2025 REPORT CARD FOR WEST VIRGINIA'S INFRASTRUCTURE

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

INFRASTRUCTUREREPORTCARD.ORG/WEST-VIRGINIA

ABOUT ASCE– West Virginia

Action of the National Board of Direction of the American Society of Civil Engineers chartered the West Virginia Section in 1937, and the Section began operation on October 7, 1937. The West Virginia Section currently serves the whole state of West Virginia and surrounding areas. There are three branches under the WV Section: Eastern Panhandle Branch, Northern Branch, and Southern Branch. These branches work to provide a resource for professional development to members and connect with students at local colleges and universities to encourage them to remain involved in ASCE after graduation.

With our commitment to serve and protect the public in mind, the Report Card released by the ASCE West Virginia Section is a public, voluntary service to citizens and policymakers to inform them of infrastructure needs in their communities.

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Cover photo credit: Adam Lytton

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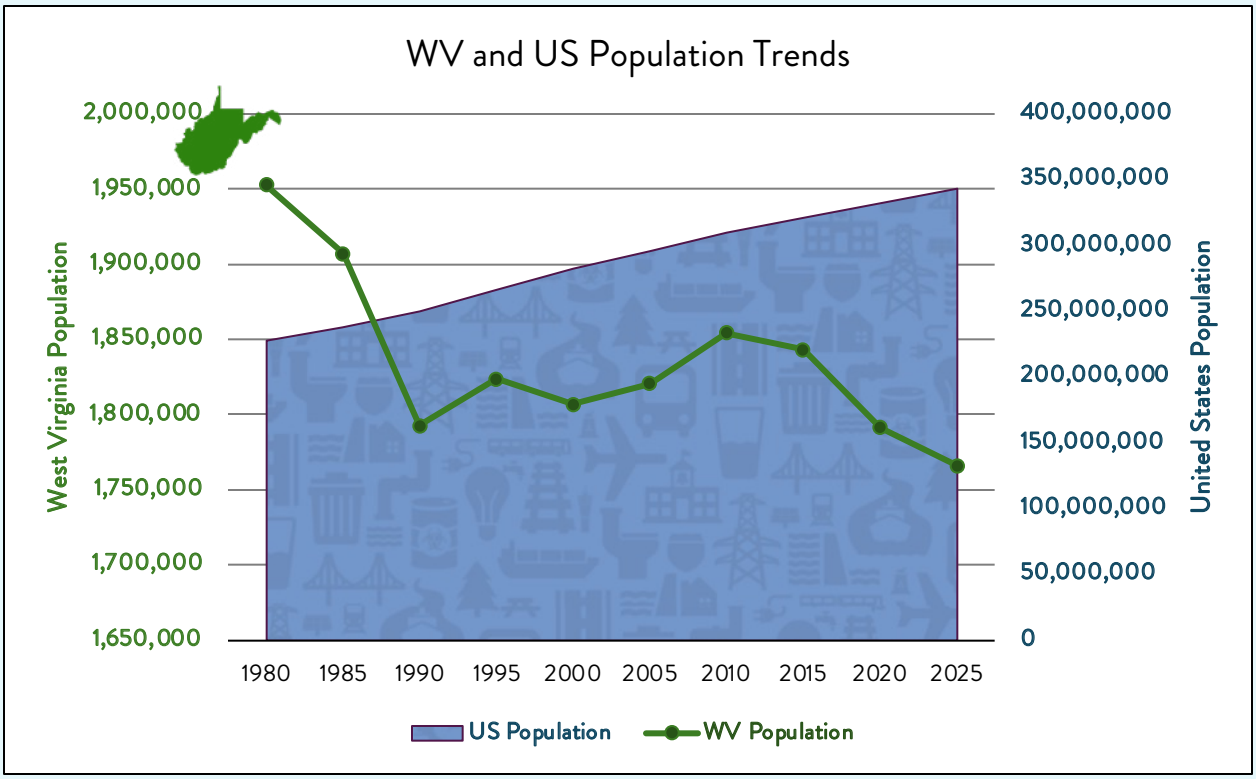
ASCE 2025 REPORT CARD FOR WEST VIRGINIA'S INFRASTRUCTURE

Executive Summary

West Virginia's infrastructure is the foundation on which our state economy, global competitiveness, and quality of life depend. While often taken for granted when it is working properly, every West Virginia household or business immediately feels the impact of just one inefficiency or failure in our built environment. Our infrastructure includes an interconnected system of public and private facilities. Maintaining these networks is essential to meet economic demands and to protect public health and safety. For West Virginia families and businesses to thrive, we need a first-class infrastructure system that moves people and goods safely, sustainably, efficiently, and affordably by land, water, and air; energy transmission systems that deliver clean, dependable, low-cost power; and water systems that reliably and safely drive industrial processes, as well as the daily functions of our communities.

West Virginia's population declined by approximately 3.2% between 2010 and 2020, a loss of about 59,000 residents according to the U.S. Census Bureau, and has continued to decline, while the overall U.S. population has increased by 7.4%. This demographic shift is notable because West Virginia was one of only a few states to lose population during this period following a relatively steady decline in population since the 1950's. This loss in population underscores the issue of having adequate future revenue, user fees and tax base to maintain and operate existing infrastructure and provide additional funds for necessary expansion within the systems.



