to the Southline Transmission Project, which will construct a 175-mile, 748-megawatt transmission line connecting

Hidalgo County, New Mexico, and Pima County, Arizona. By expanding transmission capacity and upgrading aging infrastructure along existing rights of way, the project will help deliver renewable energy generated in southern New Mexico to growing markets in Arizona that currently rely on fossil fuel-based electricity. The project is also expected to reduce regional transmission congestion and support long-term grid reliability.

In the transportation sector, the U.S. Department of Transportation through (FHWA) has allocated approximately \$76.5 million to Arizona through the National Electric Vehicle Infrastructure (NEVI) to expand highway EV charging networks.

The 2025 One Big Beautiful Bill Law has reversed some incentives and funding. For example, the Indian Hopi Nation had a \$25 million grant under the IRA canceled that would have powered 600 homes but will now only power 100. This underscores the importance of continued consistent funding to support energy needs in communities across the state.

Regulated Utilities & Private Investments

In Arizona, most electric and gas utilities fund their infrastructure via capital investments that are later recovered from ratepayers. This is regulated by the ACC, which currently oversees a total of 15 electric utilities and 6 gas utilities. The ACC facilitates cost recovery through rate-cases. Some of the capital investment that can be recovered includes, but is not limited to, replacement of aging infrastructure, installation of new systems transmission and distribution systems, storage, grid modernization, renewable energy and clean energy projects. In addition, supportive policies, demand and revenue opportunities catalyze private investments on energy infrastructure, such as Power Purchase Agreements, in which private investors partner with utilities to sell power to regulated utilities, with approval of the ACC. Some common private investments for energy infrastructure in Arizona include battery storage and solar farms.

In addition, Utilities' Grant Funding Program is a utility-led initiative by TEP, APS and SRP to support and allot funds to subsidize communities affected by the federal push to move away from coal-fired plants. These utilities

pledged a combined \$1 million for this program.

Arizona electric rates as of April 2026 were 15% lower than the national average at 18.83 cents per kWh. While these rates are lower than the national average providers like SRP, APS utilize time-of-use pricing models that charge more during peak demand hours in the summer months from 3 – 8 pm when electricity is 2 – 3 times more than off-peak hours. Rates in Arizona have shown small but steady increases year to year and increased 15.49 cents per kWh to 15.76 per kWh showing a 1.7% increase year to year.

In Arizona, residential natural gas rates have fluctuated due to market volatility and recent utility rate hikes. Arizona currently sits \$20.88 per thousand cubic feet which is 13% higher than the national average rate of \$18.11 per thousand cubic feet excluding Hawaii with the largest dollar per thousand cubic feet of \$70.84 per thousand cubic feet. In March 2025, the ACC approved a base rate increase, adding about \$3.75 to the average monthly bill of residential customers being served by Southwest Gas Corporation. In January 2026, the Monthly Gas Cost rate dropped to \$0.369 per therm from previous \$0.378 per therm, passing along savings to Southwest Gas Corporation customers. With increase in operational costs Southwest Gas Corporation submitted a general rate case application that if approved could increase residential customers bill \$5.18 per month effective April 2027. These investments will help maintain and upgrade natural gas pipelines for safety and reliability.

State/Local Funding

State and local funding for energy infrastructure in Arizona is minimal compared to federal funding and investments from utilities. Arizona Governor's Office of Resiliency was established in 2023 to support local funding for clean energy at a residential level, along with grants to expand grid resilience. The FY2026 budget for the state will dedicate \$1.5 million for technical research to unleash geothermal potential in the state.

The state also launched a new Energy Efficiency Revolving Loan Fund program, making \$1 million available through qualified lending institutions to support energy efficiency upgrades and retrofits for privately owned commercial buildings. The program prioritizes financing for small

businesses in rural and tribal communities, with eligible projects required to demonstrate cost-effective energy savings and improve building energy efficiency, occupant comfort, indoor air quality, or energy management.

FUTURE NEED

Arizona's population is rapidly increasing – from 7.2 million to 7.6 million between 2020 and 2025 – resulting in increasing energy demands. In addition to this, Arizona has become an attractive landing spot for some key industries, such as data centers, semiconductor manufacturing and advanced manufacturing. The state has become one of the top three states with the most data center growth based on AI-related venture investments at \$2.6 billion.

According to the Electric Power Research Institute, by 2030, data centers could account for as much as 16.5% of the state's total electricity use, more than double their current share. This trend is straining the grid and prompting discussions about special tariffs, renewable energy mandates, and even advanced solutions like

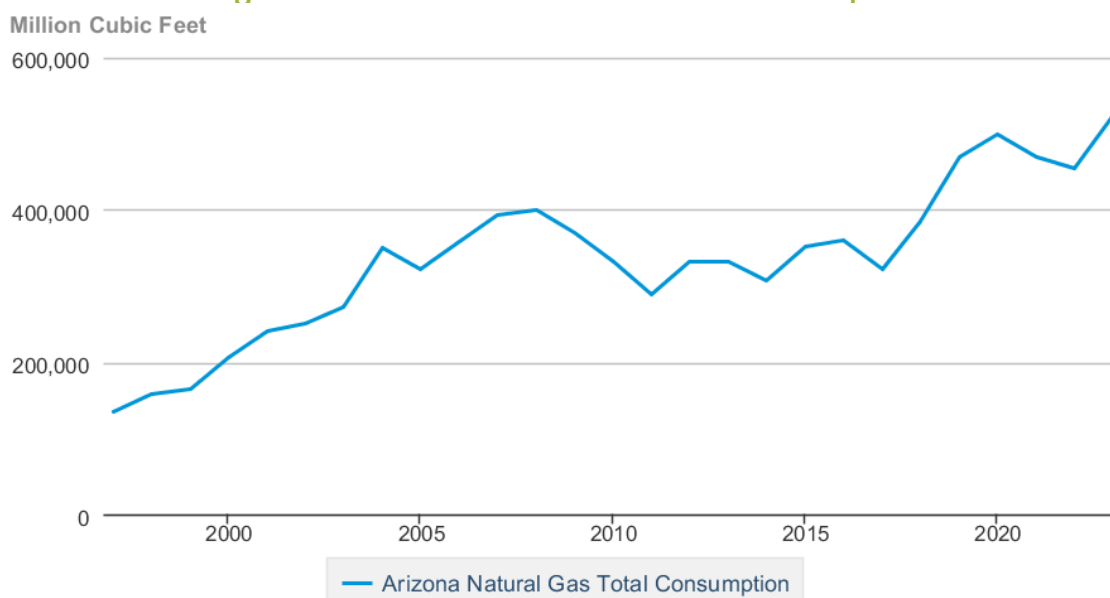
Funding can support measures recommended through an energy audit, including geothermal systems and certain solar-plus-storage projects, helping businesses reduce energy consumption and peak demand.

small modular nuclear reactors to ensure reliability and affordability.

APS, the largest electric provider in the state, expects energy use to increase 40% between 2024 and 2031. In the next 15 years, APS expects that the grid will need to double in size to maintain its current output.

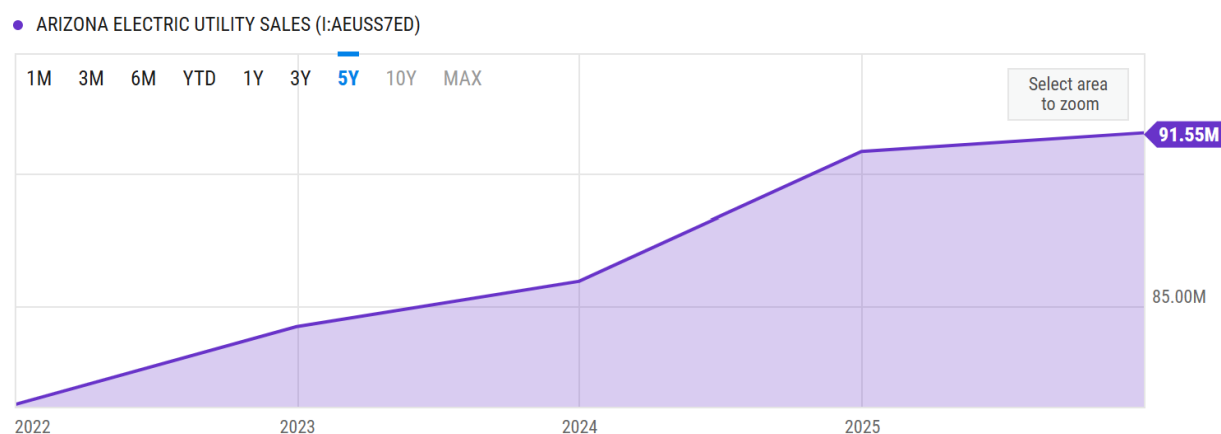
APS disclosed in their 2024 annual report that Arizona's electricity sales growth was due to industrial and commercial customers, not residential. The ACC reported for a third year in a row that Arizona electric utilities, set new records for peak demand. At the same time, natural gas consumption continues to trend upwards (see Figure 3), and electricity consumption has also been steadily increasing for the past five years (see Figure 4).

Figure 3. Arizona Natural Gas Total Consumption



Source: Energy Information Administration

Figure 4. Arizona Electric Utility Sales



Source: YCharts

PUBLIC SAFETY & RESILIENCE

Arizona's energy infrastructure faces resilience challenges from severe weather threats in the state, including extreme heat that heightens wildfires risks, monsoon storms with high winds, flooding, lightning, and dust storms.

Arizona benefits from one of the nation's most reliable and resilient electrical grids. Between 2000 and 2023, only about 32% of the state's major power outages were attributed to extreme weather, compared with more than 80% nationally, and Arizona experienced just six weather-related major outages during that period. The state's grid also remained stable through record-breaking heat and peak electricity demand in recent years, reflecting the resilience of its energy infrastructure and its ability to maintain reliable service during extreme climate conditions.

While major utilities in the state provide real-time outage maps that keep residents informed of outage locations and in some cases, approximate restoration times, and the likelihood of power or natural gas outages remain relatively low due to the minimal chance of a major natural disaster, such as earthquake, hurricane, tornadoes, etc. However, the potential consequences for public health and safety are severe. According to recent studies, if a multiday blackout were to coincide with a heat wave, severe public health consequences would occur: in such a scenario, up to half of Phoenix's residents, the largest city in Arizona with over 1.6 million residents, could require medical attention, with residents of surrounding towns and cities facing similar risks.

Arizona has recently advanced energy resilience planning through the Arizona Energy Promise Taskforce, a 36-member public-private body established to address rapidly growing electricity demand driven by population growth, economic expansion, and extreme heat. The Taskforce's March 2026 report delivers 31 consensus recommendations focused on affordability, reliability, and resilience, including accelerating energy generation and transmission projects through streamlined permitting, strengthening the future energy workforce, modernizing grid infrastructure, and improving community engagement around energy development. The recommendations also promote energy efficiency, virtual power plants, distributed solar, energy storage, transmission upgrades, and low-carbon firm power resources while exploring emerging options such as geothermal and advanced nuclear energy. In addition, the report seeks to reduce infrastructure bottlenecks, prevent cost shifting from large industrial energy users to households and small businesses, expand regional transmission planning, and enhance long-term grid flexibility to support Arizona's continued economic growth while maintaining reliable and affordable electricity for residents. Complementing these long-term planning efforts, Arizona is making significant investments in grid resilience and modernization, including a recent commitment of \$15.6 million in resilience grants, leveraging a total of \$27 million with matching funds, to strengthen critical energy infrastructure and reduce outage risks for approximately 290,000 utility customers across the state.

INNOVATION

Arizona's energy technology is advancing through initiatives such as development of energy storage systems and emerging clean energy solutions that have not been implemented largely within the state yet. This presents an opportunity to invest in research and implementation of promising technology that would allow strengthening the grid and potentially increase clean energy usage and reduce energy costs, along with increasing clean energy usage in the state. One area of growing interest is geothermal energy, which is currently undeveloped in the state, but has become increasingly scalable in recent years. Early in 2026, the Arizona Governor's Office of Resiliency release its 2027 executive budget proposal, which secures \$1.5 million for geothermal energy research aimed at assessing the

state's subsurface portfolio for its potential to introduce geothermal energy systems in the state.

While Arizona has significant potential for solar energy generation, renewable energy sources such as solar and wind introduce some concerns, such as variability and grid balancing challenges. The integration of renewable energy with storage technology represents a key focus of innovation statewide. In recent years, Arizona has been incorporating storage from renewable resources via Battery Energy Storage Systems (BESS). Recent projects, led by Arizona Public Service and Salt River Project, are incorporating BESS into large-scale renewable designs to be able to store excess energy that is being produced. These efforts demonstrate its potential, effectiveness and utility scalability.



Energy



RECOMMENDATIONS TO RAISE THE GRADE

Enhance grid reliability while maintaining affordability

- Balancing priorities such as reliability, sustainability and cost, increasing flexibility in favor of consumers.

Upgrade and modernize aging infrastructure

- Invest in the replacement of aging transmission and distribution systems to reduce outage risks.

Maintain and optimize a diverse energy portfolio

- Advocate for balanced mix of energy resources in the state between more stable sources of energy and renewable sources.

Continue investing and implementing emerging technology

- Expand the implementation of new technology such as utility-led battery storage systems paired with renewables, geothermal energy, etcetera.

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Levees



GRADE
COMPARISON

AZ: C

Nat'l: D+



LEVEES

EXECUTIVE SUMMARY

Levees are a critical part of Arizona's flood risk management system, protecting hundreds of thousands of residents and tens of billions of dollars in assets. Since 2020, the state has made progress inventorying levees, advancing risk-informed planning, and securing federal funding, including through the Infrastructure Investment and Jobs Act (IIJA). However, significant gaps persist in system-wide condition assessment, long-term funding, and coordinated management across jurisdictions. Arizona's levee portfolio continues to age, with most systems between 35 and 60-years in service life. Development continues to expand in areas protected by levees, while shifting and uncertain future hydrologic conditions increase risk exposure. Despite notable investments in urban areas, particularly in Maricopa and Pima Counties, most levees remain under local or regional ownership with limited dedicated funding for inspection, maintenance, and rehabilitation. Without accelerated investment, improved inventory and assessment and stronger statewide coordination, Arizona's levee systems will face increasing risk of failure, threatening public safety, economic stability, and community resilience.

BACKGROUND

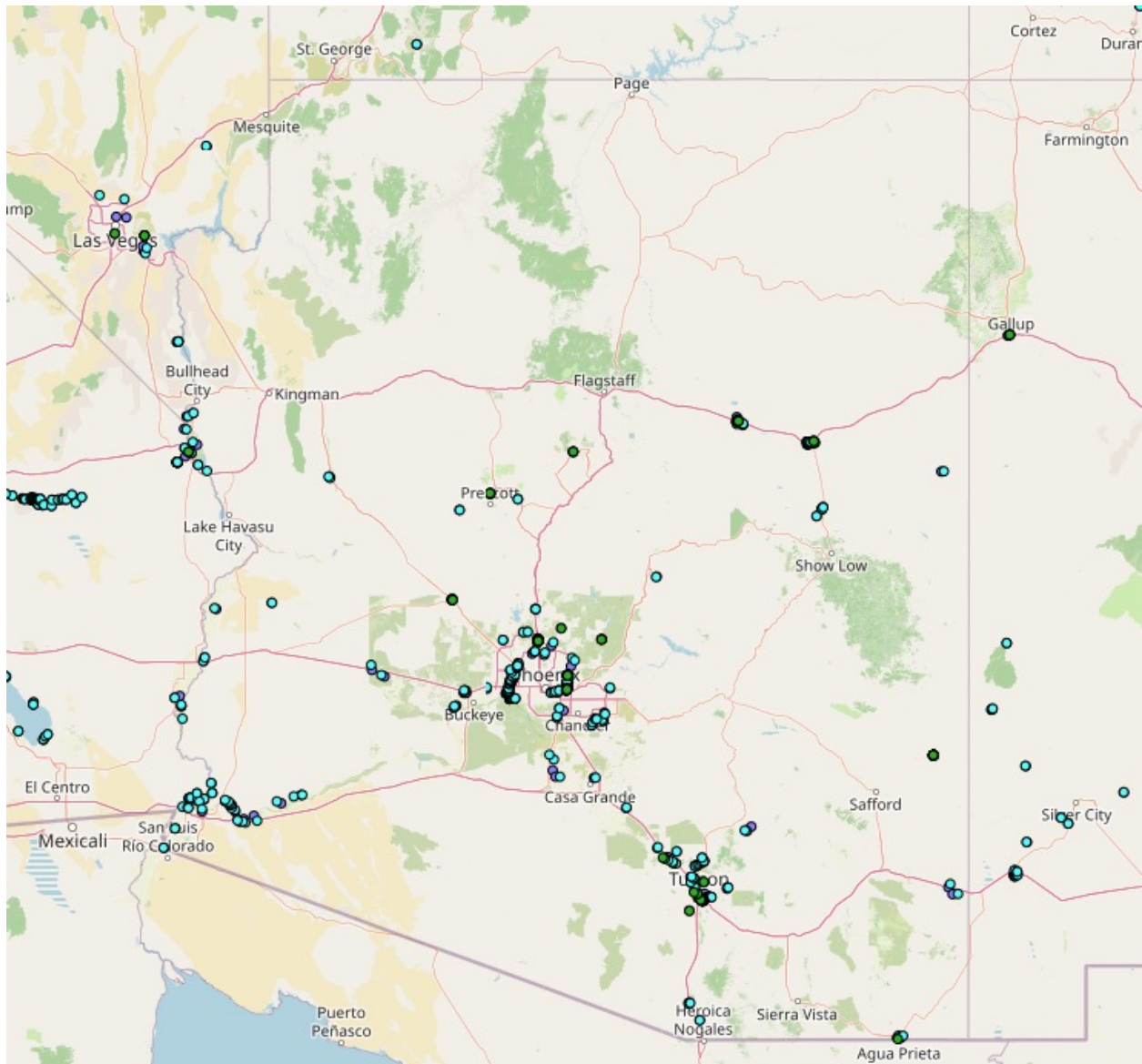
Levees in Arizona enable economic development and provide critical protection from riverine flooding, particularly along major systems such as the Salt, Gila, Santa Cruz, and Colorado Rivers. These structures include earthen embankments, cement-stabilized aggregate, and structural flood control channels.

As of 2025 there were over 6,200 total levee systems, totaling a combined length of over 23,000 miles in the United States, with at least 159 levee systems in Arizona, totaling approximately 387 miles, protecting approximately 345,000 people and \$60 billion in assets, including over 112,000 structures. Since

that time, continued population growth, especially in central Arizona, has increased reliance on levee protection systems. As of 2025, between 50 and 70 levee systems were inventoried in the National Levee Database (NLD).

Levees do not eliminate flood risk; rather, they reduce it. Residual risk remains should these levees become compromised due to overtopping, seepage, structural failure, or events exceeding design capacity. As such, ongoing investment in inspection, maintenance, and modernization is essential in concert with other stormwater and drainage infrastructure management.

Figure 1 - Map of Arizona Levee Systems



National Levee Database Excerpt, 2026

CAPACITY & CONDITION

The NLD, maintained by the U.S. Army Corps of Engineers (USACE), remains the primary inventory tool for levee systems nationwide. According to that database, Arizona contains approximately 143 mapped levee systems, reflecting one of the largest inventories in the arid Southwest. These systems are concentrated along the Gila, Salt, Agua Fria, Santa Cruz, Colorado, New, and Verde Rivers, as well as numerous flood-

control channels that protect rapidly urbanizing communities throughout Maricopa, Pima, Yuma, Pinal, and other counties. The inventory indicates that 63 levee systems are FEMA-accredited, 4 are Provisionally Accredited Levees (PALs), while 73 are classified as non-accredited, with a small number identified as having special FEMA mapping considerations.

Only a limited number of Arizona levees are currently

active participants in the USACE Rehabilitation and Inspection Program (RIP), while many others are listed as not enrolled or inactive, illustrating that much of the state's levee infrastructure is locally owned and maintained rather than federally supported. This places increased responsibility on local flood control districts and municipalities to conduct inspections, maintenance, and capital improvements necessary to sustain long-term flood protection.

As of 2025, only approximately 8% of levees in Arizona have been screened for a condition and risk analysis by the U.S. Army Corps of Engineers (USACE). While many levees in the state are inventoried in the NLD, the vast majority fall outside direct USACE jurisdiction and have not undergone condition screening. However, between 2020 and 2025, progress has still been made through local and regional projects, including targeted rehabilitation and post-fire flood protection investments.

However, despite those advancements, a substantial portion of Arizona's levees still lack comprehensive condition assessments, updated hydrologic and hydraulic analyses, and modernized design criteria. Furthermore, conditions within watersheds continue to change because of shifting land uses, changes in peak return event frequency, changes in the magnitude of storm events, and other climate related issues.

Urban levee systems, particularly in Maricopa County, have benefited from more frequent inspection and rehabilitation programs. However, rural and non-accredited levees remain at higher risk due to limited technical and financial resources. Aging infrastructure, sedimentation, vegetation encroachment, and erosion continue to degrade system performance. Additionally, post-wildfire hydrology and extreme storm events have introduced new stressors not fully accounted for in original designs.

**Figure 2 – Levee in Maricopa County, Arizona
Flood Control District of Maricopa County**



There are also notable successes: since 2020, the Maricopa County Flood Control District, which maintains numerous levees along the Agua Fria, New River, Salt River, and Gila River corridors have reported no major structural levee failures, continued routine inspections under USACE and FEMA programs, maintained systems that remain operational with acceptable performance ratings, and ongoing maintenance efforts focused on vegetation management, erosion repair, and preserving FEMA accreditation.

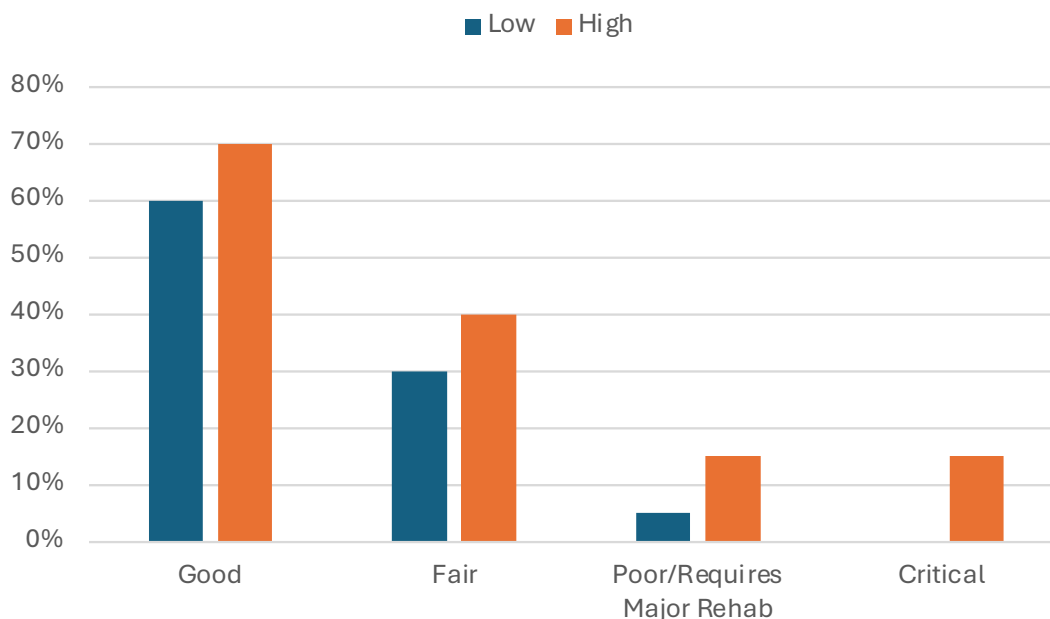
Pima County has been active in levee augmentation from 2020–2025. Following the 2020 Bighorn Fire, hydrologic studies showed increased flood risk and sediment deposition in the Cañada del Oro system. The county completed a major levee augmentation project in 2025 involving floodwalls, earthen berm raises, slope armoring and channel-capacity improvements. That project was completed in August 2025 and reflects proactive condition improvement rather than emergency repair. Additional projects such as the El

Rio Preserve levee improvements were completed in 2020 to enhance flood protection along the Santa Cruz River corridor.

Arizona does not publish a statewide condition index for all levees. Therefore, as based on evaluation by subject matter experts of available NLD records, county capital programs, and rehabilitation activities,

we have summarized our understanding of the current conditions, as documented, in the figure below. These results identify as many as 15% of the levees in Arizona may require significant rehabilitation, renewal or improvement, and that between 30% and 40% are only in fair condition.

Figure 3- Condition by Share of Portfolio (Estimated)



PUBLIC SAFETY

Levees provide critical life safety benefits but can create a false sense of security. As noted in 2020, levee failures can result in rapid inundation, evacuation challenges, and long-term community disruption.

Since 2020, Arizona has seen increased awareness of residual flood risk through FEMA Risk MAP updates, expanded emergency action planning and flood warning systems and greater emphasis on community outreach in leveed areas. However, gaps remain in:

- Public understanding of levee risk;
- Consistent emergency preparedness across jurisdictions;
- Mapping of residual risk behind non-accredited levees.

Population growth in leveed areas, referred to as “development creep”, continues to increase consequences of potential failure. However, there

have been individual projects and investments that demonstrate the ability to adapt and integrate the risk reduction from levee projects, with other natural and anthropogenic needs and impacts.

Project Proofs – Pima County Regional Flood Control District – Tucson Area Levee Improvements

The Pima County Regional Flood Control District has advanced multiple levee and bank protection projects tied to voter-approved bonds and regional flood mitigation programs.

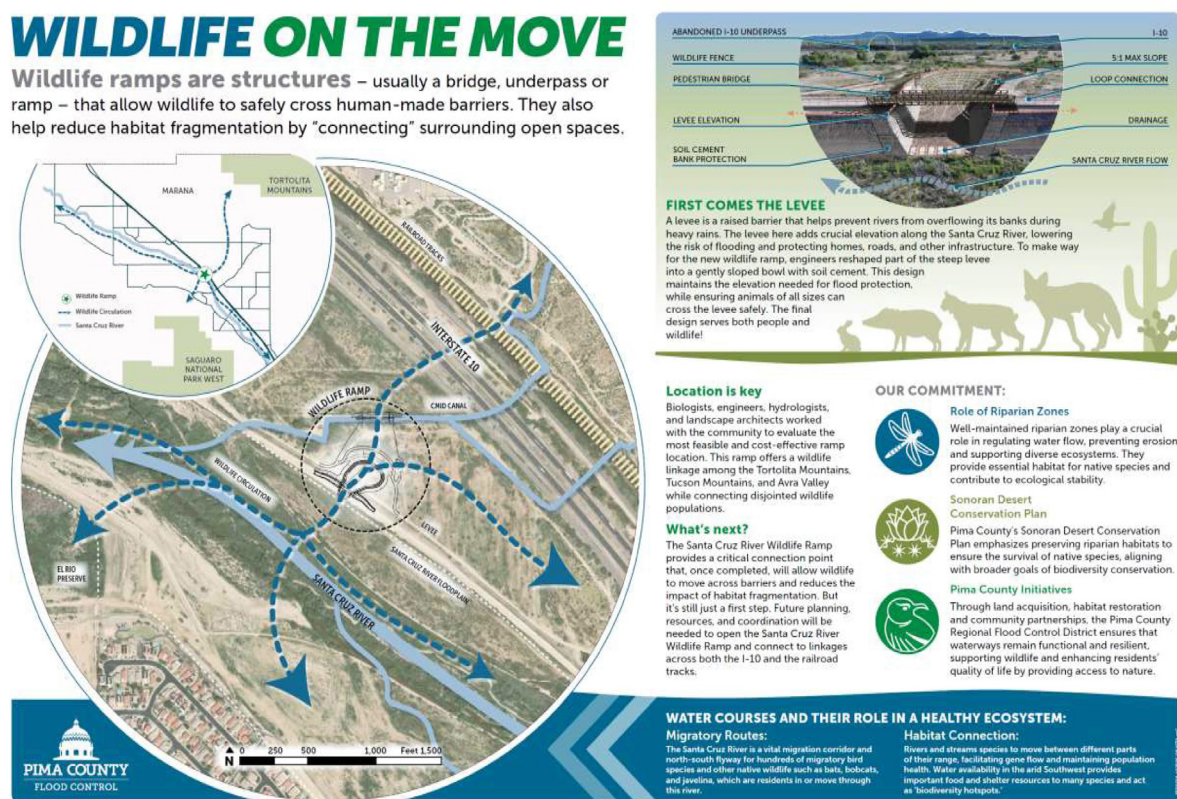
The Santa Cruz River levee and bank protection program included an investment of between \$20–40 million across multiple projects, which included funding from local bonds, county flood control funds and FEMA cost-share for projects including levee stabilization, grade control structures, and erosion mitigation to reduce the risk of channel migration and levee failure in urban Tucson.

Cañada del Oro Wash improvements included an investment of approximately \$10+ million for bank protection and flood conveyance improvements to enhance the protection for residential and transportation infrastructure.

The Santa Cruz River Wildlife Ramp Project is a roughly \$3 million investment that transforms a traditional FEMA-certified levee into a multi-benefit

infrastructure system. Considered a first-of-its-kind innovation in the United States, the project combines flood protection with ecological connectivity and community access. By integrating a soil-cement levee, ADA-accessible pedestrian bridge, and wildlife passage into one design, the project shows how civil engineering can deliver environmental, economic, and social value beyond conventional flood-control functions.

Figure 4 - Santa Cruz River Wildlife Ramp Project



OPERATION & MAINTENANCE

Responsibility for levee operation and maintenance (O&M) in Arizona remains largely decentralized. Local flood control districts and municipalities are the primary operators, while the Arizona Department of Water Resources (ADWR) provides coordination and regulatory support.

Since 2020, key efforts have include increased coordination between ADWR, FEMA, and USACE, expanded use of asset management practices in larger districts and the implementation of more formal inspection and reporting protocols, as demonstrated in the case studies above.

Counties such as Maricopa and Pima continue to lead in proactive O&M, including channel stabilization, levee rehabilitation, and flood control capital improvement programs.

However, challenges persist:

- Lack of standardized asset management across all jurisdictions
- Limited funding for smaller or rural levee owners
- Inconsistent inspection frequencies and documentation

FUNDING & FUTURE NEED

Funding distribution is part of the challenge for Arizona's levee systems. In 2020, the estimated funding need was approximately \$10–20 million annually, with a long-term gap of up to \$387 million. Between 2020 and 2025, new funding opportunities emerged that included the Infrastructure Investment and Jobs Act (IIJA),

Although the IIJA made more than \$1.2 trillion in infrastructure investments nationally, including nearly \$4.8 billion through FEMA's BRIC program. However, Arizona received relatively little direct federal funding for new levee construction. Most federal resilience funding in Arizona has instead been directed toward drought resilience, drinking water infrastructure, wildfire mitigation, flood studies, stormwater management, and rehabilitation of existing federal flood-control infrastructure such as the Yuma Colorado River levee system.

Despite those gains, funding remains inconsistent and largely reactive. Most non-federal levees lack dedicated revenue streams and much needed lifecycle funding (inspection - maintenance - rehabilitation) is not fully institutionalized.

Local and regional funding programs in place enabled the continuation of projects related to the rehabilitation of critical levee segments, or the improvement of floodplain mapping and risk assessment and some targeted investments in high-risk urban corridors.

Despite those gains, funding remains inconsistent and largely reactive. Most non-federal levees lack dedicated revenue streams and much needed lifecycle funding (inspection - maintenance - rehabilitation) is not fully institutionalized.

Project Proofs – Maricopa County Flood Control District – Regional Levee and Channel Improvements

The Flood Control District of Maricopa County has continued to lead the state in levee and flood risk reduction investments through its voter-approved property tax funding mechanism.

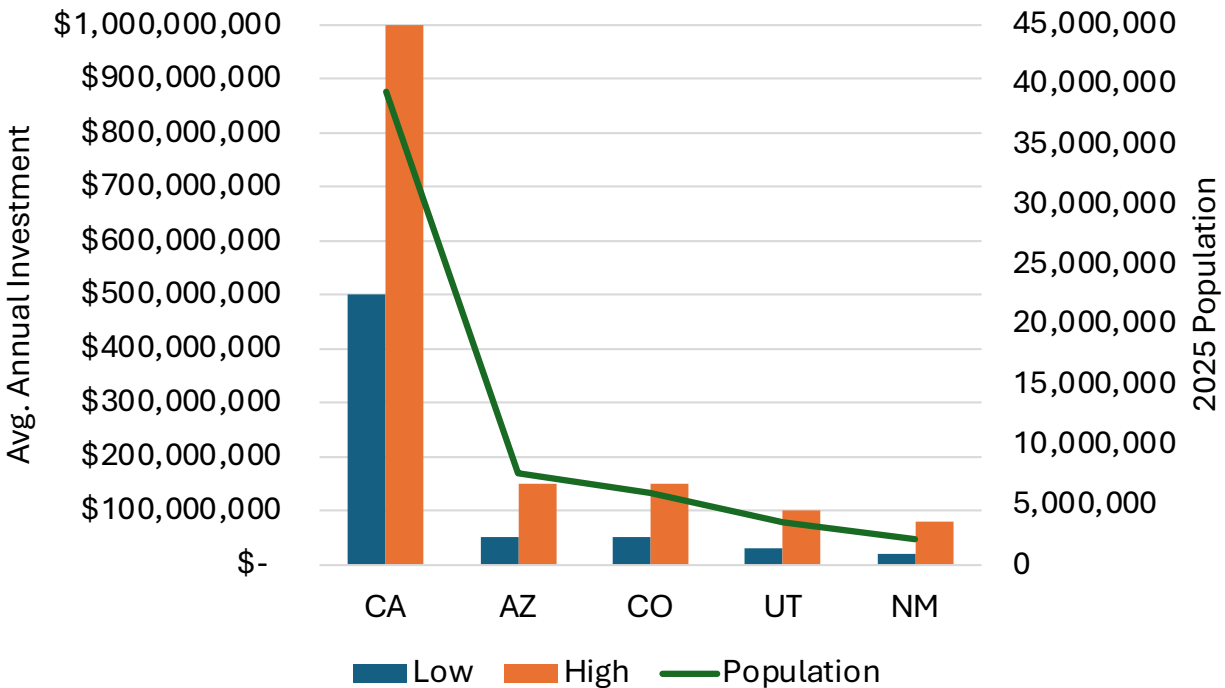
The Indian Bend Wash & Salt River system improvements (from 2020 to 2024) represented an estimated \$60 million to \$80 million in multi-year capital investment. Funded largely through local flood control district tax revenues and supplemented by federal partnerships, the work included channel stabilization, levee rehabilitation, bank protection, and sediment removal. These improvements helped reduce erosion risk and strengthen conveyance capacity in high-growth urban corridors.

The Skunk Creek and New River flood control projects represent an ongoing investment of more than \$30 million through 2025. The work includes levee construction, channelization, and floodplain management improvements designed to better protect rapidly developing areas of the northwest Phoenix metro region. Together, these projects are helping reduce flood risk and support more resilient growth in one of Arizona's expanding urban corridors.

Further improvements are needed in statewide levee inventory completion and risk classification, dedicated funding mechanisms for O&M and capital renewal and the expanded eligibility and utilization of federal programs.

Arizona's levee-related investments were found to be an order of magnitude lower than larger, flood-prone states like California or Texas, and generally below or comparable to peer interior western states, but with less dedicated statewide funding structure, as depicted in the figure below.

Figure 5 - ROM Annual Flood / Levee Investment (2020–2025) by State



Each of the states compared have different drivers, metrics, and demographics. However, such a comparison is useful for this topic as when considering the magnitude of populations and investments being protected.

A further comparison, considering their investments by population, area and drivers are summarized in the table below. As seen in the table, Arizona is on the lower end of flood investment per capita.

Table 1 -Estimated Annual Investment – Comparing Arizona to surrounding states

State	Population	Area (mi2)	Key Drivers	Flood Investment per Capita	Insight
AZ	7.62M	113,998	~\$50M–\$150M (highly localized, mostly Maricopa County-driven)	Moderate–Low	Skewed toward one metro area
CA	39.35M	163,696	~\$500M–\$1B+ (state + federal + local combined)	High	Reflects extreme risk + policy priority
CO	6.01M	104,094	Front Range urban flooding, watershed restoration, post-wildfire mitigation	Moderate–High	Strong resilience focus
UT	3.55M	84,899	Great Salt Lake basin, Wasatch Front flood control districts	Moderate	Efficient district model
NM	2.12M	121,590	Rio Grande system, federal-led projects	Low	Limited funding base

Arizona was found to have a locally strong, and statewide fragmented model for levee infrastructure planning and management where the total investment appears moderate, but is highly concentrated in Maricopa County with limited statewide funding or programs.

Additional notable levee projects or programs were identified as examples of the type of projects and advancements since 2020 across Arizona.

USACE & Local Sponsor Projects – Salt and Gila River Systems

The U.S. Army Corps of Engineers, in partnership with local sponsors, has advanced rehabilitation and inspection activities under the Levee Safety Program.

The Salt River Federal Levee Rehabilitation effort in the Phoenix area has focused on ongoing inspections and rehabilitation prioritization from 2020 to 2025. Supported by federal operations, maintenance, and rehabilitation funds through PL 84-99 program eligibility, the work includes periodic inspection compliance, erosion repair, and vegetation management. These activities help preserve the levee system's condition while maintaining federal eligibility for post-disaster rehabilitation funding.

The Gila River levee system assessments in central and western Arizona represent several million dollars in inspection and study funding. These efforts focus on risk screening, consequence analysis, and condition assessments to better understand levee performance and potential vulnerabilities. The assessments support more informed decision-making and help prioritize future improvements to reduce flood risk for nearby communities.

FEMA BRIC and Hazard Mitigation Grants (Statewide)

The Federal Emergency Management Agency (FEMA) has provided increased funding through the BRIC program thanks to the IIJA.

A review of Arizona BRIC awards from the 2020 to 2024 cycle found that approximately \$63.9 million was selected across 34 sub-applications for flood mitigation projects, including levees, drainage, and floodplain management. However, only about 5% of those funds had been obligated. These projects typically followed a 75% federal and 25% local cost-share structure and included levee setbacks and improvements, floodplain restoration, stormwater upgrades, and channel capacity enhancements. These investments help smaller communities access capital for flood mitigation projects that would otherwise be unaffordable.

Yuma Area Levee and Colorado River System Improvements

The Yuma County Flood Control District, in coordination with federal partners, has maintained and improved levee systems along the Colorado River from 2020 to 2025. These efforts have been supported by federal funding through the U.S. Army Corps of Engineers and Bureau of Reclamation, along with local contributions. Work has included vegetation management, embankment repair, and certification documentation, helping continue protection for critical agricultural lands and cross-border infrastructure.

Arizona Department of Water Resources – Statewide Levee Data & Dam Safety Integration

The Arizona Department of Water Resources has played a key role in strengthening statewide coordination on levee data and flood risk management. From 2020 to 2025, modest but meaningful programmatic funding, in coordination with FEMA and the U.S. Army Corps of Engineers, supported levee inventory improvements and floodplain mapping efforts. This work helped better align levee data with regulatory floodplain management decisions.

In the context of Arizona's State Infrastructure Report Card, these findings suggest that Arizona is not underinvesting uniformly, but rather unevenly. Maricopa County's flood control investments alone likely rival or exceed entire statewide programs in neighboring states such as New Mexico or Utah in some years. However, we find *the real gap is NOT total dollars, it is a structural deficit*.

Arizona lacks a statewide levee/flood program, beyond the State of Arizona Hazard Mitigation Plan, with a dedicated recurring funding stream and without consistent, risk-based prioritization across all regions. Compared to peer western states, Arizona's levee investments are moderate in scale but highly decentralized. While local agencies, particularly in Maricopa County, have invested tens of millions annually in flood risk reduction infrastructure, Arizona lacks the sustained, statewide funding programs seen in states such as California, where annual flood management investments regularly exceed several hundred million dollars. As a result, investment levels across Arizona are uneven, with urban areas receiving significantly more attention than rural and non-accredited levee systems.

RESILIENCE & INNOVATION

Arizona's levee systems face increasing challenges from climate variability, including more intense, short-duration storm events, increased wildfire impacts leading to debris flows and altered runoff, and changing precipitation patterns, all of which were identified in 2020 and remain highly relevant.

Although total annual precipitation has not shown a strong long-term increase statewide, rainfall is increasingly occurring as short-duration, high-intensity storm events capable of producing flash flooding that exceeds the design assumptions for many aging levees, channels, and drainage facilities. Arizona's highly urbanized watersheds, particularly in central and southern Arizona, respond rapidly to these intense monsoon storms, producing large peak flows within minutes to hours.

At the same time, statewide temperatures have increased approximately 2.5°F as measured from the early 20th century, contributing to greater atmospheric moisture-holding capacity and increasing the likelihood of more intense precipitation events when storms do occur. Climate projections also indicate continued warming, more variable precipitation, and an increasing risk of hydrologic extremes.

Wildfire has become an increasingly significant flood risk multiplier for Arizona's watersheds. Larger and more severe wildfires reduce vegetation cover, create water-repellent soils, and substantially increase runoff, erosion, sediment transport, and debris-flow potential during subsequent rainfall events. Studies following Arizona wildfires, including the Woodbury, Schultz, and other major fires have documented dramatically elevated post-fire flood and debris-flow hazards even where rainfall intensities were similar to nearby unburned watersheds.

These post-fire events can generate sediment-laden flows that threaten levees, culverts, bridges, and flood-control infrastructure while accelerating channel aggradation and reducing conveyance capacity. Communities around Flagstaff alone have invested tens of millions of dollars in post-fire flood mitigation following the Schultz Fire, illustrating the long-term infrastructure consequences of wildfire.

The economic consequences of these hazards continue to grow. Since 1980, Arizona has experienced 34

billion-dollar weather and climate disasters, including 14 wildfire events and three major flooding events, with the frequency of billion-dollar disasters increasing from an average of 0.8 events per year over the long-term record to 1.8 events per year during 2020 to 2024. This trend underscores the increasing need for resilient levee systems, updated hydrologic design criteria, enhanced sediment management, and risk-informed asset management strategies capable of adapting to evolving climate conditions rather than relying solely on historical hydrology.

Resilience efforts associated with design and development of infrastructure projects need greater integration of climate-informed hydrology in select projects, plus nature-based solutions (e.g., channel restoration, bank stabilization) and the use of advanced modeling and geospatial tools in response to the climate and economic. However, innovation remains uneven across the state. Many levee systems still rely on legacy design assumptions and lack real-time monitoring capabilities.