Source: US Census Bureau

The American Society of Civil Engineers (ASCE) West Virginia Section released its first report on infrastructure in 2020 covering five infrastructure categories. The *2025 Report Card for West Virginia's Infrastructure* includes a comprehensive assessment of eighteen infrastructure areas: aviation, bridges, broadband, dams, drinking water, energy, hazardous waste, inland waterways, levees, parks, ports, rail, roads, schools, solid waste, stormwater, transit, and wastewater. West Virginia's infrastructure earned an overall grade of D+, reflecting widespread concerns with condition and capacity that heighten the risk of system failures. By comparison, the 2025 ASCE National Infrastructure Report Card assigned the same categories a cumulative grade of C. West Virginia's infrastructure is a driver of economic activity and quality of life and is critical for the state's public health and safety. Yet, much of the state's infrastructure is aging, underfunded, and at risk of not meeting future demand. Recent federal and state funding has made incremental improvements in the transportation network, water-related systems, and broadband statewide.

Increased infrastructure investment in West Virginia will boost economic development and create jobs in the short term. Additionally, in the long term, sustained investment will benefit both businesses and consumers in the state by lowering costs, reducing dependency on imports, improving the health of the workforce, and enabling the movement of people within the state. Together, these will position West Virginia for economic growth and ensure that it is a safe, connected place for people to call home.

Recommendations to Raise the Grade

1. West Virginia requires **sustained, statewide investment** to address aging assets, reverse the issue of long-standing backlogs, and prepare its infrastructure for future economic and demographic needs. Strengthening access to federal grants, increasing state-level funding, and supporting the state's key systems will help communities upgrade and modernize essential facilities across the state. Comprehensively, this strategy should strengthen funding from across all sectors and is critical to avoid rising repair costs.

2. **Ensuring safety** is a fundamental priority across all infrastructure systems. This includes, for example, increasing inspection capacity for dams and levees, conducting statewide assessments to identify and prioritize school safety retrofits, and accelerating the replacement of lead service lines in drinking water systems. Adopting a Safe System Approach for roadway design and strengthening rail safety through at-grade crossing improvements and technology upgrades are additional actions that illustrate the need for a comprehensive, system-wide focus on safety.

3. West Virginia must accelerate efforts to **improve the resilience of infrastructure** in order to ensure that critical systems can withstand climate-related threats and other hazards. This includes prioritizing investments in grid modernization, updated flood modeling, and design practices that account for future conditions. Integrating sustainability and resilience standards into all planning, permitting, and funding decisions will help safeguard critical systems such as energy, stormwater, dams, and levees while reducing long-term recovery costs.

4. West Virginia has a long-standing technological innovation gap and needs to **increase the pace of technology adoption**. The state should begin phasing in new and emerging technologies such as improved disposal technologies for hazardous and solid waste, distributed power units for rail, and updated intermodal logistics and cargo handling systems for freight. Prioritizing the implementation of innovative practices across all sectors will enhance system efficiency and safety, reduce lifecycle costs, and strengthen West Virginia's ability to compete for new economic opportunities.

5. Reversing the population decline trend will require **strategic investment in infrastructure systems that support daily life** and shape community vitality. Population growth depends on creating and supporting communities with reliable, modern infrastructure. West Virginia should prioritize improvements to broadband access, public transportation, water systems, and community facilities in order to create healthy, vibrant, and connected places where people want to live and work while supporting statewide economic development. Modernizing these systems will help communities attract new residents, support young families, and improve long-term economic stability. All of these are critical to reversing decades of population loss.

About the Report Card for West Virginia's Infrastructure

The 2025 Report Card for West Virginia's Infrastructure was written by over fifty Fairmont State University Students from the Classes of 2022, 2023, 2024 and 2025, and over twenty-five West Virginia civil engineers serving as committee members. Through the coursework of Fairmont State University, students conducted initial research, data collection, and chapter drafting for every infrastructure category, working directly with a champion from the committee for each category.

The West Virginia 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 ASCE Committee on America's Infrastructure is made up of fifty-two 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 review the Report Card for each state. The Committee reviews the reports and the grades based on 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?

Grading Scale

EXCEPTIONAL: FIT FOR THE FUTURE

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.

GOOD: ADEQUATE FOR NOW

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable with minimal capacity issues and minimal risk.

MEDIOCRE: REQUIRES ATTENTION

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

POOR: AT RISK

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure.