Although many of Arizona's levees continue to provide reliable flood-risk reduction, the statewide inventory highlights an aging and highly variable portfolio of infrastructure that requires ongoing assessment and investment. Many levees were originally constructed decades ago to protect agricultural lands and have since become critical infrastructure safeguarding rapidly expanding residential, commercial, and industrial development.

Continued urbanization, more intense short-duration monsoon storms, post-wildfire debris flows, channel degradation, and changing hydrologic conditions are placing increasing demands on these systems. Recent assessments emphasize the need for regular inspections, updated engineering evaluations, improved emergency action planning, and targeted rehabilitation projects to maintain accreditation and reduce flood risk.

As Arizona continues to experience population growth and climate variability, proactive asset management and strategic investment in levee modernization will become increasingly important to preserve public safety, maintain FEMA accreditation where applicable, and improve statewide flood resilience.

Levees



RECOMMENDATIONS TO RAISE THE GRADE

Complete Statewide Levee Inventory and Risk Classification

- Accelerate efforts to fully populate the National Levee Database and assign risk classifications to all levees.

Establish Sustainable Funding Mechanisms

- Develop dedicated funding streams at the state and local level for levee maintenance, rehabilitation, and modernization.

Expand Asset Management Practices

- Implement standardized asset management frameworks across all levee-owning entities, including inspection, condition assessment, and lifecycle planning.

Enhance Public Risk Communication

- Improve outreach and mapping of residual flood risk to ensure communities understand the limitations of levee protection.

Integrate Climate Resilience into Design and Planning

- Update hydrologic and hydraulic design criteria to reflect changing climate conditions and watershed responses.

Strengthen Interagency Coordination

- Enhance collaboration between ADWR, FEMA, USACE, and local jurisdictions to align funding, data, and project delivery.



Photo: Pinal Co Irrigation Canal; Frederick Tack

Levees



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Photo: Broken levees pouring water into towns, during massive floods;Topaz

Rail



FLAGSTAFF

**GRADE
COMPARISON**

**AZ: C
Nat'l: B-**

Photo: Railway station in Flagstaff, gismas



RAIL

EXECUTIVE SUMMARY

Arizona's rail system consists of Class I and III railroads, Amtrak, and rail services designed for tourists, totaling 1,730 miles of freight rail track, and 65 miles of excursion rail track. Tracks are inspected regularly, though condition data is sparse since most of the state's track is privately owned. Passenger rail and freight rail demand has increased over the past five years, with significant investments being made to meet these demands. In recent years, the Federal Railroad Administration (FRA) has made notable investments in Arizona's rail infrastructure including \$60.2 million allocated for passenger rail accessibility and efficiency improvements in 2024 and \$46 million set aside for railroad crossing safety improvements in early 2025. However, future federal funding is currently unknown, making future investments in rail in Arizona uncertain, and reliant on private railroad companies to invest.

CONDITION AND CAPACITY

Arizona is home to both Class I (carriers with revenue above \$1,074,600,816 billion) and Class III (carriers with revenue below \$48,237,637 million) railroads, along with Amtrak services and two excursion railroads (Grand Canyon Railway and Verde Canyon Railroad), totaling 1,795 miles of railroad track. The two Class I railroads are BNSF Railway and Union Pacific Railroad (UPRR), which own approximately 1,380 miles of track. BNSF Railway runs east/west through the northern part of the state via Flagstaff, and north/south from Phoenix to the north, connecting with the east/west route. UPRR also runs east/west, but through the southern part of the state, connecting San Simon to Yuma. The north/south segment of UPRR runs from Phoenix to the south, terminating in Nogales at the border crossing.

The Class III (or short line) railroads that make up about 532 miles of track listed in Table 1 below. Railroads facilitate the transportation of 29.9% of total freight

tonnage moved through the state. Tonnage moved by rail accounts for 48.6% of total freight value in the state.

Table 1: Arizona Short Line Railroads

Railroad	Miles Operated
Apache Railway	42
Arizona & California Railroad Co	172
Arizona Eastern Railway Co	208
Clarkdale Arizona Central Railroad, Inc	38
Copper Basin Railway, Inc.	61
Drake Switching Company	1
Kingman Terminal Railroad	3
San Pedro & Southwestern Railroad	7
Total	532

Source: Association of American Railroads

Figure 1: Arizona Statewide Railroad Map

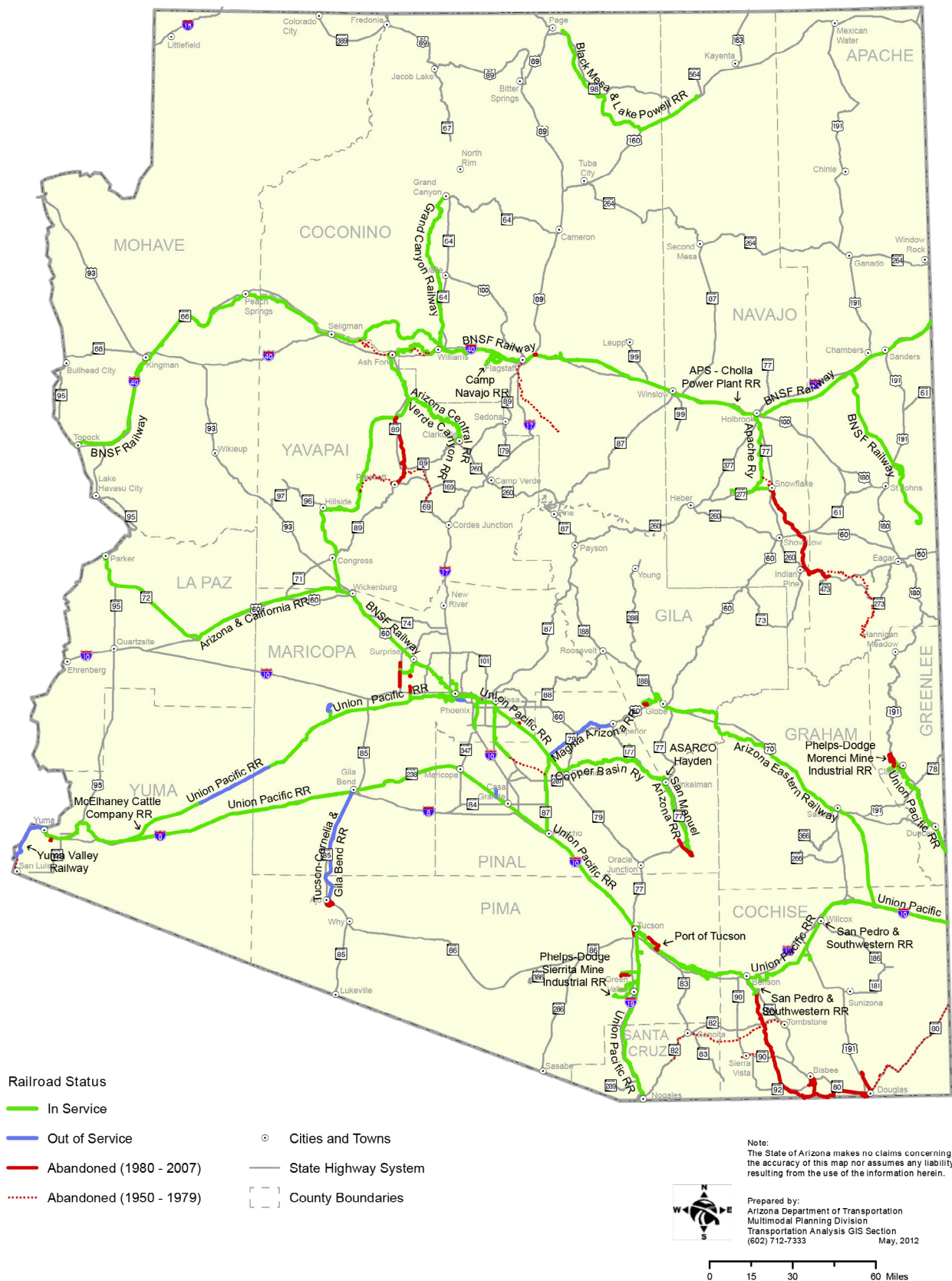


Table 2: 2023 Arizona Total Rail Tonnage (Inbound and Outbound)

Outbound		
Commodity	Tons (millions)	Carloads
Intermodal	1.8	115,400
Stone, clay, & glass products	0.7	6,500
Waste & scrap	0.6	6,300
Metallic ores	0.6	6,200
Steel products	0.4	4,300
Other	0.8	11,200
Total	4.8M	149.9K
Inbound		
Commodity	Tons (millions)	Carloads
Coal	7.7	64,000
Chemicals	3.3	34,000
Intermodal	1.6	115,400
Grain	1.5	14,400
Stone, clay, & glass products	1.5	14,400
Other	7.3	105,200
Total	22.9M	347.3K

Source: Association of American Railroads

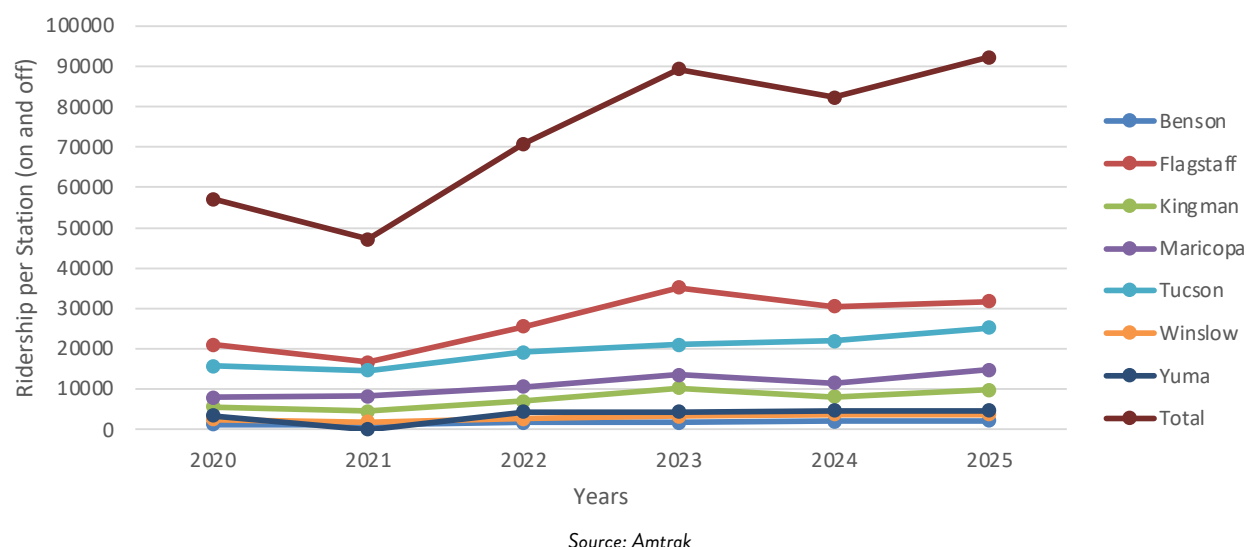
In 2016, the total rail tonnage was about 28.1 million tons. As seen in the above table, total rail tonnage (inbound and outbound) in Arizona was about 27.7 million tons in 2023, a 1.4% decrease from 2016.

Two Amtrak routes, Southwest Chief and Sunset Limited, service Arizona. Southwest Chief utilizes the BNSF tracks in northern Arizona, connecting Chicago to Los Angeles via Flagstaff, Kingman, and Winslow. Sunset Limited utilizes UPRR tracks in southern Arizona, connecting New Orleans to Los Angeles via Benson, Tucson, Maricopa, and Yuma. In 2025, 92,248 total passengers boarded or alighted in the state, an increase of about 12% from the previous year's 82,304 passengers. Figure 2 below shows ridership (ons and offs) numbers for each station in Arizona from 2020-2025. There has been

a general uptick in ridership in Arizona, with an overall increase of 38% in the past five years. Benson, Kingman, and Maricopa stations have seen the greatest growth.

Amtrak shares track with both UPRR and BNSF in Arizona. A ruling from the FRA in 2020 gives preference to passenger rail sharing track with freight rail. This ruling mandates that a minimum of 80% of Amtrak trains must arrive at their destination within 15 minutes of the scheduled time, subject to federal penalty. As a result, Amtrak trains running in Arizona have preference over the BNSF and UPRR trains despite using the freight rail tracks. Amtrak has plans to invest over \$24 million in Arizona to ensure stations meet the requirements of the Americans with Disabilities Act (ADA).

Figure 2: Amtrak Ridership by Station, 2020-2025



The two excursion railroads, Grand Canyon Railway and Verde Canyon Railroad, are for tourism and sightseeing. The Grand Canyon Railway takes visitors to Grand Canyon National Park from Williams to the South Rim. Annual ridership is about 225,000 passengers, which accounts for 7% of annual Grand Canyon South rim visitation. The railroad reduces automobile traffic within Grand Canyon National Park. Verde Canyon Railroad begins and ends in Clarkdale, taking about 100,000 annual riders through the Verde Canyon. The Verde Canyon Railway operates on Clarkdale Arizona Central Railroad tracks.

Data regarding the conditions of Arizona's railroad track is sparse since nearly all of Arizona's railroad track is privately owned. Physical infrastructure is maintained by the track owners (primarily private freight railroads). Regular track inspections are mandatory, as a minimum number of inspections are required annually by the FRA. Frequency of inspections is based on track classification, amount of weight that trains typically carry on the track, type of traffic, and regional weather conditions.

OPERATION AND MAINTENANCE; FUNDING AND FUTURE NEED

The state of Arizona does not fund any rail services themselves; rather, all funding for rail infrastructure comes from private company revenues or federal funding sources which are then distributed by the state. The largest recent federal investment in railroad infrastructure is the result of the Infrastructure Investment and Jobs Act (IIJA) of 2021, which included \$66 billion for rail infrastructure for Fiscal Years (FY) 2022 through 2026. In Arizona, this included almost \$47 million in Railroad Crossing Elimination (RCE) Grant Program awards for projects in Yuma, Hualapai, Gilbert, and Marana. The IIJA also funds the Railway-Highway Crossings (Section 130) Program for the elimination of hazards at public railway-highway crossings. Arizona received over \$16 million from FY 2022-2026 for this program, which was used to fund some of the projects in the Arizona State

Highway-Rail Grade Crossing Action Plan. However, the IIJA will sunset September 30, 2026. The funding through IIJA has made significant safety improvements to the railroads in Arizona, and sustained, predictable funding is needed in order to continue these much needed improvements. ASCE has urged Congressional leaders to pass a multi-year reauthorization bill that sustains infrastructure investment prior to this date.

The FRA has funded many projects in Arizona through the Consolidated Rail Infrastructure and Safety Improvements (CRISI) program, which saw increased funding levels thanks to the IIJA. In 2022, the City of Phoenix was awarded \$7 million for improvements to two railway-highway crossings, including the installation of gate arms, signals, and ADA-compliant features as well as minor roadway improvements. In 2024, this included

\$21.6 million to the Arizona Eastern Railway Company, \$4.9 million to the City of Flagstaff, \$3.3 million to Grand Canyon Railway Acquisitions, and \$30.2 million

to Amtrak. Projects ranged from rehabilitating of track and a locomotive to replacing aging bridges and installing a new boarding platform and crossover.

Figure 3: Grand Canyon Railway



Source: Amtrak Vacations

Through the Infrastructure for Rebuilding America (INFRA) Grant Program, the City of Flagstaff was awarded \$32.4 million in 2022 to deliver pedestrian safety, freight, and passenger rail improvements along one mile of BNSF track. In 2024, the Maricopa Association of Governments was awarded \$133.8 million to mitigate issues around a highway/arterial intersection that included two at-grade railroad crossings. Additionally, the town of Wickenburg was awarded \$26 million for a project that included a new bridge with a pedestrian walkway over BNSF tracks among other improvements.

BNSF partners with public entities on their related projects, and any improvements to their freight facilities or capacity is internally funded. In 2025, BNSF invested more than \$5.8 billion in rail-related projects nationwide, with plans to invest \$3.6 billion in 2026. This includes beginning construction on a new intermodal facility in Phoenix, and track expansions in Winslow.

UPRR also partners with public entities for related projects near their facilities and funds their own freight facility and capacity projects. UPRR invests nearly \$10 million daily in capital projects nationwide to support network performance and supply chain reliability. UPRR opened its Phoenix Intermodal Terminal in February

2024, providing a key link to the Ports of Los Angeles and Long Beach. In December 2025, a major UPRR expansion project was completed in Casa Grande that included four new tracks (new total of 8), a new industrial lead, upgraded main line signals, a new yard control point, and a powered switch. Capacity at the Casa Grande yard was doubled due to this project.

Beyond federal and private funding, local jurisdictions are also funding their own projects to mostly improve railway-highway crossings, especially in the Phoenix, Tucson, and Flagstaff areas. Some projects will be able to get additional funding through the Arizona Department of Transportation (ADOT) if the railroad crossing is located by an ADOT facility, as is the case for the Cortaro Road project in the Tucson area.

Robust federal funding is not a guarantee in the future, presenting a need to find new forms of revenue to continue making investments. Generally, federal funding has been used to make safety improvements related to public interaction with railroads, i.e. grade crossings, pedestrian facilities, etc., while the private railroads make updates to their aging infrastructure to increase capacity and productivity. Both forms of funding are needed to keep the railroads safe for the public and railroad

employees, as well improve freight movement through the state. Without federal funding, the state will need to determine how to leverage local funding with private funding to continue to make safety improvements. Since

rail tracks are privately owned, there is limited publicly available information on investment needs and O&M challenges in the state.

PUBLIC SAFETY; RESILIENCE; INNOVATION

A rail grade crossing incident is defined by the FRA as “any impact between on-track railroad equipment and a highway user (e.g. automobile, pedestrian, etc.) at a highway-rail grade crossing.” Rail incidents have remained steady over the past five years. Grade crossing incidents have been fluctuating, varying between 24 and 32 incidents annually in the past five years, with the biggest reduction from 2024 to 2025 (see Figure 4). Derailments have also seen fluctuating numbers over the past five years, varying from

11 to 23 incidents annually, with the largest reduction also from 2024 to 2025 (see Figure 5). Although incidents and derailments have seen a downward trend, fatalities are concerning on an upward trend (see Figure 6). In 2020, there were 18 fatalities, which has increased about 44% to 26 fatalities in 2025. However, fatalities at railway-highway-crossings have greatly reduced over the past five years (from 6 fatalities in 2020, to just 1 in 2025), largely due to increased Section 130 funding (Figure 6).

Figure 4: Arizona Rail Grade Crossing Incidents, 2020-2025

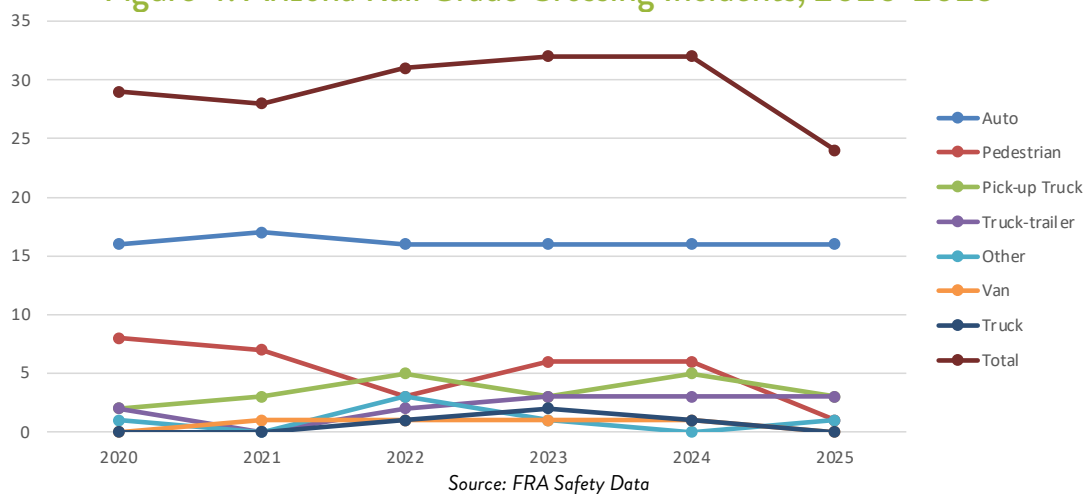


Figure 5: Arizona Derailments, 2020-2025

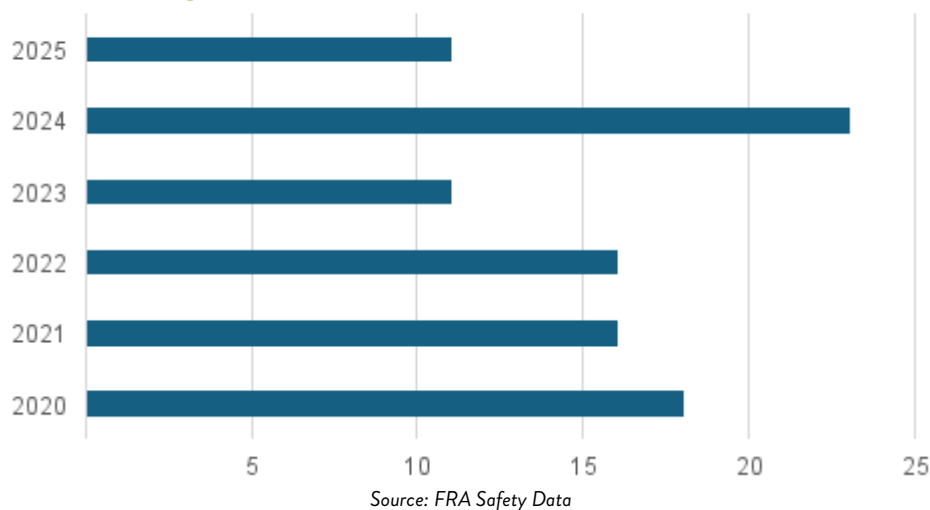
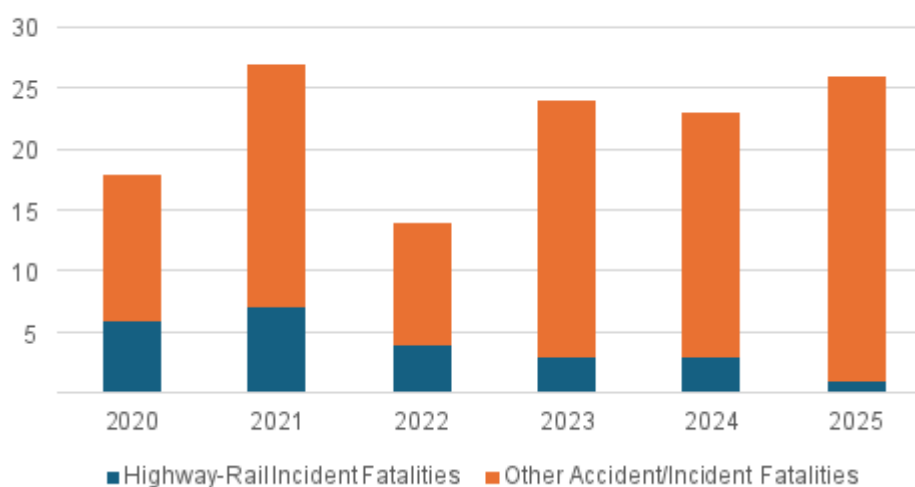


Figure 6: Arizona Rail Fatalities, 2020-2025



Source: FRA Safety Data

There has been a focus statewide to reduce railway-highway crossing incidents, which is outlined in the Arizona State Highway-Rail Grade Crossing Report (2022). As found in the report, most incidents occurred in Phoenix, but most fatalities occurred in Flagstaff. The report highlights a number of crossings throughout the state that have received recommendations for crossing treatments, such as added lighting, automatic gates, signage, grade separation, or closure. “Other incidents” are defined by the FRA as “any death, injury, or occupational illness of a railroad employee that is not the result of a ‘train accident’ or ‘highway-rail incident.’”

Investing in freight rail is one of the more sustainable options for moving goods across the country. Arizona’s freight rail infrastructure connects the busy ports in Southern California to the rest of the country. One train can carry one ton of freight nearly 500 miles on one gallon of fuel. Choosing freight rail over freight trucks results in up to 75% reduction in greenhouse gas emissions and reduces vehicular congestion in Arizona’s major cities. If 25% of annual freight trucking traffic traveling over 750 miles was transported by rail, it would result in 1.2 billion gallons of fuel savings nationwide and reduce approximately 13 million tons of greenhouse gas emissions.

Rail in Arizona faces resilience challenges in the form of extreme heat and flooding. The Arizona State Hazard

Mitigation Plan evaluated infrastructure vulnerabilities, including railways, rail yards, and train depots. Rails that are improperly spaced can buckle because of heat expansion. Flooding can result in rail separation or misalignment. These challenges were identified in a Resiliency Improvement Plan Primer developed by ADOT and will be expanded upon in a complete Resiliency Improvement Plan. Some projects are underway to enhance the resilience of Arizona’s rail system. For example, the Eastern Arizona Rail Safety, Efficiency, and Resiliency Project, which received IIJA funding through the CRISI program, will rehabilitate 34 miles of track, replace three bridges, and install two emergency crossings, among other improvements.

Although not Arizona-specific, Union Pacific highlights several innovation efforts that benefit rail operations in the state. The company is enhancing safety and efficiency through technologies such as real-time monitoring, predictive analytics, and GPS tracking to improve operations and shipment visibility. Tools like Physics Train Builder and customer platforms such as UPGo streamline train building and terminal access, increasing service speed and reliability. Core systems, including Positive Train Control and Energy Management Systems, further improve safety and fuel efficiency, supporting more sustainable operations and reducing greenhouse gas emissions compared to trucking.

Rail



RECOMMENDATIONS TO RAISE THE GRADE

- Continued state and local support for implementing safety improvements and education at railway-highway crossings.
- Improved passenger rail services through funding for Amtrak.
- Support asset management by providing publicly available information on condition and capacity of privately owned tracks for greater transparency on investment and O&M needs in the state.
- Aggressively position Arizona for federal rail funding by building a strong pipeline of shovel-ready projects and aligning them with federal priorities to compete for INFRA, CRISI, RCE, and Section 130 funds. Strengthen applications through regional coordination and clear national significance.
- Create Arizona-specific incentives, expedited permitting, and cost-sharing programs to attract BNSF, Union Pacific, and short lines to expand capacity and safety improvements. Pair this with a state rail fund to provide matching dollars and de-risk projects, while marketing Arizona's Sun Corridor and inland port opportunities to draw private intermodal and logistics investment.

Rail



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Roads



GRADE
COMPARISON

AZ: D+

Nat'l: D+

Photo: Curvy mountain road overlook viewpoint Tucson Arizona Mount Lemmon desert, Mark



ROADS

EXECUTIVE SUMMARY

Arizona's roadway network reflects a system under pressure. While the Arizona Department of Transportation (ADOT) is leading the way and partnering with the State's towns, cities, counties and metropolitan planning organizations to deliver critical project bridge rehabilitations, resurfacing, and lane additions, these efforts address only a fraction of the backlog. Many rural and urban segments continue to experience pavement distress, rutting, and cracking. Growth in the Phoenix metro area and in major cities continue to outpace roadway capacity. Routine maintenance lags behind needs. Seasonal closures and weather-driven disruptions continue to affect high-country routes, underscoring the need for resilient design. Arizona's projected funding gap is estimated to be \$162 billion by 2050. Arizona requires a more aggressive pavement preservation program to prevent further decline. Without increased investment, more roadways will fall into "poor" condition, raising future rehabilitation costs. Crash rates remain elevated due to outdated geometrics, limited shoulders, and insufficient access management, reinforcing the need for targeted safety investments.

CONDITION & CAPACITY

Arizona maintains upwards of 75,200 miles of public roads, an increase of approximately 8,700 miles since 2020. As of 2024, pavement conditions have worsened, with 54% of major roads rated poor or mediocre (an 11% increase since 2018, when 43% of major roads were rated poor or mediocre). These conditions cost drivers \$5.1 billion annually (\$871 per driver) in repairs, vehicle wear, and fuel expenses. Although not yet available, 2026 conditions may be inferred based on HPMS Cycles and ADOT Portal Notes. Based on statewide trends, 2026 conditions likely show continued deterioration in segments already rated fair or poor, unless resurfacing occurred.

Urban congestion is centered in Phoenix and Tucson. In 2024, the average Phoenix commuter lost an estimated 76 hours and \$1,645 annually due to congestion, while the average Tucson commuter lost 50 hours and \$915. Total estimated costs due to congestion reached \$5.6 billion in Phoenix and \$793 million in Tucson in 2024. Post-pandemic, Phoenix congestion has surpassed pre-2020 levels by approximately 8 hours per commuter, while Tucson remains below. As of March 9, 2026, traffic volume in Maricopa County is 115% of what it was in the first week of March 2020. This is a significant increase from an all-time low pandemic traffic volume experienced in April 2020, which was only 61% of the March 2020 volume.

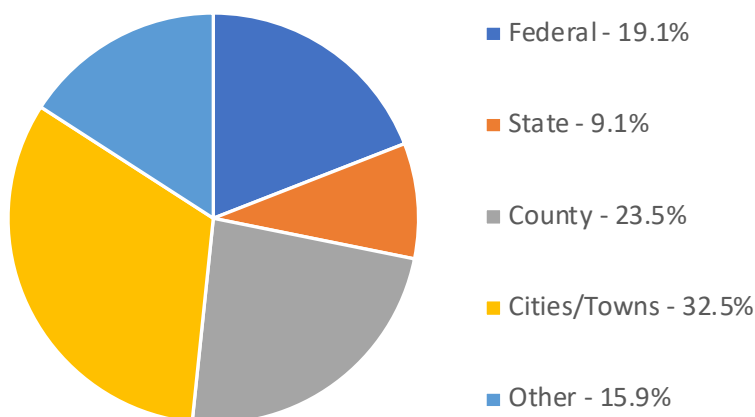
This congestion is mainly driven by urban sprawl. Phoenix-Mesa in particular has a very large urban area covering 1,114 square miles, of which only 16.5% can be accessed in a typical 30-minute car ride.

Based on ADOT, FHWA, and MAG reports, commuter delays in 2020 were an anomaly with historically low congestion. 2024 shows a strong rebound, consistent with national trends. 2026 reflects continued growth pressures, especially in Maricopa County, where population and economic activity are expanding faster than roadway capacity. This aligns with broader

transportation system assessments: congestion is one of the conditions that has not improved and is likely to worsen without additional investment in operations, capacity, and multimodal strategies.

Statewide, vehicle travel dropped 33% in 2020, but rebounded to 12% above pre-pandemic levels by 2024. Arizona's population, projected to grow from 7.3 million in 2020 to 10.5 million by 2055, is expected to further concentrate in the Sun Corridor, the area between Phoenix and Tucson, thereby increasing congestion and roadway demand.

Figure 1: Arizona Road Mileage by Ownership



Source: FHWA Highway Statistics Series

FUNDING AND FUTURE NEED

Arizona's transportation system is at an inflection point. Current revenues—primarily from fuel taxes that have not kept pace with inflation, vehicle efficiency, or population growth—are inadequate to maintain existing assets, let alone expand the system to meet future needs.

Without new funding sources, Arizona faces:

- Accelerating pavement and bridge deterioration
- Higher long-term rehabilitation costs
- Reduced freight efficiency and economic competitiveness
- Increased congestion and travel delays
- Growing safety risks for all roadway users
- Inability to meet federal performance targets

Strategic investment is essential to preserve the system, enhance mobility, and build a resilient network capable of supporting Arizona's economic growth, tourism, and quality of life. Arizona's transportation system is supported by a mix of federal, state, and local funding sources, with 67.3% of total state and local road spending covered by road-use taxes. Road-use taxes are funded by taxing vehicles and fuel in the state through vehicle license tax, gas tax, etc. As of 2025, only three states (Delaware, Montana, and New Jersey) cover all road infrastructure and maintenance through their road-use taxes. Arizona ranks 23rd nationally. While the majority of state road projects and maintenance are covered through these taxes, there's a funding gap to cover all projects in the state. This funding gap is closed with federal money and additional local taxes, like Prop 479 in Maricopa County

and the recent Props 418 and 419 in Pima County. Despite this broad funding base, Arizona faces a substantial future shortfall as traditional revenue streams fail to keep pace with construction costs, vehicle efficiency gains, and population growth. Arizona also has fairly high electric vehicle (EV) use with 1.7% of all vehicles registered, which is above the national average and makes Arizona one of the top 10 states for EV use. However, there is no current route to taxing EV use since they do not use fuel like gasoline powered cars. As the EV usage in the state grows, there will be even less fuel tax revenues. Sales tax increases that fund infrastructure have approved by voters successfully across the state, there's no guarantee that voters will continue to vote that way in order to cover the funding needed across the state.

The federal government plays a vital role in Arizona's road funding through the Federal-Aid Highway Program (FAHP) and other discretionary grants. The state receives roughly \$700–\$800 million per year in federal reimbursements derived from the Highway Trust Fund, which is supported by fuel tax revenue from the federal gas tax. These funds are distributed through programs such as the National Highway Performance Program, the Surface Transportation Block Grant Program, and the Highway Safety Improvement Program.

A significant boost to federal funding arrived with the Infrastructure Investment and Jobs Act (IIJA), signed in 2021. Approximately \$5.3 billion in formula funding was provided to Arizona for highways and bridges. In addition, a \$27.5 million award was announced to ADOT for the I-40 Window Rock and Lipton Traffic Interchange Enhancement Project, which will replace four bridges on I-40 that were built in 1963. Arizona has also benefitted from funding from the Safe Streets and Roads for All program which was stood up by the IIJA. Thirty-nine awards, amounting to over \$77 million went to municipalities within the state to enhance safety. These projects largely focus on enhancing safety for vulnerable roadway users. The IIJA is scheduled to expire in 2026, and uncertainty over its renewal adds risk to long-term planning.

Despite this infusion, federal funding remains unstable. Since the federal gas tax rate has not been raised since 1993, rising vehicle fuel efficiency and the increased

adoption of electric vehicles continues to erode purchasing power, threatening the sustainability of federal support.

At the state level, the Highway User Revenue Fund (HURF) is a principal source of transportation revenue. It collects money from:

- Gasoline tax: \$0.18 per gallon
- Use fuel tax: \$0.26 per gallon
- Vehicle license and registration fees
- Motor-carrier taxes and other vehicle-related charges

The HURF generated \$1.7 billion in 2022 and is projected to reach \$2.5 billion by 2031. The fund's revenues are shared among the State Highway Fund and local governments.

Arizona's gas tax rate of 19 cents per gallon, unchanged since 1991, ranks 46th among U.S. states and sits far below the national average. This stagnation, coupled with improved fuel efficiency and the growth of hybrid and electric vehicles (EV), has steadily weakened the HURF's real value.

Local governments maintain most roads outside state and federal networks using funds derived from HURF distributions, property taxes, local general funds, and municipal bonds. Vehicle registration fees, title and license taxes, and shared state revenues provide limited support for local transportation needs. Rural roads in particular face significant funding challenges, as funding is often prioritized for state highways and other high-volume roadways, oftentimes in urban areas.

Arizona's metro areas have found funding opportunities through minimal sales tax increases. In Maricopa County, a half-cent regional transportation sales tax supports the Regional Area Road Fund (RARF) and generates hundreds of millions annually. For example, 38% of the total project cost for the Loop 202 South Mountain Freeway was funded by this sales tax. The project, which added a 22-mile, eight-lane freeway in the Phoenix metropolitan area, cost approximately \$1.8 billion and was finished in 2019. In 2024, Maricopa County voted to extend this tax through 2045.

Table 1: HURF Sources of Revenues

Fiscal Year 2016 Through Fiscal Year 2025
(000's)

Fiscal Year Ended June 30	Motor Vehicle Fuel Tax Revenues (1,4)	Motor Vehicle Registration Fee Revenues	Motor Carrier Tax Revenues	Motor Vehicle Operators' License Fees and Misc. Fees and Revenues	Motor Vehicle License (In Lieu) Tax Revenues (4)	Smart & Safe AZ Act Revenues (3)	Total Deposited to Arizona Highway User Revenue Fund	Percentage Change	Total Distributed to Arizona Highway Fund (2)
2025	\$822,992	\$241,504	\$57,827	\$52,344	\$619,226	\$43,547	\$1,837,439	2.0%	\$861,420
2024	817,064	241,394	58,405	52,475	589,861	41,934	1,801,132	3.0%	849,990
2023	784,698	242,960	58,486	54,234	567,304	41,613	1,749,295	1.2%	829,723
2022	794,737	236,121	56,698	55,578	542,835	43,167	1,729,138	6.3%	820,170
2021	755,063	220,075	52,129	48,762	551,141		1,627,170	9.9%	749,986
2020	733,406	191,464	45,472	37,236	473,259		1,480,836	-2.6%	682,310
2019	749,885	192,926	45,812	62,128	469,470		1,520,221	4.4%	656,751
2018	729,469	181,227	42,823	57,503	444,757		1,455,779	2.8%	624,919
2017	705,737	177,868	42,091	57,813	421,939		1,405,448	3.6%	610,998
2016	688,105	173,693	41,058	57,943	395,952		1,356,752	5.1%	589,476

Source: Arizona Department of Transportation

Similarly, Pima County has collected a half-cent sales tax since 2006. The original tax sunsets in June 2026, but will continue another 20 years after the tax extension was approved by voters in March 2026. The Regional Transportation Authority, a state-established tax district within Pima County, accounted for \$126 million in tax revenues in 2025, while traditional state and federal funding sources only provided \$54 million to the region. This additional funding has proven essential for major projects in their corresponding regions, but is contingent on voter approval, fell short of needs, and was not flexible enough to adapt to the evolving transportation needs of the community. Within Pima County, the City of Tucson

has implemented their own half-cent sales tax through Prop 411 in 2022. Over a 10-year period, the City will use the funds collected to improve neighborhood street conditions and systemwide street safety. This includes repaving, lighting, sidewalks, traffic signal upgrades, etc.

The City of Maricopa's council approved a new 20-year half-cent sales tax in 2025 that is completely dedicated to funding transportation projects within the City. In Pinal County, voters passed the extension of a 20-year half-cent sales tax in 2024, which generates funds for road construction, maintenance, and safety improvements.

FUTURE NEED

The Federal Highway Administration's National Highway Construction Cost Index rose 54% between early 2022 and mid-2024, reflecting inflation in materials, labor, and equipment. These increases severely limit the buying power of available funds, effectively reducing the number of projects that can be completed within existing budgets.

According to the ADOT 2050 Long-Range Transportation Plan (LRTP), total transportation needs from 2026–2050 are estimated at \$231.4 billion, including:

- \$174.4 billion for infrastructure (highways, bridges, safety, freight, and mobility projects)
- \$57.0 billion for stewardship (funds allocated to public transit, passenger rail, aviation infrastructure, EV infrastructure, bridge inspections, air quality improvement, and planning programs)

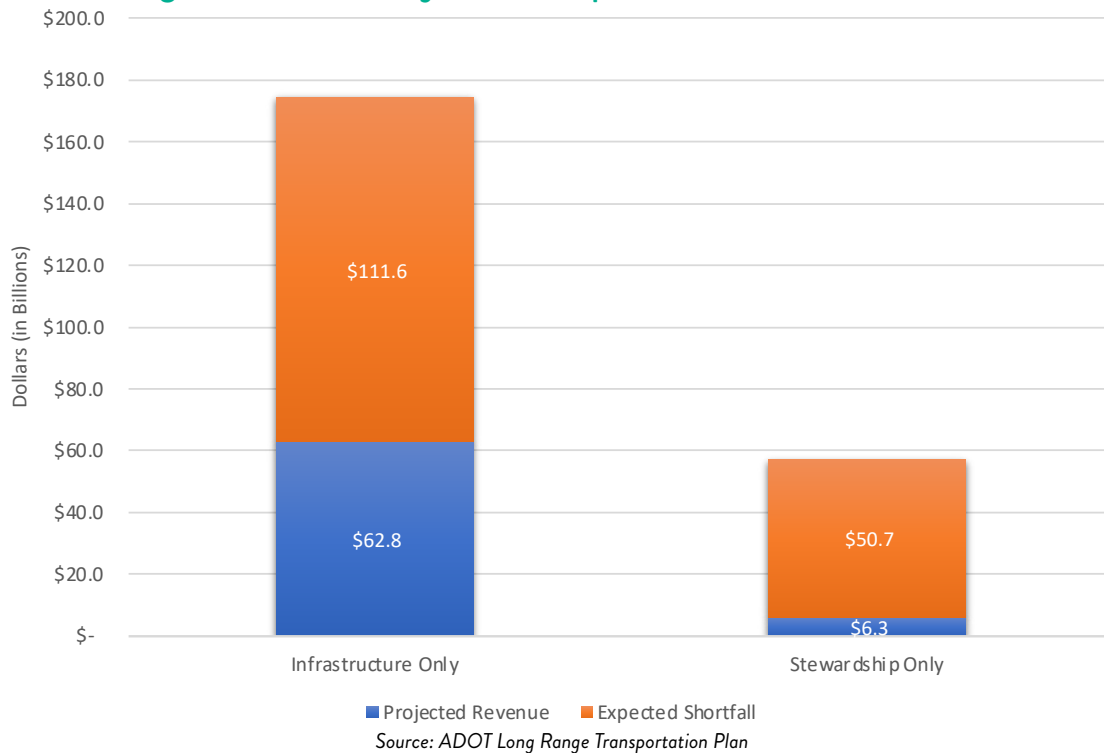
However, projected revenues fall far short of these needs. The baseline revenue projection from 2026–2050 is \$69.1

billion. The \$162.3 billion gap reflects insufficient growth in user revenues, the instability of funding programs across jurisdictions, and cost increases. For comparison, the previous Long-Range Transportation Plan estimated transportation needs from 2016–2040 totaled \$98.3 billion.

Pavement maintenance alone is expected to require \$63.3 billion, while safety improvements total an estimated \$5.9 billion. Without new revenue mechanisms, critical maintenance will be deferred, leading to deteriorating pavement conditions, reduced safety measures, and higher long-term costs.

Although local sales taxes and HURF distributions help cities and counties maintain roads, smaller jurisdictions face persistent shortfalls. Many rely on volatile property or general fund revenues that compete with other local priorities. The rigid structure of state and federal funding rules can also restrict how dollars are used, limiting flexibility to address local congestion, safety, and multimodal needs.

Figure 2: Arizona Projected Transportation Costs and Shortfall



OPERATION AND MAINTENANCE

Responsibility for the operation and maintenance of Arizona's roads is divided between state, county, and smaller municipal entities. ADOT maintains approximately 27,000 miles of road, while the City of Phoenix, for example, maintains around 4,850 miles of road. Maricopa County is also responsible for intermittent arterial roads within its borders and smaller communities such as Sun City, Anthem, and Sun Lakes. Private entities such as Homeowners' associations are typically responsible for private roads and access easements.

While the prevailing funding gap in ADOT's 2050 LRTP is significant, the plan helps to guide the department with decision making going forward and align its priorities accordingly. Arizona's current operation and maintenance strategy is to preserve and upgrade existing infrastructure rather than expand the state's road network.

Additionally, ADOT has a coordinated, multilayer approach to operations and maintenance. The Transportation Asset Management Plan (TAMP), last updated mid-2025, helps to manage the state's highways, bridges, and pavements through all stages of use and maintenance. The Transportation Systems Management and Operations

(TSMO) program complements this by optimizing existing infrastructure performance through numerous multimodal strategies, such as traffic incident management, traffic signal systems and coordination, and travel information services. ADOT has processes in place to improve the condition and capacity of its roadways, yet funding and implementation continue to provide challenges.

Arizona's highway sector faces significant workforce challenges as the state works to deliver a growing pipeline of roadway and infrastructure projects. Contractors continue to report difficulty filling skilled craft positions, and while not specific to roadway construction, a 2025 AGC & NCCER workforce survey found that 88% of firms reported challenges filling hourly craft positions. State initiatives such as BuildItAZ are helping expand the construction workforce pipeline, with nearly 3,000 apprentices added since 2023 and new grant funding directed toward construction and trades programs. Continued investment in recruitment, training, and on-the-job support will be essential to building a skilled, diverse highway workforce capable of meeting Arizona's transportation needs.

PUBLIC SAFETY

From 2020 to 2024, Arizona averaged about 1,220 annual traffic fatalities. Over this period, the rate of fatalities per 100 million vehicle miles traveled (VMT) continually worsened and consistently exceeded the national fatality rate. While total fatalities in Arizona declined slightly in 2024, Arizona's rate (1.74 per 100 million VMT in 2024) remained higher than the national average of 1.20 per 100 million VMT, reflecting persistent safety challenges, particularly on rural non-interstate roads, where fatality rates are almost double those of urban areas.

Safe System Approach (U.S. Department of Transportation)

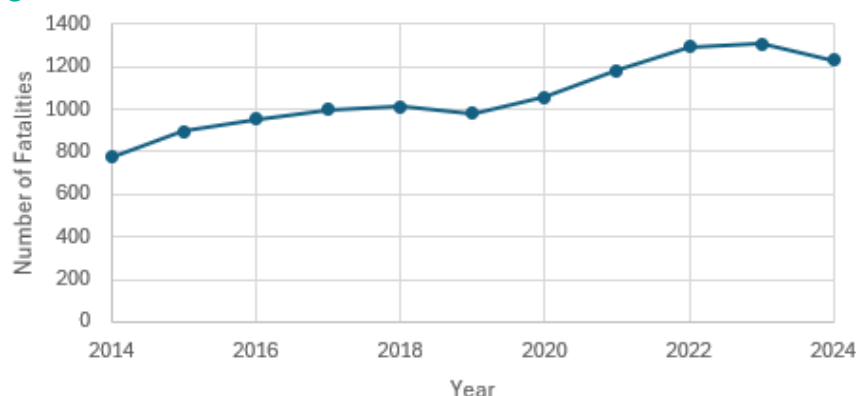


Fatality rates among bikers and pedestrians are also of concern. 2024 saw 250 pedestrian deaths and 43 biker deaths. The fatality rate per 100,000 people is nearly twice that of the national average. Additionally, while

pedestrian fatality rates have declined in Arizona, crash rates increased 35% between 2020 and 2024, from 1,538 to 2,079. Most of these crashes occur on wide arterial roads designed for speed as opposed to bikers and pedestrians. Design choices focused on enhancing safety for bikers and pedestrians, the most vulnerable roadway users, will be critical to reverse these trends.

Risky behavior such as speeding, impaired driving, and driving while distracted remain significant contributing factors to the recorded crashes. In response, ADOT and state partners are expanding enforcement, safety training, and public education under the 2024 Strategic Highway Safety Plan (SHSP) and the Active Transportation Safety Action Plan (ATSAP), both grounded in the U.S. Department of Transportation's Safe System Approach. These initiatives prioritize high-risk corridors, promote multimodal safety, and intend to reduce life-altering crashes statewide 20% by 2030 through coordinated investments and targeted infrastructure improvements. Proposed initiatives include implementing more forgiving roadway geometry, escalating speed enforcement, and increasing physical separation between vehicles and vulnerable road users, and more. The state is also seeking to reduce speeds through context-dependent roadway design like complete streets and lane narrowing. Additionally, the 2050 LRTP has chosen funding strategies that prioritize safety, and the Governor's Office of Highway Safety (GOHS) provided a \$440,000 grant to the Arizona Department of Public Safety (AZDPS) in 2025 to help increase enforcement and enhance traffic safety initiatives in an effort to decrease serious and fatal crashes.

Figure 3: Annual Traffic-Related Fatalities in Arizona 2014-2024



Source: Arizona Motor Vehicle Crash Fact
Note: traffic-related fatalities include all motor-vehicle fatalities as well as pedestrian and bicyclist fatalities

RESILIENCE AND INNOVATION

Arizona is integrating innovation and sustainability into transportation planning, design, and maintenance where feasible, but is lacking stable funding for future projects to mitigate climate issues. For example, the City of Phoenix has deployed a Cool Pavement Program. Partnering with Arizona State University (ASU), test areas were used to evaluate a pavement sealant that effectively absorbs less heat than traditional pavement methods. In 2024, ASU found this program reduced pavement surface temperature up to 12 degrees in the summer, compared to traditional pavement. However, this is still a pilot program without widespread use in the city. ADOT continues to implement wrong-way detection systems using thermal cameras. The immediate alerts from the camera system provide faster responses by emergency services than 911 calls from nearby drivers.

ADOT is in the process of rolling out a Digital Delivery Program that will transition design and construction deliverables toward fully digital 3D modeling, which is intended to help elevate the design quality and mitigate risk throughout the process. Looking forward, the Maricopa County Department of Transportation (MCDOT) is planning to deploy vehicle-to-everything (V2X) technology on certain corridors for its Connected Vehicle Acceleration Zone (CVAZ). This federally funded project enables certain vehicles to automatically communicate with travel elements such as traffic signals, other road users, and roadside infrastructure. The City of Tucson has implemented adaptive signal technology in key locations throughout the city and has already seen congestion reduction of over 1.25 million hours for drivers, which has saved over \$1 million in fuel costs.

In 2026, the Governor Katie Hobbs signed an Executive Order to protect workers from heat risk, which will build

on a 2023 Heat Stress State Emphasis Program. This will lead to continued improvements for the vulnerable outdoor workers within the transportation system.

Although sustainability requirements are not uniform statewide, agencies such as the Maricopa Association of Governments (MAG) and the City of Tucson have incorporated green design and water-saving strategies into their design requirements. Governor Katie Hobbs has created the Governor's Office of Resiliency with the purpose of implementing responsible, visionary, and equitable environmental policies and programs. ADOT's Transportation Asset Management Plan (TAMP) guides long-term infrastructure preservation.

These programs have the potential to deliver economic and safety benefits, but initial deployment often leads to increased time and financial costs associated with putting sustainable or innovative measures into practice. Strategic implementation could help address these challenges while mitigating the impacts on project stakeholders.

Although ADOT and other major cities in Arizona have some sort of resilience program or plan, most projects end up being reactive rather than proactive, mostly due to that continued budget shortfall statewide. The programs listed above are a small step in trying to mitigate climate issues, but they focus on a very narrow set of issues. Increased heat, fire danger, and monsoon storm intensity are continual issues that are rarely addressed due to funding shortages. The state has already seen extreme drought and more hot days over the past few years. Statewide plans are a great first step, but an implementation plan with specific funding and greater focus on climate resilience and adaptation is needed.



RECOMMENDATIONS TO RAISE THE GRADE

- Raise the federal and state gas tax rates or implement a mileage-based user fee to provide reliable funding for infrastructure needs.
- Continue prioritizing preservation and maintenance of the existing roadway system over expansion to reduce the long-term costs of a deteriorating network.
- Enhance smart traffic management systems to improve efficiency within the current network, reducing the need for costly new lane construction and added maintenance burdens.
- Combine engineering solutions with efforts to reduce risky driving behaviors that contribute to Arizona's high fatality rate.
- Educate the public and politicians on the importance of prioritizing Arizona's aging infrastructure.
- Statewide and local focus on implementing projects focused on addressing increasing temperatures, fire danger, and stormwater flooding.

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Photo: Flooded road from recent rainstorm at Tortilla Flat Arizona on the Apache Trail; MelissaMN



STORMWATER

EXECUTIVE SUMMARY

Arizona's stormwater infrastructure plays a critical role in mitigating flash flood risks intensified by monsoon storms, wildfire burn scars, and rapid urbanization. While urban MS4-regulated systems generally meet modern design standards, rural and tribal areas face capacity, funding, and implementation challenges. Recent budget cuts, including the reduction of WIFA funds, highlight the urgent need for sustainable financing mechanisms such as stormwater utility fees and regional cost-sharing. Flood control in these mostly rural areas faces some challenges. Long-term resilience requires investment in hydrologic/hydraulic modelling, asset mapping, and green infrastructure strategies to optimize capacity, reduce pollutant loads, and enhance groundwater recharge. Coordinated regional planning and targeted capital improvements are essential to protect public safety and adapt to increasingly severe storm events. Arizona is also home to 22 Native American tribal reservations who enjoy tribal sovereignty. While state stormwater regulations do not apply to these regions, ADEQ has established liaisons to partner with various tribes.

BACKGROUND

Flash flooding is the most common form of natural disaster in Arizona. As a result, stormwater infrastructure is crucial for protecting lives, property, and the environment throughout the state. This critical infrastructure includes pipes, both natural and man-made channels, underground and above-ground stormwater retention, water quality control, green infrastructure, dry wells, and other methods of dewatering constructed in a variety of combinations. The State of Arizona is known for a dry climate but has both winter and summer rainy seasons that drop significant rainfall in short periods of time. The July-September monsoon season (with short duration but high-intensity storms) can drop up to 60% of the total yearly rainfall in some portions of the state. Stormwater infrastructure

has been constructed extensively in urbanized areas, while natural washes generally control rainfall runoff in rural areas.

In Arizona, management of floodplains and stormwater is handled by an assortment of county and city/town level departments. There are ten county-wide flood control districts out of 15 total counties in Arizona. The smaller counties manage the floodplains through their public works departments and FEMA mapping. Four major cities, Scottsdale, Phoenix, Tempe, and Gilbert, manage their own flood control. Additionally, fifteen smaller cities perform this function. The remainder of the towns and cities rely on the county-wide agencies. Generally, these groups manage floodplain development and floodplain risks.

CAPACITY

Before the 1970s, construction stormwater management focused on quickly removing water from job sites using pipe networks, channels, and dry wells to facilitate rapid project completion. As development accelerated in Arizona during the late 1960s and 1970s, local governments began requiring stormwater controls, including on-site retention, to limit runoff to near pre-development conditions. Dry wells (injection wells) were commonly paired with detention basins to capture and recharge stormwater into the ground. By 2015, more than 50,000 dry wells were registered statewide, including thousands in the Phoenix metropolitan area.

Because much of the state has low-permeability soil, even minor storms can produce rapid runoff and peak flows, creating hazardous roadway crossings where drainage swales intersect roads. Infrequent rainfall also allows oils and debris to accumulate and wash into drainage systems during storms.

Today, urban storm drainage systems are designed in accordance with Arizona Department of Environmental Quality (ADEQ) Municipal Separate Storm Sewer System (MS4) requirements. Since the 1990s, these regulations have included measures to reduce pollutants washed from roads, parking lots, and buildings, improving water quality. Arizona does not have combined sanitary and storm sewer systems. ADOT manages one of the state's largest stormwater networks, consisting primarily of roadside channels, cross pipes, and culverts. The agency conducts inspections on a five-year cycle to assess system condition and support ongoing maintenance.

Flood risks in Arizona continue to evolve due to ongoing development and changing climate conditions, requiring cities and counties to plan for future storm flows. Because much of the state has low-permeability soil, even minor storms can produce rapid runoff and peak flows, creating hazardous roadway crossings where drainage swales intersect roads. Infrequent rainfall also allows oils and debris to accumulate and wash into drainage systems during storms. Communities are addressing these issues through stormwater management strategies, including infiltration basins in Pinal County that help filter runoff and support groundwater recharge.

Continued development also increases runoff and places additional stress on older systems. In addition, monsoon storms can produce rainfall intensities that exceed the design events used to size drainage infrastructure. Modern stormwater detention systems serve two primary purposes: controlling runoff to approximate pre-development conditions and retaining the “first flush” of more contaminated runoff from developed surfaces, allowing it to infiltrate onsite. This helps reduce nonpoint-source pollution reaching downstream and environmentally sensitive areas.

Constructed open channels are designed using the same capacity criteria as pipes. Runoff from urban areas that is not managed through dry-well recharge systems is typically conveyed to networks of open channels through direct or regulated discharges. While natural floodplains can absorb and slow runoff, urban encroachment reduces their storage capacity. Flood control districts across the state manage these channel systems and continually work to improve capacity through measures such as bank stabilization, larger bridge openings, and updated hydrologic and hydraulic studies that reflect current watershed conditions.

Natural rural washes have formed over time through historic rainfall patterns and runoff processes, with little engineered modification. Wildfires also present a significant challenge by removing vegetation that would otherwise slow runoff. Burn scar areas can generate substantially higher runoff volumes, potentially overwhelming downstream drainage systems. For example, the 2019 Museum Fire north of Flagstaff contributed to significant flooding impacts in the city.

CONDITION

Much of the urbanized stormwater infrastructure is buried and it is difficult to evaluate its physical condition. Periodic inspection by owners is not completed with any regularity or reliability. Storm drainage system outfalls are easy to assess and maintain, but the condition of underground components is not generally known until the time of failure or during excavation for a nearby related project. The establishment of mapping of these underground storm drains is needed and can assist with future development conflicts. New construction, such as telecommunication and utility systems, can avoid the area of mapped storm drains and not bore through existing pipes.

The Arizona MS4 program is managed statewide by ADEQ. It regulates publicly owned conveyance systems that discharge untreated stormwater in the waters and washes to prevent pollution. The program requires stormwater management plans for each permitted municipality or agency. The program includes:

1. Public Education
2. Public Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention

The program also requires periodic reporting by the agency to ADEQ regarding the status of each portion of the program.

Much of Arizona's stormwater infrastructure built since the late 1960s and 1970s remains within its 50- to 100-year design life. While widespread age-based replacement is not yet imminent, damaged materials must be repaired before failure occurs.

Stormwater storage and treatment facilities, such as retention ponds and underground storage, generally last 20-30 years with regular preventative maintenance but no major repairs. At the time stormwater reaches a stormwater management facility, it contains pollutants and solids washed from impermeable road and parking lot surfaces, and it enters the storm system without

treatment. Unmaintained facilities accumulate sediment and runoff pollutants that can therefore reduce storage capacity. Stormwater flowing through pipes and in channels contains sediment and pollutants, which also accumulate in the system and must be removed to prevent turbulence and corrosion. Ongoing maintenance and inspection of public and private systems are required to meet the intended design performance of the system. ADEQ requires MS4 inspection reports from jurisdictions, recapping their yearly efforts to maintain systems. The accumulated pollutants in systems are monitored to determine if illegal cross-connections have been made. The goal of this monitoring system is to reduce untreated non-point pollution from reaching the natural environment.

Arizona has few rivers with perennial flow. Erosion and sedimentation can occur in the various rivers throughout the State during the short duration, high-intensity monsoon storms. As with the enclosed systems, accumulated sediment reduces capacity in natural and open channels. Efforts have been made to control flooding in natural rural swales, most visibly in the form of dams that have been placed across washes and notably with groundwater recharge efforts that have been established. The Pinal Valley Recharge and Recovery facility, awarded AZASCE project of the year, captures and stores renewable surface water instead of over pumping groundwater.

While the State of Arizona provides comprehensive floodplain and stormwater regulations statewide, most of the detailed studies are performed by local cities and counties. There are some examples of statewide studies. ADOT prepared a Statewater Stormwater & Erosion Control Study, finalized September 2020. The purpose of this study was to create a model whose output will create a prioritized list of potential stormwater construction projects.

Additionally, Arizona's three state universities, University of Arizona, Arizona State University, and Northern Arizona University all have bachelor and advanced degree programs related to the practical design of stormwater systems. Research is conducted into, among other things, arid land hydrology and groundwater recharge.

OPERATION AND MAINTENANCE

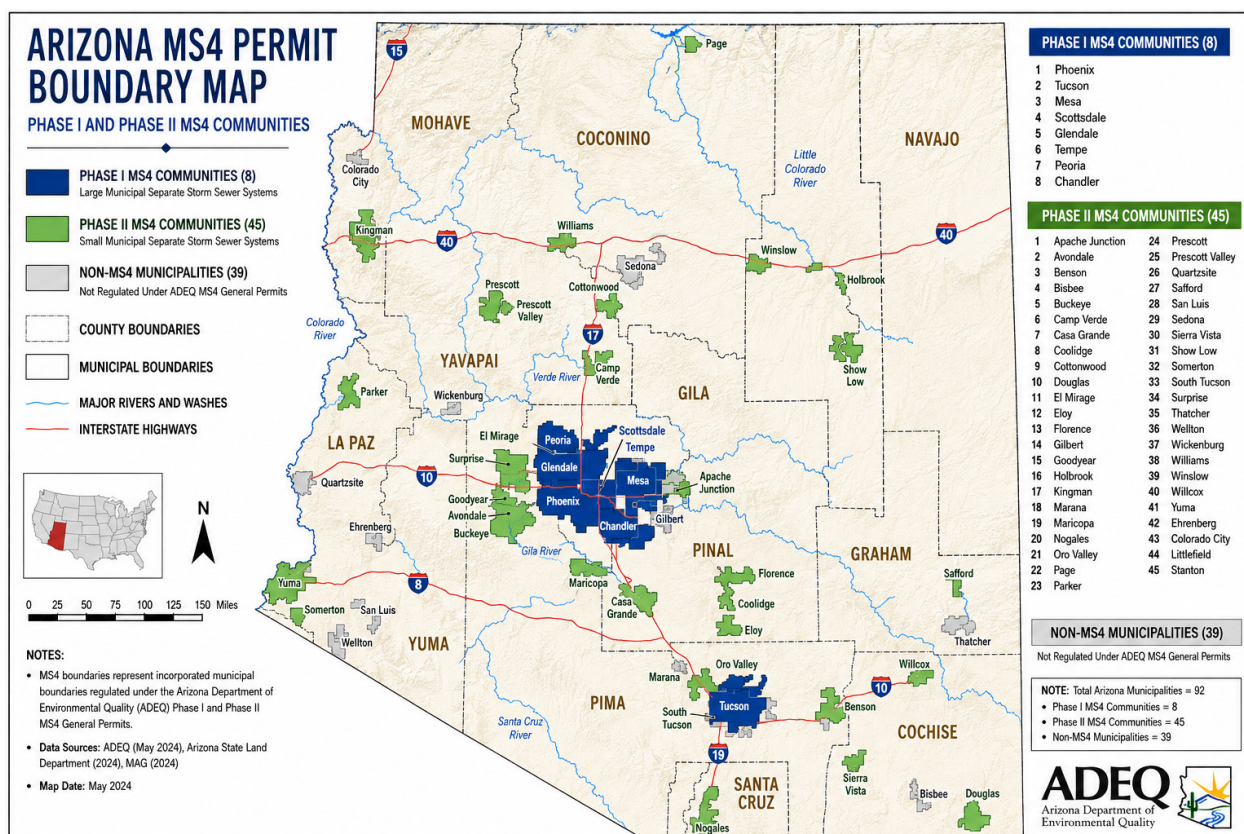
Stormwater infrastructure is only as effective as its management plan. Operations and Maintenance (O&M) are key to ensuring the adequate performance of stormwater infrastructure over the course of its operational lifespan. The City of Phoenix estimates that there are roughly 1,000 miles of stormwater pipes under the city, and given the national estimate of 3.5 million miles, there could be over 10,000 miles throughout all of Arizona. Responsible parties for stormwater infrastructure can vary between state and local governmental authorities, tribal authorities, homeowners' associations, and private/corporate ownership.

O&M permitting under ADEQ maintains compliance with the EPA's National Pollutant Discharge Elimination System (NPDES) MS4 program. Arizona has 8 Phase I MS4s and 45 Phase II MS4s regulated under the

AZPDES program. Over half the land area of Arizona is covered by MS4s, with the exception of significant areas of La Paz, Santa Cruz, Graham, Greenlee, Navajo, Apache, and Gila Counties, as well as Tribal Lands. Nearly all major population centers in Arizona are regulated under MS4 permits, leaving the rural areas as the focus for O&M improvement.

Arizona faces a range of water and stormwater workforce challenges, including an aging workforce and impending retirements, difficulties in recruiting qualified staff, operator shortages, increasing technical demands, gaps in stormwater expertise, and ongoing training needs. In addition, Arizona's rapid population growth—particularly in metropolitan areas such as Phoenix and Tucson—has further increased demand for skilled professionals in the water and stormwater sectors.

Figure 1. Arizona MS4 Permit Boundary Map



Source: ADEQ

FUNDING

Arizona has generally not maintained a dedicated stormwater funding program within its annual state budget. Unlike funding streams that support flood control or water supply infrastructure, there is no recurring state budget line item specifically focused on stormwater system upgrades, expansion, or long-term maintenance. The primary state-level funding source is the Arizona Sewer Overflow and Stormwater Reuse (OSG) Municipal Grant Program, administered by the ADEQ. This program supports pilot projects aimed at stormwater reuse and reducing pollutant runoff. However, the program is relatively modest in size and narrowly focused, limiting its ability to address broader stormwater infrastructure needs across the state. Arizona's overall water infrastructure funding landscape has also weakened in recent years. A significant concern is the 2025 budget reduction of \$333 million from the Water Infrastructure Finance Authority (WIFA). While these funds were not exclusively designated for stormwater projects, they were intended to support water infrastructure resilience and long-term planning. Their removal reduces the pool of state resources that could have indirectly supported stormwater-related investments.

Stormwater management is primarily funded at the municipal level through local fees and assessments.

In 2023, the City of Phoenix implemented a dedicated stormwater fee of \$0.25 per month for single-family residential properties to support compliance with MS4 requirements. According to the city, the fee is projected to generate approximately \$6.6 million in stormwater revenue during FY 2024–25. A few other Arizona communities also maintain dedicated stormwater fees, including Oro Valley in the Tucson metropolitan area and Flagstaff. However, dedicated local stormwater revenue mechanisms remain the exception rather than the norm across the state.

Arizona has historically relied on federal programs to supplement stormwater and flood-resilience investments. The state has received and continues to pursue funding through FEMA's Flood Mitigation Assistance (FMA) program, although the number of funded projects has been comparatively limited relative to larger flood-prone states. Over the last two decades, Arizona has received approximately \$57 million in FEMA Public Assistance funding, nearly \$2 million in Hazard Mitigation funding, and more than \$190,000 in Individual Assistance funding related to flood and disaster recovery efforts. While these programs can support certain stormwater and flood-mitigation activities, they are generally project-specific and not designed to provide sustained funding for routine stormwater infrastructure maintenance.

FUTURE NEED

Arizona's urban population, especially in the Phoenix metro and Tucson, has increased steadily over the past 10–15 years, driven by migration and housing expansion. Stormwater funding hasn't increased at the same rate. Most municipalities rely on general funds, flood control district property taxes, and limited stormwater utility fees. MS4 permits have driven some funding increases for compliance, but not for expanding capacity. This increased funding covers monitoring, sampling, reporting, public outreach and control measures.

According to EPA Needs Survey estimates, national stormwater infrastructure needs total approximately \$110–\$120 billion over 20 years, including \$60–\$70 billion for separate stormwater and wet-weather management systems. Arizona's stormwater priorities

center on MS4 compliance, urban drainage systems, flood-control infrastructure, and management of natural washes and channels. The state's investment needs are driven by stormwater management and flood mitigation, rather than the rehabilitation of legacy combined sewer systems.

In Arizona, "other stormwater infrastructure" includes drainage channels such as ephemeral washes, detention and retention basins, culverts and roadway drainage systems, green infrastructure retrofits, and erosion control systems. Quantifying these needs statewide is challenging due to the absence of a unified stormwater asset inventory and fragmented ownership among cities, counties, and flood control districts, making comprehensive planning and funding assessments more difficult.

Based on EPA national needs data adjusted for Arizona's population and urbanization, the state's total stormwater infrastructure need is estimated at approximately \$1–2.5 billion over a 20-year period. However, current funding falls far short of this need. Estimated total annual stormwater funding across Arizona is likely between \$50–150 million, distributed across various agencies and jurisdictions. As a result, the projected funding gap over 20 years is several hundred million to more than one billion dollars.

NOAA climate assessments for the Southwest highlight key trends affecting Arizona, including more intense

rainfall events, longer dry periods between storms, increased flash flood behavior, and greater rainfall variability, even if total annual precipitation does not rise significantly. These trends, combined with rapid urbanization and expanding impervious surfaces, are contributing to higher peak runoff rates, increased flood risk in washes and drainage channels, and greater stress on existing stormwater systems. Consequently, design standards based on historical rainfall patterns may underestimate future hydrologic extremes, emphasizing the need for more resilient and adaptive stormwater infrastructure planning in Arizona.

Arizona's urban population, especially in the Phoenix metro and Tucson, has increased steadily over the past 10-15 years, driven by migration and housing expansion. Stormwater funding hasn't increased at the same rate.

PUBLIC SAFETY

Arizona's weather is often characterized by extremes. Although Arizona has been in a long-term drought since 1994, it has experienced two 1000-year storm events in the last ten years. The majority of high-profile stormwater-related public safety incidents are due to flash floods. Arizona's climate makes it unique for flash flood potential due to sporadic and unpredictable monsoon storms paired with wildfire-scarred areas. In the past 20 years, there have been 13 federally declared flooding disasters by FEMA related to flooding, four of which have been in the past five years.

There are a variety of public safety resources available across the Arizona counties. Maricopa County has developed

publicly available storm-event simulation hydraulic models and real-time rainfall data. The City of Tucson develops its own detailed floodplain mapping. Throughout the state, FEMA Flood Maps are available as well as the Arizona Flood Warning System (AFWS) which is a statewide network of sensors that monitors rainfall, streamflows, and flood conditions. Many counties also utilize unique stormwater control infrastructure such as flood retarding structures, channel capacity modifications, and alluvial fan stabilization, which are often accompanied by an Emergency Action Plan. Although Arizona has developed many sophisticated public safety programs and structures, it is important that there is continued investment in public safety as the population continues to grow.

RESILIENCE AND INNOVATION

Arizona's stormwater systems have generally been designed to accommodate large rainfall events despite the state's arid climate and episodic precipitation patterns. However, increasingly unpredictable and intense storms are placing greater stress on existing infrastructure, particularly as assets age. Building resilience requires designing systems that can withstand

extreme events, fail safely when capacity is exceeded, and minimize recovery costs following flooding.

A key element of Arizona's resilient stormwater framework is the preservation of natural rivers, washes, and floodplains. Major waterways—including the Colorado, Gila, Salt, Verde, and Little Colorado Rivers—continue to serve as important natural conveyance

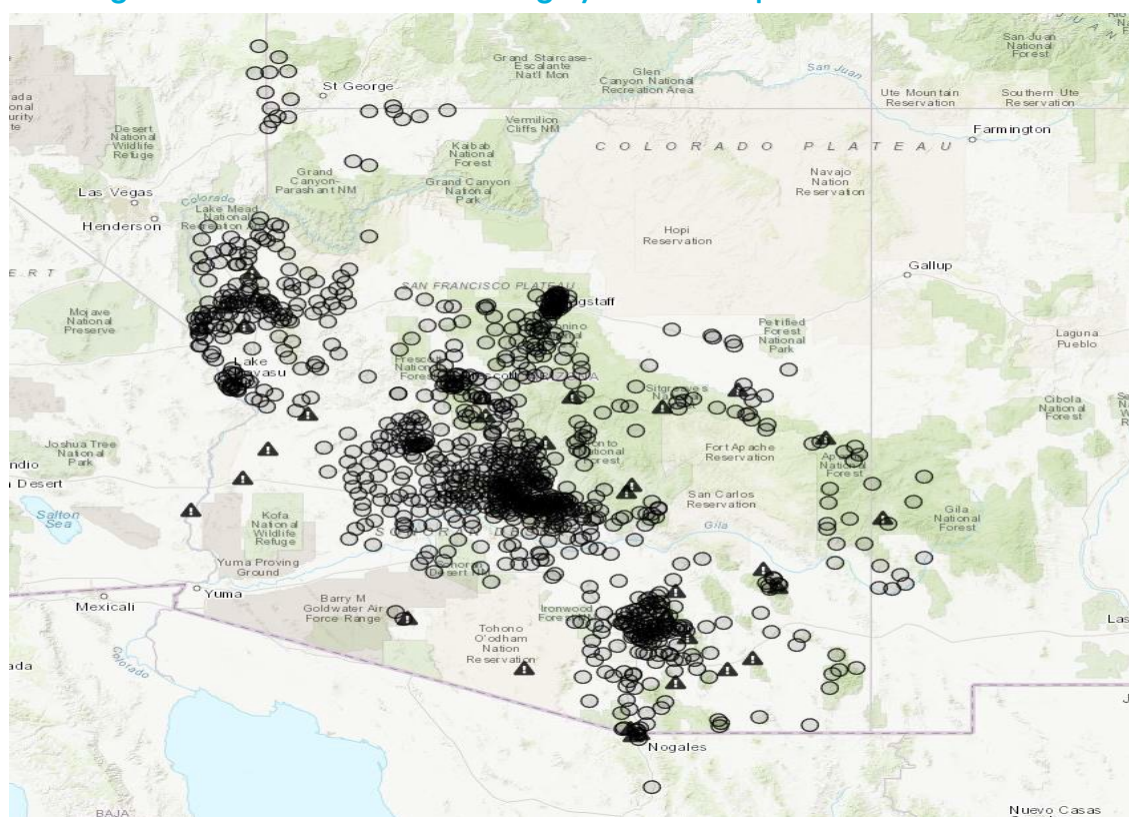
systems, directing stormwater flows away from developed areas. Preserved floodplains provide additional storage during extreme events and reduce the risk of catastrophic flooding. Protecting these natural corridors and their tributary washes remains one of the state's most effective stormwater management strategies.

Urban areas, particularly Phoenix and Tucson, have invested heavily in stormwater infrastructure over recent decades. As a result, these rapidly growing regions have generally managed storm events successfully through a combination of engineered drainage systems and development standards. Continued maintenance, rehabilitation, and eventual replacement of aging infrastructure will

be essential to sustaining this performance, requiring increased long-term funding commitments.

Challenges are more pronounced in smaller municipalities and rural communities, where stormwater infrastructure is often less developed and terrain can create large, fast-moving runoff events. Flash flooding remains a significant risk in these areas. Continued investment in AFWS monitoring technology and data-driven planning can help identify vulnerable locations and prioritize future infrastructure investments. The map below shows the concentration of AFWS sensors in the developed urban jurisdictions, but also the presence of sensors elsewhere throughout the state.

Figure 2. Arizona Flood Warning System – Map of Sensor Locations



Source: Arizona Flood Warning System

Innovation efforts across Arizona increasingly emphasize green infrastructure and low-impact development (LID) practices. Recent initiatives have focused on enhancing stormwater detention, infiltration, and reuse through measures such as reduced impervious surfaces, drywells, and drought-tolerant vegetation. While individual project improvements may be modest,

their cumulative effect can significantly reduce runoff, improve groundwater recharge, and lessen downstream flood risks. As future development occurs, incorporating resilient and innovative stormwater design at the project level will be critical to managing growing stormwater challenges statewide.



RECOMMENDATIONS TO RAISE THE GRADE

- **Improve Regional Coordination:** Develop coordinated stormwater management plans among counties, municipalities, and flood control districts to support sustainable funding, watershed-scale planning, and statewide asset management.
- **Increase System Resilience:** Incorporate updated rainfall and flood projections into stormwater planning and prioritize resilience-focused infrastructure upgrades.
- **Expand Public Engagement:** Promote public awareness of stormwater pollution prevention, water conservation, and the benefits of effective stormwater management.
- **Protect Natural Drainage Features:** Encourage policies and incentives that preserve natural wash corridors and other natural stormwater management assets.
- **Strengthen Workforce Capacity:** Invest in workforce development and technical expertise in hydrology, MS4 compliance, and asset management.
- **Advance Stormwater Asset Mapping:** Establish comprehensive mapping and inventory of underground stormwater infrastructure to support maintenance, planning, and future development.

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Transit



GRADE
COMPARISON

AZ: C
Nat'l: D



TRANSIT

EXECUTIVE SUMMARY

Public transit in Arizona delivers essential mobility, economic value, and environmental benefits, yet remains constrained by limited statewide funding, uneven service coverage, and aging assets. According to APTA, Arizona transit systems produce an estimated \$4 return per dollar invested.

Despite strong regional progress, particularly in the Maricopa, Pima, and Coconino regions, Arizona lacks a dedicated statewide transit funding source. This structural gap limits expansion, modernization, and the ability to meet growing demand. Transit remains a lifeline for seniors, individuals with disabilities, and workers who rely on non auto modes, yet 10–15% of the workforce still lacks adequate access to reliable transit.

Major investments, including the 2025 South Central Light Rail Extension, Flagstaff's Prop 488 expansion, and new regional mobility plans, demonstrate momentum. However, first/last mile gaps, operator shortages, aging fleets, and inconsistent infrastructure conditions continue to constrain performance. Without state-level investment and policy alignment, Arizona's transit systems cannot fully support economic growth, environmental goals, or equitable mobility.

CAPACITY AND CONDITION

Public transit programs include local and express buses, light rail, streetcars, neighborhood circulators, shuttles, rural connector buses, dial-a-ride services, and vanpools. However, a significant portion of the state's population lacks adequate access to public transit. Arizona features local and regional transit systems in 13 of the state's 15 counties, including five urbanized and 22 rural transit systems. Nine of these counties are in rural Arizona and provide essential services to residents throughout the state. Arizona's transit systems

primarily serve the four largest urbanized areas: the Phoenix metro area, Tucson, Flagstaff, and Yuma. These urban areas display varying levels of dedicated local transit funding, governing authority over regional transit, and regional funding sources.

In Arizona, 15-10% of the workforce do not drive themselves to work and instead use other means such as carpooling, buses, or light rail to commute. Transit agencies in Arizona continually strive to provide services

to various users and communities, including park-and-ride stations where commuters can conveniently park their vehicles near a public transit stop and continue their journey via public transit. Carpool programs and incentives have also been introduced, such as the “Get On Board” program by Tucson’s SunTran, which collaborates with employers and employees, and carpooling programs instituted by SunTran and Valley Metro. Notably, the extensions and improvements to the Maricopa Association of Governments (MAG), Pinal public transit, and Flagstaff’s Mountain Line have occurred since the establishment of regional funding programs (i.e., for the MAG/Pinal regions: Prop 400 in 2004, and Prop 479 in 2024, RTA for Pima County in 2022, and Prop 488 in 2024 for Flagstaff).

Several transit and transportation initiatives are underway to improve mobility and support growth. MAG is evaluating Maricopa Express Transit (MET) service performance and local connectivity to meet the needs of the city’s rapidly growing population. In western Arizona, the Western Arizona Council of Governments (WACOG) has developed a Regional Transit Implementation Plan for Mohave and La Paz counties to assess service options and strengthen coordination among local transit providers. The Phoenix metropolitan area recently expanded its transit network with the opening of the South Central light rail extension in June 2025, adding 5.5 miles of track and eight new stations. Meanwhile, Pinal County is advancing long-range transportation plans that emphasize transit integration, while communities such as Glendale are investing in new sidewalks and bike lanes through a combination of federal and local funding.

Arizona’s largest transit network is centered in the MAG region, where Valley Metro operates light rail and regional bus services across Phoenix, Tempe, and Mesa. The system expanded significantly with the opening of the 5.5-mile South Central Extension in June 2025, bringing the rail network to 35 miles and introducing two operating routes that connect Mesa, downtown Phoenix, and north and south Phoenix. Valley Metro plans five additional high-capacity transit projects—including light rail, streetcar, and bus rapid transit investments—to expand the network to 49 miles by 2030.

In Arizona, 15-10% of the workforce do not drive themselves to work and instead use other means such as carpooling, buses, or light rail to commute. Transit agencies in Arizona continually strive to provide services to various users and communities, including park-and-ride stations where commuters can conveniently park their vehicles near a public transit stop and continue their journey via public transit.

In southern and central Arizona, regional agencies are advancing transit planning and service coordination. The Pima Association of Governments (PAG) oversees transportation planning in the Tucson area and works with Sun Tran and Sun Shuttle services, which collectively provide millions of annual transit trips while pursuing accessibility enhancements such as upgraded bus stop amenities and signage. In Pinal County, the Sun Corridor Metropolitan Planning Organization (SCMPO) supports transit services in Casa Grande, Coolidge, Eloy, and surrounding communities, where agencies are expanding microtransit, fixed-route service, and regional connections. Coolidge is updating its Transit Plan in 2025, while Casa Grande is extending routes and adding bus stops after initially launching service with federal pandemic-relief funding. Complementing these efforts, the Central Arizona Governments (CAG) is leading the Pinal County Mobility Gap Analysis, a regional study that will guide future transit development across Gila and Pinal counties, while SCMPO continues to coordinate transit planning, funding applications, and project inclusion in regional transportation improvement programs.

Table 1: Summary of Transit in Large Urban Areas in Arizona

Services	MAG Region (City of Phoenix, Valley Metro Light Rail, RPTA, and Tempe (Tier 1, indicating the highest level of service))	Sun Tran (Tucson)	Yuma County Area Transit (YCAT)	Flagstaff
Bus/ Express Routes	19 Express/RAPID Routes	29 regular fixed routes and 13 express routes, totaling 42 routes	11 fixed routes and 24 buses across southwestern Yuma County, including cities such as Yuma, San Luis, Somerton, and Wellton, as well as areas like the Cocopah and Quechan Indian Reservations	9 fixed routes and 30 buses, including two battery electric buses and 28 hybrid-electric buses
Streetcar	The City of Tempe has 6 Tempe Streetcar cars, while Phoenix does not have a streetcar system.	The route includes a 3.9-mile loop with 23 stops.	N/A	N/A
Light rail	35-mile two-line rail system, with additional miles under construction/in development	N/A	N/A	N/A
Van/ Shuttles/ Taxi	N/A	12 neighborhood circulator routes	3 minivans utilized for paratransit services	7 paratransit vans dedicated to serving passengers with disabilities. 15 vans for workers who live or work in nearby cities (i.e., Williams, Winslow, Holbrook) and connect to Flagstaff. Some employers are supporting the costs of these vanpools in addition to the Coconino County subsidy of \$400 per van per month.
Other	14 Transit Centers 55 Park and Ride Lots (more than 4,500 total parking spaces) 29.5 Average Headway in Minutes (all routes and transit modes).	Sun Tran plans to eliminate all diesel buses by 2028, replacing them with electric and CNG-powered vehicles. Recent expansions include the addition of 19 electric buses and the installation of new charging stations.	Commuter services to or from employment sites provided the van starts, ends, or travels through Yuma County; 4 trolleys. The Saguaro Foundation provides transportation services for elderly, handicapped, and developmentally disabled individuals within Yuma County and the State of Arizona.	Mountain Line GO!: A microtransit service designed to provide flexible, on-demand transportation within specific zones in Flagstaff. There are also subsidized taxi rides for eligible passengers, enhancing mobility options beyond the fixed-route and paratransit services.



FUNDING

Arizona's transit systems are funded through a combination of federal grants, local sales taxes, fare revenue, and other directly generated income sources, such as parking fees. The relevant transit agencies may also receive funds from federal and local governments; however, Arizona is one of the few states in the nation without dedicated statewide transit funding. Funds administered by ADOT are generally passed through the state from the federal government, with local funding provided by participating cities, towns, and regions. Because grant funding is often limited to capital projects, it can typically support buses, buildings, and related expenses, but not service operations. As a result, local funding sources are necessary both to sustain transit service and to access federal dollars.

The Arizona Department of Transportation Multimodal Planning Division (ADOT-MPD) manages and oversees various transit programs on behalf of the FTA to benefit public transit in Arizona. Examples include the Metropolitan Transportation Program, the Enhanced Mobility of Seniors and Individuals with Disabilities Program, and the Rural Public Transportation Program. ADOT is Arizona's designated state agency for administering several FTA programs, helping ensure federal funds are used to enhance transportation services for targeted populations, support rural transit, and improve bus infrastructure. ADOT works with regional transportation planning agencies, direct recipients, and subrecipients to implement these programs and ensure compliance with federal requirements.

Federal funding continues to play an important role in supporting major transit investments in Arizona. Federal transit funding saw a significant increase thanks to the Infrastructure Investment and Jobs Act of 2021 (IIJA). As of January 2021, over \$776 million in IIJA funding had been announced for public transit in the state through a combination of competitive and formula funding. A significant amount of federal support comes through the Capital Investment Grant (CIG) program, which received increased funding through IIJA. A number of projects have received CIG funding in recent years including the Capitol Extension in Phoenix, the Northwest Extension, the Tucson High-Capacity Transit Project, and Valley Metro's South Central Light Rail Extension/Downtown Hub Project. The Capitol Extension is a 1.4-mile light rail extension in downtown Phoenix, including a single-track, one-way loop

and three split-platform stations. The Tucson High-Capacity Transit Project aims to improve public transit options in Tucson, while the South Central Light Rail Extension/Downtown Hub Project expands the Valley Metro light rail system with a new extension and downtown hub.

In the Phoenix metropolitan region, Valley Metro member agencies provide funding to operate the transit system throughout the region alongside grant funds. Additional funding is provided through Proposition 479, approved by Maricopa County voters in November 2024. The measure extends the region's half-cent transportation sales tax through 2045 and is projected to generate \$14.9 billion in revenues in 2020 dollars. Public transportation is allocated 37% of Proposition 479 funding, with transit expected to receive approximately \$9.3 billion over the 20-year program. Per state law, however, Proposition 479 half-cent sales tax revenues cannot be used to expand the Valley Metro Rail network, including light rail or streetcar service. The Phoenix region also recently expanded its transit network with the opening of the \$1.34 billion South Central light rail extension in June 2025, adding 5.5 miles of track and eight new stations.

In the Tucson metropolitan region, the transit system is operated by Sun Tran and is largely funded by the City of Tucson, the Regional Transportation Authority, and grant funds. Like the Phoenix area, the Tucson region receives additional transportation funding through a 20-year half-cent sales tax, which was extended as of March 2026.

In Flagstaff, the Mountain Line is funded through a local sales tax and also secures competitive federal funding through the Small Transit Intensive Cities program for achieving the same performance measures as larger systems. Following a 70% increase in dedicated sales tax, Mountain Line is increasing weekday and weekend frequency, extending service hours, and reaching more areas. Proposition 488 is expected to further increase service frequency, coverage, and infrastructure improvements while supporting local economic development.

Arizona has also taken steps to support statewide transportation innovation. In 2025, the Arizona Legislature passed SB 1750, establishing the Arizona Statewide Transportation Innovation Fund, which provides new revenue for local, non-federal transit projects.

FUTURE NEED

A statewide Long-Range Transportation Plan named What Moves You Arizona (WMYA) 2040 was developed to address the growing needs of the state's transit system. The plan covers a 25-year horizon from 2016 to 2040 to tackle the current transportation infrastructure. The first step involves conducting research for Arizona's MPOs and other ADOT partners regarding the state's current transportation status, including anticipated system performance. The total needs for the 25-year plan exceed \$98 billion.

ADOT's goal for 2040 is to provide enough vehicles to 5,310 agencies and deliver these vehicles promptly to ensure that fleets across Arizona are maintained in good

repair. ADOT also aims to provide sufficient preventive maintenance to meet the needs of all 5,310 agencies within Arizona and assist them in keeping their vehicles in good condition. ADOT received funding requests for the Federal Fiscal Year (FFY) 2025 and 2026, with 40 applications totaling \$15 million. However, ADOT was only able to allocate \$5.2 million. Some safety concerns involve the disposal process for vehicles that 5,310 transit providers possess, which are in poor condition or considered lemons. Limited staffing may have hindered these providers from starting the disposal process. Additionally, due to the ongoing loss of drivers, transit providers must train new drivers who may not be highly experienced on the roads of Arizona.

The need for continued asset management is reflected in ADOT's 2022 inventory and condition data. Participating subrecipients reported 477 revenue vehicles, 14 equipment assets, and five facilities. Approximately 23% of revenue vehicles were at or past their useful life benchmark, with higher shares among vans, minivans, and certain non-revenue equipment.

OPERATION & MAINTENANCE

Operations and maintenance responsibilities for Arizona's transit systems are managed primarily by individual transit agencies and local governments. While comprehensive statewide O&M data is limited, available information from major systems indicates that transit agencies are making targeted investments to maintain service, modernize facilities, and address workforce constraints.

ADOT also supports statewide transit asset management through its Transit Asset Management Group Plan, which provides guidance for achieving and maintaining a state of good repair for public transportation assets across Arizona. The plan is used to manage the equitable distribution of a portion of FTA's funding for the state. The plan includes a capital asset inventory, condition assessment, decision-support process, and investment prioritization framework to help guide maintenance, rehabilitation, replacement,

and funding decisions. ADOT's goals include improving statewide average vehicle condition, prioritizing replacement of vehicles in poor condition or beyond their useful life, and continuing preventive maintenance to extend vehicle service life.

The need for continued asset management is reflected in ADOT's 2022 inventory and condition data. Participating subrecipients reported 477 revenue vehicles, 14 equipment assets, and five facilities. Approximately 23% of revenue vehicles were at or past their useful life benchmark, with higher shares among vans, minivans, and certain non-revenue equipment. Facilities reported through the plan had an average condition score of 4.0/5.0 using the FTA Transit Economic Requirements Model (TERM). This rating indicates a generally good condition, but continued monitoring and investment will be needed as assets age.

In the Phoenix region, Valley Metro operates and maintains the region's light rail and streetcar systems, supported by its Operations and Maintenance Center. The facility, which was expanded in 2023, houses the full light rail and streetcar fleet and serves as the base for Valley Metro's O&M workforce. Valley Metro reported annual operating costs of approximately \$31.3 million for light rail, covering vehicle operations, maintenance, staffing, and infrastructure upkeep.

In Tucson, transit O&M needs are reflected across Sun Tran bus service, Sun Link streetcar, and Sun Van paratransit. Recent available data indicate annual O&M costs of roughly \$107 million across the system, including approximately \$91 million for Sun Tran bus service, \$4.7 million for Sun Link streetcar operations, and \$11 million

for Sun Van paratransit. These costs support millions of annual riders and extensive service miles across fixed-route and demand-response services.

Like transit agencies nationwide, Arizona systems continue to face operator shortages, which can affect service reliability and long-term system capacity. Some agencies have responded with creative partnerships. In Flagstaff, Mountain Line partnered with the Flagstaff Unified School District after both organizations faced driver shortages following the pandemic. Through the partnership, eligible students receive transit passes and support using the public bus system. More than 1,000 students, or about 60% of those eligible, now use public transit to get to school, demonstrating how local coordination can help address workforce and service challenges.

SAFETY

Public transit is one of the safest ways to get around, estimated to be ten times safer per mile than driving. Arizona is taking steps to further improve safety of transit in the state. The Federal Transit Administration (FTA) requires all operators of public small and large urban transportation systems that receive federal financial assistance from the Urbanized Area Formula Program to complete a PTASP that includes safety performance targets set by the transit provider. In the MAG region, these providers are the City of Phoenix, Valley Metro RPTA, and Valley Metro Rail. By this requirement, these providers have established targets based on previous benchmarks. The four target categories included in the PTASP include safety events (such as collisions, derailments, fire, evacuation, etc.), injuries, fatalities, and system reliability.

Targets are first derived from each transit operator. Then, each target category is combined to establish the regional PTASP targets. MAG's 2025 regional targets include:

- **Motor Bus:** 0.01 fatalities, 0.51 injuries, 2.4 safety events per 100k miles; 15,612 miles between failures.
- **Rail:** 0.03 fatalities, 0.60 injuries, 1.66 safety events per 100k miles; 15,000 miles between failures.

Valley Metro has seen decreases in safety incidents as a result of partnerships with local law enforcement, social services, and increased training. Bus operator assaults saw a 61% decrease between the second half of 2024 and the first half of 2025, in part due to training, signage, and a new felony state law. Rail security incidents also saw a 54% decrease.

Several cities use collaborative outreach models that pair law enforcement with specialized homelessness-support teams. In Chandler, police officers work alongside community "navigators" who connect people experiencing homelessness with services and programs. In Mesa, officers partner with the Homeless Outreach Project, a joint effort with a nonprofit organization that proactively engages individuals experiencing homelessness and links them to available resources. In Tempe, police coordinate with the HOPE (Homeless Outreach Program Effort) team, which provides a broad range of support services and crisis assistance. Together, these approaches emphasize service connection and outreach in addition to traditional policing.

INNOVATION AND RESILIENCE

Across the Valley and beyond, a quiet revolution is underway. In Peoria, an autonomous shuttle glides along its programmed route; these are smooth, electric, and driverless, offering residents a glimpse of what a fully automated transit ecosystem could become. What began as a test is quickly becoming a proving ground for how smaller cities can adopt cutting edge mobility without sacrificing safety or reliability.

Farther north, Flagstaff and Lake Havasu have been exploring a different frontier: on demand transit. Flagstaff's bold 2022 pilot, Microtransit GO!, did more than fill service gaps; it demonstrated that flexible, app based mobility could thrive in a mountain town with seasonal tourism, university travel patterns, and diverse community needs. Its success was undeniable. By 2023, the pilot became a permanent part of the city's transit network, signaling a statewide shift toward microtransit solutions that meet riders where they are.

In the Phoenix metro area, innovation is accelerating at an even faster pace. Waymo's partnership with Valley Metro Rail is redefining the first and last mile experience. Instead of relying on personal vehicles or long walks, riders can now connect to rail stations using Waymo's autonomous fleet, an integration that blends public transit with private sector technology in a way few regions in the country have achieved.

Micromobility is also experiencing a renaissance. Cities like Phoenix, Tucson, and Tempe have embraced bike share programs that give residents and visitors a low cost, zero emission way to navigate dense urban corridors. Even Flagstaff, whose pilot program faltered during COVID,

has reignited conversations about a micromobility share program, recognizing its value for students, workers, and tourists alike.

And as mobility preferences evolve, so do the options. Tempe and Phoenix have leaned into carshare programs, offering residents an alternative to car ownership that aligns with sustainability goals, urban living patterns, and the growing desire for flexible, pay as you go transportation.

Transit in Arizona is also vulnerable to extreme weather. ADOT is in the process of developing a Resilience Improvement Plan which will address vulnerabilities across the transportation system, including transit systems in the state. Extreme heat is of particular concern in Arizona. Phoenix's extreme heat makes bus stops a serious public health and transit access issue, seeing at least 21 heat-related deaths at Phoenix bus stops in 2023. While 77.5% of the city's roughly 4,000 bus stops have shade structures and the city aims to shade every stop by 2050, shade alone may not provide adequate thermal comfort, especially when surrounding pavement, benches, and metal surfaces retain dangerous heat. Phoenix and Valley Metro are using strategies such as improved bus air conditioning, real-time arrival information, cooling center outreach, and broader heat-response programs, while studies point to trees, vegetation, reflective materials, and better-designed shelters as more effective ways to reduce heat exposure. As Phoenix works toward becoming a more sustainable desert city and increasing the share of residents using transit, walking, and biking, improving bus stop shade, comfort, and reliability will be essential for protecting riders and supporting equitable access to public transportation.



RECOMMENDATIONS TO RAISE THE GRADE

- Advocate and support legislation to increase funding for repairing and rehabilitating Arizona's public transportation infrastructure. The state of Arizona does not provide transit funding; it is all pass-through federal funds.
- Raise and allocate state gas tax to support local and regional transit system expansion.
- Prioritize the movement of public transportation through transit supportive policies that allow and encourage bus rapid transit (BRT), transit signal priority, transit-only lanes, and bus stop additions.
- Align state policies to support crossings addressing pedestrian and bicycle infrastructure and improvements.
- Coordinate efforts with land use planners and developers to incorporate transit-oriented development principles to create more walkable and accessible urban environments.
- Leverage the opportunities provided by e-bikes and e-scooters to connect users in first/last-mile trips and create larger and more robust pedestrian and bicycle networks.
- Encourage state support to drive federal action on redefining the Commercial Driver's License (CDL) requirement and process for transit programs.



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Wastewater



Photo: Phoenix 23rd Avenue Wastewater Treatment Plant

GRADE
COMPARISON

AZ: C
Nat'l: D+



WASTEWATER

EXECUTIVE SUMMARY

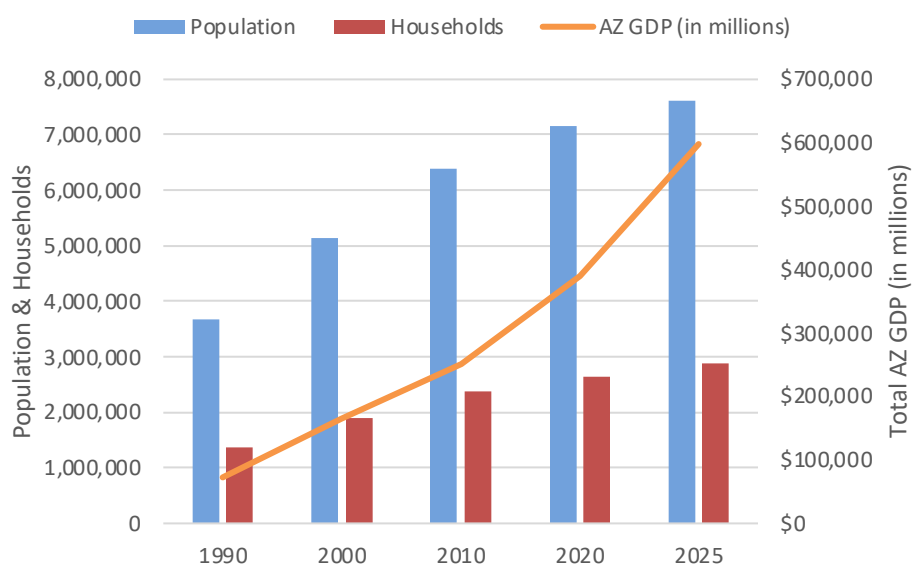
Wastewater infrastructure provides basic sanitation needs with measurable value for public health, quality of natural environments, and ability to support population and economic growth. For Arizona's wastewater sector to maintain the state's economic and projected population growth, approximately 30-50% of the state's wastewater network, and 15% of the wastewater treatment plants (WWTPs) require rehabilitation, and at least a dozen WWTPs need expansion. Disparities exist between urban and rural utilities in technical, financial and management capacity. Future regulatory requirements will require enhanced treatment processes requiring higher levels of instrumentation and control to ensure compliance. Prolonged drought conditions in the region are driving implementation of Advanced Water Purification (AWP) technologies. Although the majority of WWTPs have up-to-date assessments of their needs, Arizona's wastewater infrastructure has a \$1.9 billion investment shortfall. Despite this significant funding gap, there has been a positive trend in recent investments, but those trends are not uniform across the State.

BACKGROUND

Wastewater collection and treatment are critical in Arizona to protect public health and ensure water security in a desert climate. Proper collection networks and rigorous treatment processes eliminate disease causing bacteria, hazardous chemicals, and contaminants from the environment. Treated wastewater, known as effluent, is an essential, renewable resource used to replenish groundwater aquifers, sustain local riparian habitats, and irrigate municipal landscapes, and reduce reliance on finite potable water supplies.

Arizona's population exceeded 7.61 million in 2024 according to the Arizona Office of Economic Opportunity and has experienced a 108% increase in population since 1990. One of the distinctive features of the population distribution is, based on 2024 data, 78.6% of Arizona's total population resides in one of the 90 incorporated cities or towns and 72.3% of the population resides in the Phoenix Metropolitan area.

Figure 1: Arizona Population & GDP Growth



Source: Arizona Office of Economic Opportunity

CONDITION & CAPACITY

There are over 26,000 miles of sewer collection pipelines and approximately 320 WWTPs in Arizona. Approximately 54% of those WWTPs discharge treated effluent for beneficial reuse, accounting for 52% of treated effluent from WWTPs statewide in Arizona. The wastewater infrastructure is provided by over 140 public utilities, across 46 cities and 45 towns in 15 counties, in addition to approximately 41 private wastewater utilities, as regulated by the Arizona Corporation Commission.

Public wastewater collection systems will need near-term expansions to serve planned development, along with targeted upgrades to the existing network to support that growth. However, only a slight majority (52%) of public wastewater entities currently maintain, or have recently completed master planning assessments, which formally identify the available capacity and determine the condition of those collection systems. While this demonstrates most utilities are adopting a proactive approach to sustaining capacity needs in collection systems, many utilities need to initiate or maintain master planning assessments.

Most sewer pipes owned by the state's largest utilities were constructed 50 to 70 years ago. While the materials for this type of infrastructure should have a life cycle approaching 100 years, some materials observed have a life cycle closer to 30 to 40 years on average. This reduction in life cycle can be attributed

to advances in the manufacture of the pipes and less stringent construction methods and standards. Therefore, a massive effort will be required by utilities to rehabilitate or renew 30% to 50% of the collection system infrastructure in the next 10 years.

Per state requirements via plat operating permits in Arizona, when flow to a WWTP reaches 80% of its average daily capacity, design for expansion and/or improvements is required to begin, and at 90% of the average daily capacity, construction should be initiated. Based on the available performance and capacity data, and review of short-term capital improvement planning of 140 public WWTPs, it was found that expansion of at least a dozen WWTPs, the construction of at least three new WWTPs, plus the re-commissioning of two WWTPs are planned in the next five years.

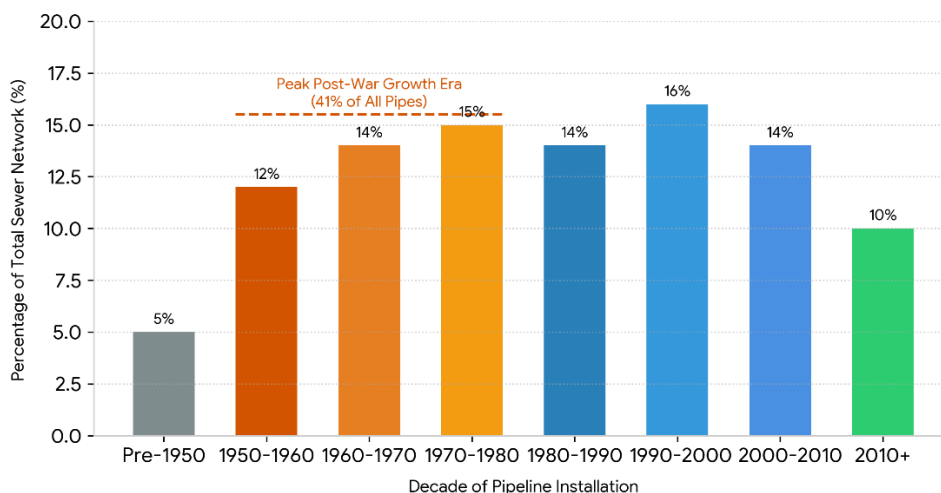
Analysis of available Capital Improvement Plans indicates that current projects primarily focus on replacing or rehabilitating 25- to 40-year-old assets to extend the useful life of wastewater systems. Evaluation of the needs of private wastewater treatment providers revealed approximately 20% of the 41 private providers have WWTPs projected to need improvements or expansion due to performance and/or capacity limitations.

Additionally, up to 30% of existing public and private WWTPs have advanced condition and/or performance concerns, requiring rehabilitation, renewal, and optimization.

Approximately 15% of Arizona's existing households rely on decentralized wastewater treatment systems such as septic tanks, according to data from the Arizona Department of Environmental Quality

(ADEQ). Septic systems remain a viable solution for decentralized wastewater treatment as the systems are well regulated by the ADEQ and county environmental quality departments. When engineered, constructed, and maintained correctly, the potential negative impacts these systems have on the state's aquifers and natural habitats are minimized.

Figure 2: Age Distribution of Wastewater Collection Piping



Source: data collected from City of Phoenix and other municipalities

OPERATION & MAINTENANCE

There is a continuing and ongoing shortfall in the Operation & Maintenance (O&M) staff employed by the state's utility providers to maintain the growing wastewater infrastructure as both more facilities and more complex facilities are built and brought into operation. The need for O&M staff is expected to grow even larger as more experienced staff retire from the workforce. Roughly 30% of Arizona's wastewater workforce could retire within the next ten years, elevating the urgency for operator training, certification, and competitive pay. This trend will worsen as additional and more complex treatment plants are required to meet population growth, regulatory requirements, and the need to construct and bring AWP treatment facilities online. Utility providers will need to address the need for more, higher skilled and highly trained certified operators by taking proactive steps to keep pay competitive and increase training opportunities.

One approach utilities are using to identify the rehabilitation needs and develop the necessary funding to support and sustain the state's wastewater sector is by using proactive management techniques like asset condition assessments and predictive maintenance systems. Formalized condition assessments utilize an evaluation of the actual asset condition, available level of service and a criticality analysis to quantify the rehabilitation needs and necessary funding to maintain and improve wastewater infrastructure and strategically use financial resources. The use of predictive and reliability-centered maintenance systems, which focus on the planning, monitoring and measurement of maintenance activities, allow providers to further use financial resources strategically. These types of systems support data driven decision making, which is a more effective financial and maintenance management tool for wastewater infrastructure. From 2020 to 2025,

the number of public providers initiating or continuing an asset management program for their collection systems and WWTPs has continued to increase based on market data and analysis. This is another area of disparity between the larger, urban utility providers and the smaller, rural utility providers, as much of the

increase in asset management programs has occurred with the urban utility providers. It is expected this trend will continue to grow as utility leaders see the benefits of having data to drive decisions and the ability to provide data to support the need for increased capital improvement spending and rate increases.

FUNDING AND FUTURE NEED

Wastewater utilities have a variety of funding sources, unique to whether they are public or private, and based on the type and extent of the infrastructure need. Funding can come from external sources such as Federal and State funding programs, internal sources such as fees relating to services provided, development impact fees for new services, and contributions from other tax revenue.

At the Federal level, funding options include Water Infrastructure Finance and Innovation Act (WIFIA) loans and funding through the Infrastructure Investment and Jobs Act (IIJA). These funding sources either add to Federal funding available to State Revolving Fund (SRF) programs or are made available directly from the Federal government.

At the State level, one of the primary funding sources is the Water Infrastructure Finance Authority of Arizona (WIFA). WIFA administers the State Revolving Fund programs by providing financing through low interest loans, technical assistance programs, and forgivable principal programs for communities throughout Arizona. WIFA administers a number of programs to assist communities with the greatest need to maintain and improve water quality in Arizona. These programs include:

- Drinking Water State Revolving Fund (DWSRF) – helps public and private water systems meet the objectives of the Safe Drinking Water Act.
- Clean Water State Revolving Fund (CWSRF) – CWSRF is a federal-state partnership providing various types of assistance, including loans, refinancing, purchasing, or guaranteeing local debt and purchasing bond insurance for the planning, engineering, constructing, and upgrading of publicly owned wastewater and water reclamation projects.
- Water Supply Development Revolving Fund (WSDRF) – was recently created to provide

low-cost financing and technical assistance for water supply development projects outside of Arizona's major urban centers.

- Water Conservation Grant Fund – provides funding for projects promoting groundwater recharge and aquifer health.
- Technical Assistance Program – assists eligible wastewater and drinking water systems serving populations of 10,000 or fewer to prepare for project construction through pre-design and design grants.

Funding for wastewater utilities operation, maintenance and CIP projects can also come from internal utility sources such as fees related to services provided. The vast majority (94%) of residential wastewater rate structures are based on two models: uniform flat fees independent of volume, or volumetric charges based on winter water consumption to exclude outdoor irrigation. In contrast to most residential customers, the use of increasing block or volumetric based wastewater fee structuring is used for commercial and industrial needs and recovers more cost as the use increases.

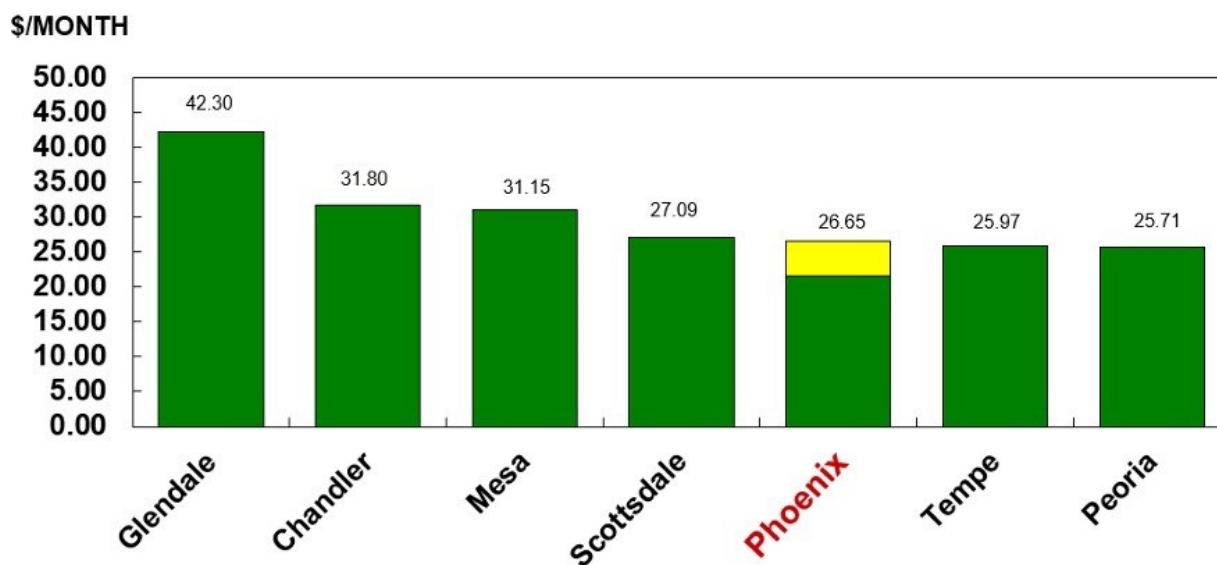
Recent surveys show that many utilities in Arizona have raised their wastewater rates in the last five years, with the most of those utilities being larger and in the urban areas.

These rate increases had been gradual but are becoming larger as economic conditions dictate higher expenses for operations and maintenance and capital improvement projects. However, approximately 50 small utilities have not adjusted their rates in the past 20 years. This means the utilities are either operating based on old assumptions of revenue versus operating costs or have evaluated their rates and costs and either decided they are adequate to sustain the required level of service, or are unable to achieve requested rate increases through their specific political processes.

Overall, Arizona's wastewater rates, as measured by average single-family monthly bills, remain generally low to mid when compared to utility rates nationally. The average single-family monthly bill for wastewater services in the City of Phoenix, for example, is at the

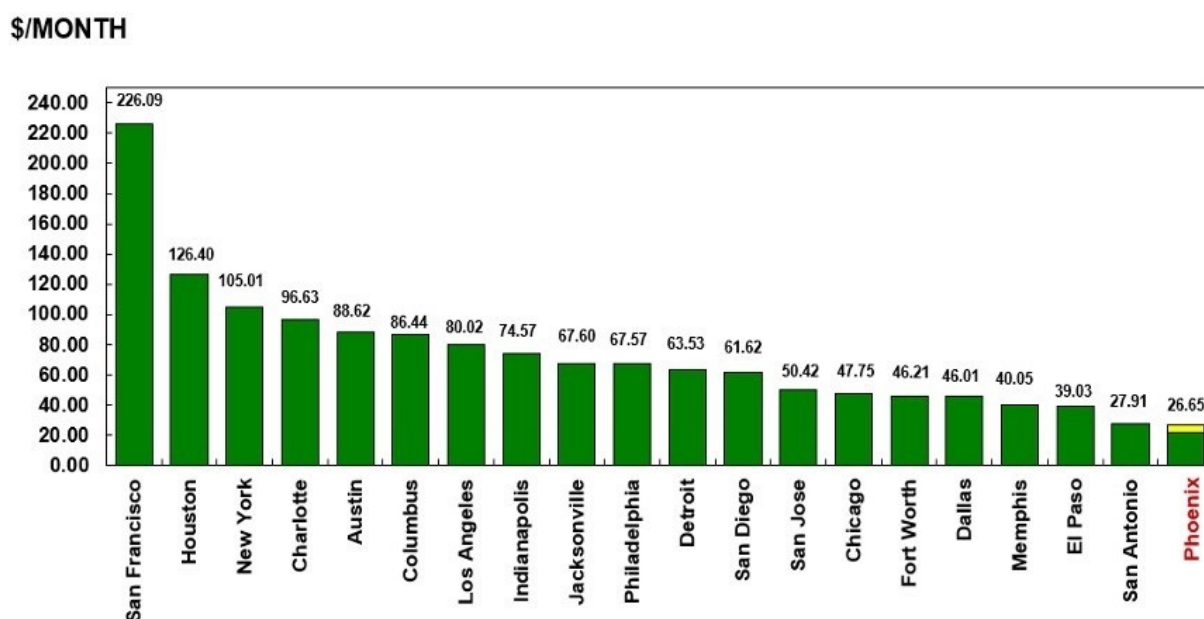
low end of the nation's largest twenty cities. The average single-family monthly bill for wastewater services for the City of Phoenix is also lower than average for the Phoenix metropolitan area.

Figure 3: Wastewater Rate Comparison of Average Single-Family Monthly Bill in Phoenix Metro Area



Source: data collected by City of Phoenix as of April 2026

Figure 4: Wastewater Rate Comparison of Average Single-Family Monthly Bill for Twenty Largest U.S. Cities

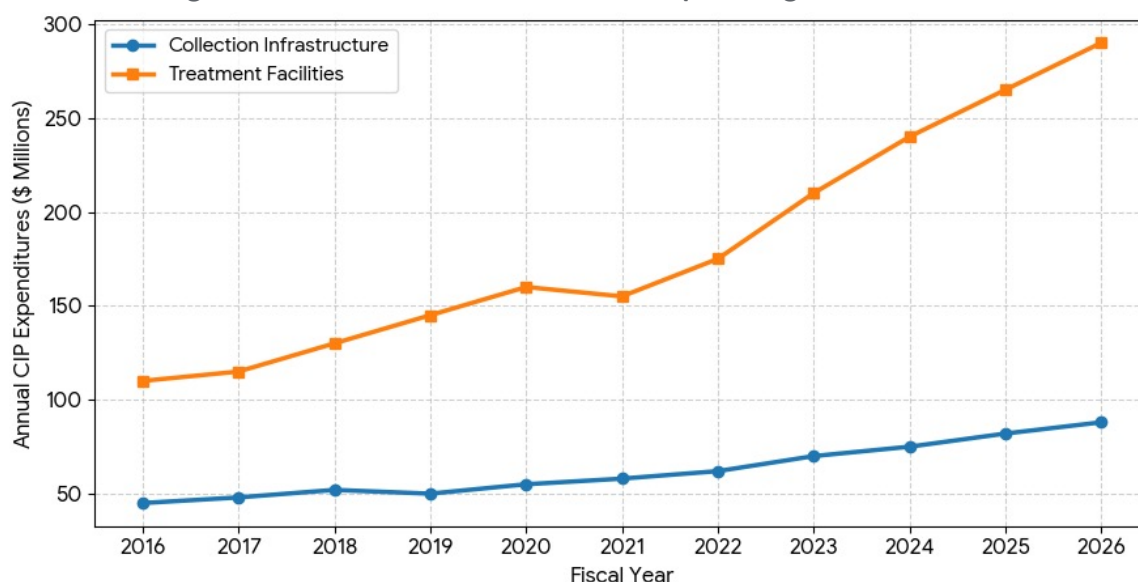


Source: data collected by City of Phoenix as of April 2026

The financial needs of Arizona continue to increase, along with the gap between available and needed funding. According to the United States Environmental Protection Agency's (EPA) 2022 Clean Watersheds Needs Survey (CWNS), the projected total financial needs to address known issues relating wastewater infrastructure for Arizona is \$5.5 billion over the next five years. While this indicates a reduction in the total financial need since 2020, spending to address the needs is concentrated in the

urban utilities while rural utilities still face limited financial capability. In addition, the gap between available funding and the need across the state continues to increase due to inflationary pressures associated with labor, operations and maintenance, and construction materials. Latest estimates place the funding gap at \$1.9 billion, which has grown 35% since 2020 due to inflationary pressures. This indicates a persistent underinvestment that will likely grow with inflation.

Figure 5: Arizona Wastewater CIP Spending (2016-2026)



Source: data collected from AMWUA, City of Phoenix, Fitch Ratings

CIP spending across the largest public wastewater utilities increased by approximately \$235 million between 2016 and 2025. This increase is in addition to significant investments in condition assessments and asset management programs. The ratio related to spending on WWTPs versus collection systems in Arizona revealed a 3:1 ratio in favor of WWTPs, \$300 million for WWTPs versus \$90 million for collection systems. This disparity is a result of increased age of treatment facilities resulting in major rehabilitation

projects, escalating regulatory requirements, and implementation of drought resilience AWP projects.

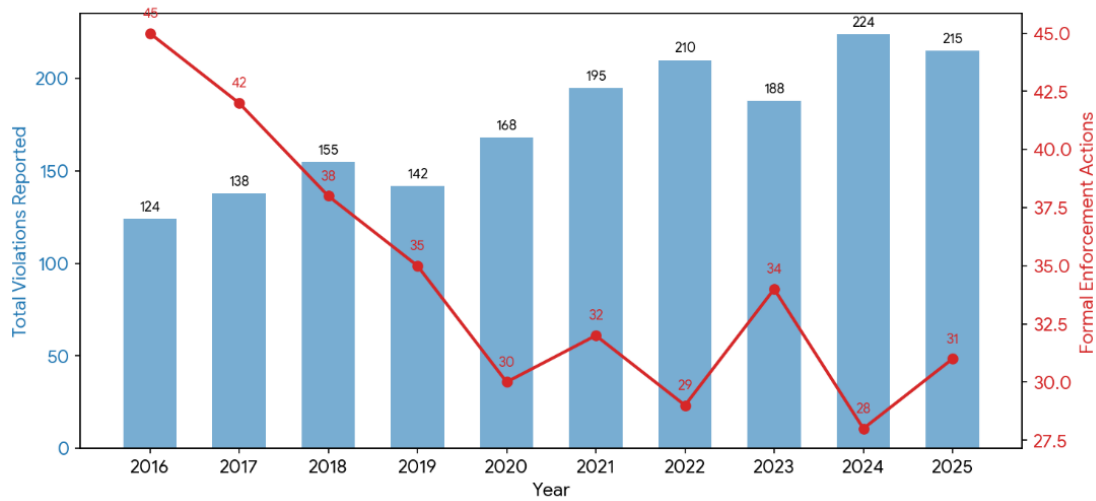
Smaller utilities have limited capability to self-fund the capital projects necessary to maintain, rehabilitate, and expand facilities to meet the myriad issues concerning their wastewater infrastructure. Smaller utilities remain reliant on federal funding (administered through the state) for capital improvement projects.

PUBLIC SAFETY

Between 2016 and 2025, the number of enforcement cases relating to the state's WWTPs has been reduced by approximately 45%. However, the number of violations reported has also increased by 73% in the same timeframe. This data reflects the reduced

capacity of regulatory agencies to enforce regulations due to decreased staff and increased prioritization of providing technical assistance and the use of informal compliance tools.

Figure 6: Arizona Wastewater Violations vs. Enforcement Trends



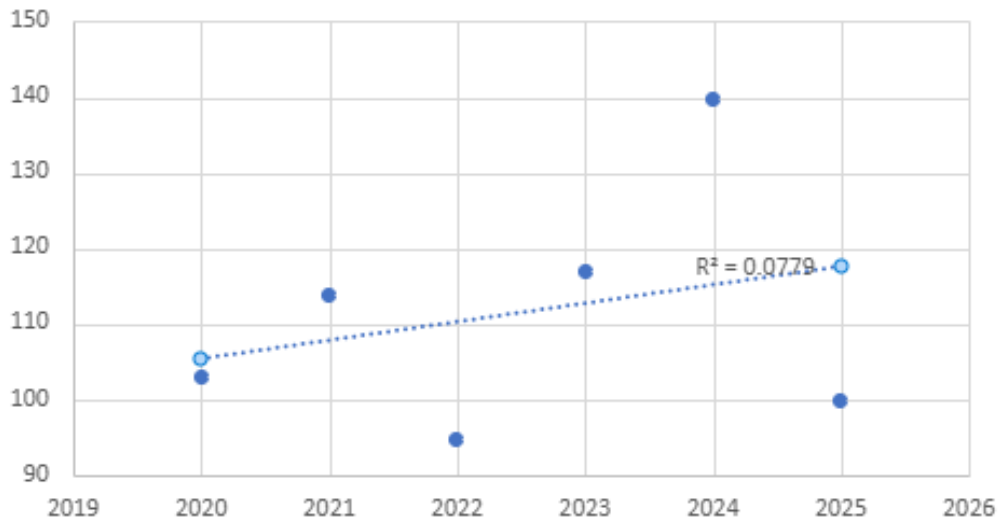
Source: data collected by Arizona Department of Environmental Quality

Beginning in 2025, the ADEQ has been able to increase its staff and capacity and invest in efficiency improvements to support the costs associated with regulation and enforcement. However, several county environmental quality departments continue to have a record number of staff openings and staffing gaps.

One area of concern relating to public safety is sanitary sewer overflows (SSO) which occur when raw sewage or untreated wastewater is released into built or natural systems where it poses a threat to water quality and

public health. The quantity, frequency, and severity of SSOs can be reduced by proper evaluation and monitoring of the existing wastewater systems, and during the design and construction of new facilities. Based on recent EPA projections, between 23,000 and 75,000 SSOs occur every year (not including sewage backups into buildings) nationwide, and based upon available recent data for Arizona from 2020 to 2025, there have been between 95 and 140 SSOs annually.

Figure 7: Total SSOs Reported to the Arizona Department of Environmental Quality by Year



Source: data collected by Arizona Department of Environmental Quality

The ability to identify and reduce the number of SSOs is dependent on the active assessment, monitoring, and evaluation of the wastewater collection infrastructure. Of the 140 public wastewater providers, approximately 30% either have a current and on-going wastewater collection system condition and performance assessment or have completed one in the past five years. Another 25% of public providers have not completed an assessment, with the remaining 45% not having information publicly available. For the past 5 years, 33% of the public providers reported SSO data to ADEQ. The best results in reducing SSOs were mainly found with the largest providers, who have the resources to develop and implement assessment, monitoring, and management programs. This shows that proper investment in assessment, monitoring, and management programs can provide a reduction in SSOs. It also indicates there is a gap between those utilities that have the capacity to develop or implement such programs and those without that do not.

Arizona's wastewater utilities face a unique combination of challenges driven by continued population growth, prolonged drought, increasing water reuse demands, aging infrastructure, a changing regulatory landscape, and emerging contaminants such as Per- and polyfluoroalkyl substances (PFAS), micro- and nano-plastics, and pharmaceuticals & personal care products (PPCPs). PFAS are often referred to as "forever chemicals" as they do not easily break down in the environment and accumulate over time in humans and wildlife. As wastewater becomes a critical water supply resource rather than simply a waste stream, utilities are being challenged to produce higher-quality reclaimed water while maintaining reliable and affordable service. Micro- and nano-plastics are environmental contaminants that have infiltrated human tissues, drinking water and the food supply. PPCPs are a broad group of chemical substances used for personal health and cosmetics that standard wastewater treatment facilities are not designed to remove and can be ecologically disruptive.

As wastewater becomes a critical water supply resource rather than simply a waste stream, utilities are being challenged to produce higher-quality reclaimed water while maintaining reliable and affordable service.

At the same time, biosolids management is becoming more complex due to PFAS, microplastics and potentially future emerging contaminant concerns, which increase disposal costs and uncertainty surrounding future regulations. Additional pressures include extreme heat impacts on treatment processes, workforce shortages, and the need to expand infrastructure in some of the nation's fastest-growing communities.

To address these challenges, Arizona is investing in advanced water reclamation and potable reuse initiatives, expanding biological nutrient removal and advanced treatment technologies, and strengthening industrial pretreatment and PFAS monitoring programs. Utilities are also adopting asset management and resilience planning to modernize aging facilities, incorporating renewable energy and biogas recovery to reduce operating costs, and using digital tools

to optimize treatment performance. Across the state, agencies, utilities, universities, and industry partners are collaborating on research, pilot projects, and long-term water resource planning to ensure wastewater treatment and biosolids management remain sustainable, resilient, and capable of supporting Arizona's future water needs.

Research led by the University of Arizona and local utilities following the Pima County biosolids moratorium has informed discussions on risk-based management rather than blanket restrictions, but utilities are preparing for increased monitoring, pretreatment requirements, and potentially higher biosolids management costs. Recent legislative proposals also demonstrate growing interest in regulating PFAS at the state level. For example, proposed legislation (HB 2646) would have prohibited the distribution and use

of fertilizers, including biosolids, containing PFAS above specified thresholds beginning in late 2026. Although the proposal has not become law, it illustrates the direction policymakers are considering and the potential for future restrictions that could substantially alter biosolids beneficial reuse programs across Arizona.

Together, these regulatory changes signal a broader shift in Arizona from traditional wastewater treatment

toward water resource recovery, potable reuse, and more rigorous contaminant management. Utilities are increasingly expected to produce higher-quality reclaimed water, strengthen industrial pretreatment programs, improve treatment reliability, and proactively address emerging contaminants while maintaining sustainable and cost-effective biosolids management.



Photo: Jeanne Jensen

INNOVATION & RESILIENCE

A key stride in Arizona is direct reuse of reclaimed water through AWP. Reclaimed water is already a significant resource helping Arizona meet increasing water needs by offsetting the need to serve industrial, agricultural and irrigation needs which would otherwise be met with raw groundwater, surface water, or potable water. The use of AWP treatment processes leverages a multiple barrier treatment approach to target pathogens and harmful chemical contaminants prior to disinfection, distribution, and potable consumption. In March 2025, ADEQ's AWP rules and regulations took effect which allow Arizona cities and water providers to apply for an AWP permit. These rules and regulations provide a crucial tool for managing water resources amid ongoing drought conditions and increasing demand. Several utilities in Arizona are beginning projects, or have projects underway, for the design and construction of AWP facilities including Phoenix, Tucson and Scottsdale with several additional utilities in the Phoenix metropolitan

area looking at options related to AWP facilities.

Another significant innovation within the wastewater industry in the past few years has been the implementation of various advanced technologies, such as drone technologies, 3-D scanning using light detection and ranging (LiDAR), Building Information Modeling (BIM), 3-D mapping, High-Definition (HD) imaging, virtual reality, remote flow and quality measurement, and Artificial Intelligence (AI). The use of these advanced technologies is driving a shift from emergency, reactive repairs to predictive, preventive maintenance. The use of AI is allowing for the real-time analysis of sewer pipe video that pinpoints pipe defects. The use of 3-D mapping, virtual reality, BIM and LiDAR allows engineers and contractors to accurately map, design and construct facilities faster with fewer construction challenges and delays. These tools also allow for greater input from O&M staff to ensure facilities meet the needs of the staff.

Wastewater



RECOMMENDATIONS TO RAISE THE GRADE

- Work to narrow the funding gap of the rural utilities by:
 - Increasing Federal and State funding support for rural utilities through:
 - expansion of WIFIA technical assistance and affordability programs,
 - increasing the amount of SRF/WIFIA funding available yearly, and
 - increasing the number of SRF/WIFIA funding opportunities available yearly.
 - Expanding the use of and implementation of risk-based asset management plans and condition assessments statewide. Leverage the increased risk-based data availability to develop risk-based CIP plans to demonstrate on-going need for increased funding availability. Utilize data to focus on extending the life cycle of existing infrastructure.
- Review wastewater billing rates as operating costs evolve and evaluate the effectiveness of various rate structure(s), striving to keep rates predictable and affordable.
- Evaluate design decisions based on life cycle cost assessments.
- Communicate the value of wastewater to the community, policy makers and legislators.
- Build the workforce pipeline by funding operator apprenticeship programs with community colleges and utilities. Accelerate opportunities for cross-training to meet the need for advanced treatment, lab analytics, and instrumentation and controls needs as the existing workforce retires. Develop ways to promote careers in the wastewater profession to K through 12 grade students through public outreach to schools.
- Further close the gap in funding needs driven by inflation in all areas of the industry including administrative, management, engineering, construction and operations & maintenance.
- Opportunities to address this gap exist by inflation-indexing the multi-year CIP and financial plans annually, inflation-indexing wastewater rates and impact fees, and maintaining affordability programs.
- Increase funding to State and County environmental quality departments to carry out their mission to keep Arizona's water healthy.

Wastewater



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