FAILING/CRITICAL: UNFIT FOR PURPOSE

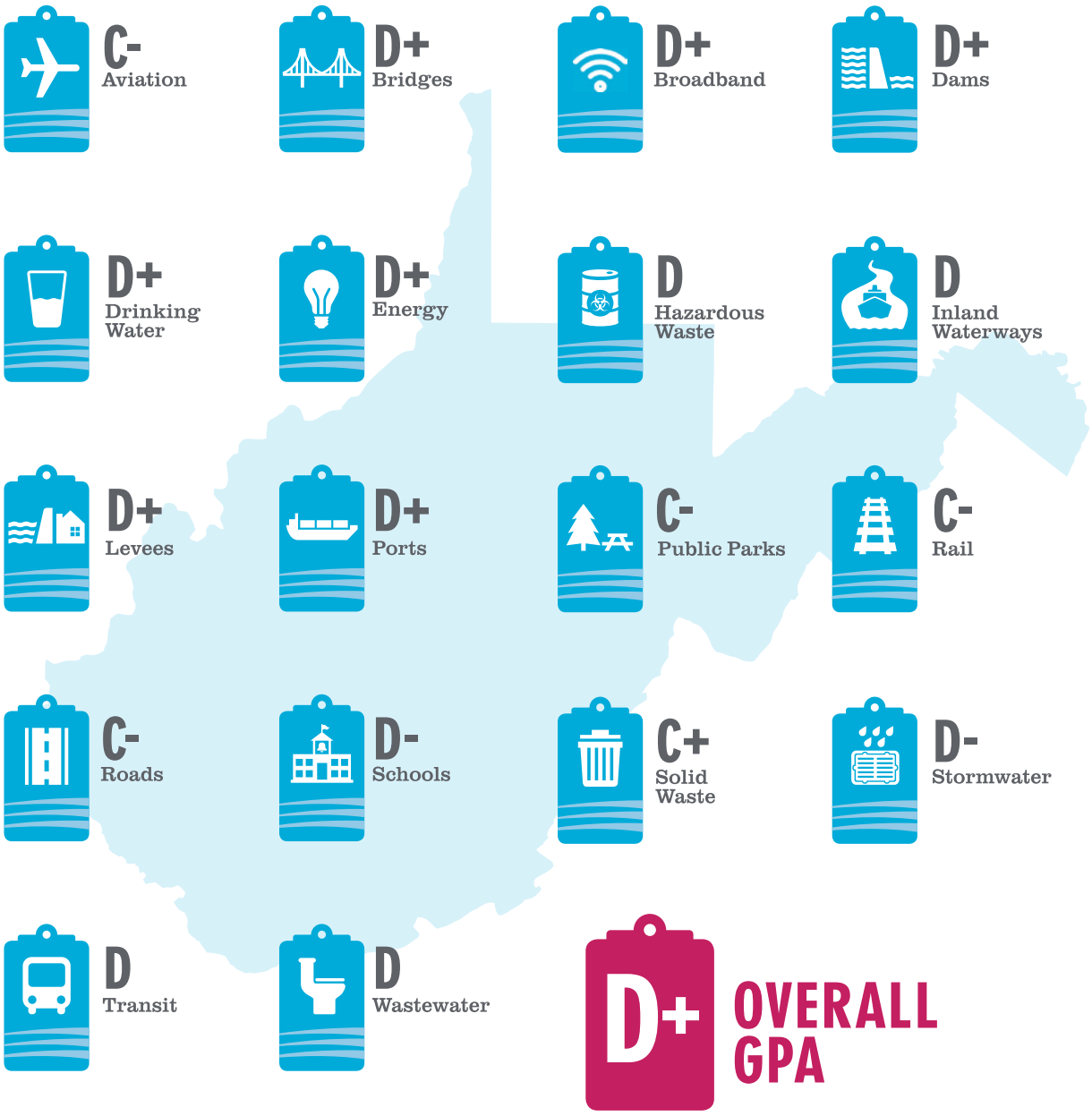
The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

The 2025 Report Card for West Virginia's Infrastructure

NOTES ABOUT THE GRADES

Across West Virginia, aging infrastructure, limited funding, and years of deferred maintenance continue to place significant strain on the systems that previous generations built, and that today's communities depend on. The analysis and grades presented in this Report Card are intended to help the public, policymakers, and local leaders better understand the importance of sustained, long-term investment; the value of proactive planning; and the need to prepare for future challenges related to growth, economic development, and resilience.

The grades reflect the condition and performance of the infrastructure systems themselves, not the dedication of the many local, state, and federal professionals who work hard every day to operate, maintain, and improve these systems despite constrained resources. This Report Card is designed to provide a clear and objective snapshot of current conditions and to serve as a tool that agencies and decision-makers can use to advocate for the funding and support necessary to keep West Virginia's infrastructure safe, reliable, and resilient for years to come.



Aviation

C-

Photo: West Virginia International Yeager Airport Terminal Building. (Photo/Yeager Airport)

GRADE COMPARISON

WV: C-

Nat'l: D+

AVIATION

EXECUTIVE SUMMARY

West Virginia's airports form a vital infrastructure network that supports the state's economy, education, military, and tourism. In 2024, they collectively handled around 250,000 flight operations and 350,000 passenger enplanements. While the aviation sector contributes over $1.6 billion annually to the state's economy, challenges remain, including aging terminal facilities, inconsistent on-time performance, and funding limitations. Nevertheless, airports are pursuing modernization projects, expanding operations, and adopting innovative technologies. Continued investment, policy reform, and technological adoption are recommended to strengthen the aviation sector's growth, resilience, and service quality statewide.

BACKGROUND

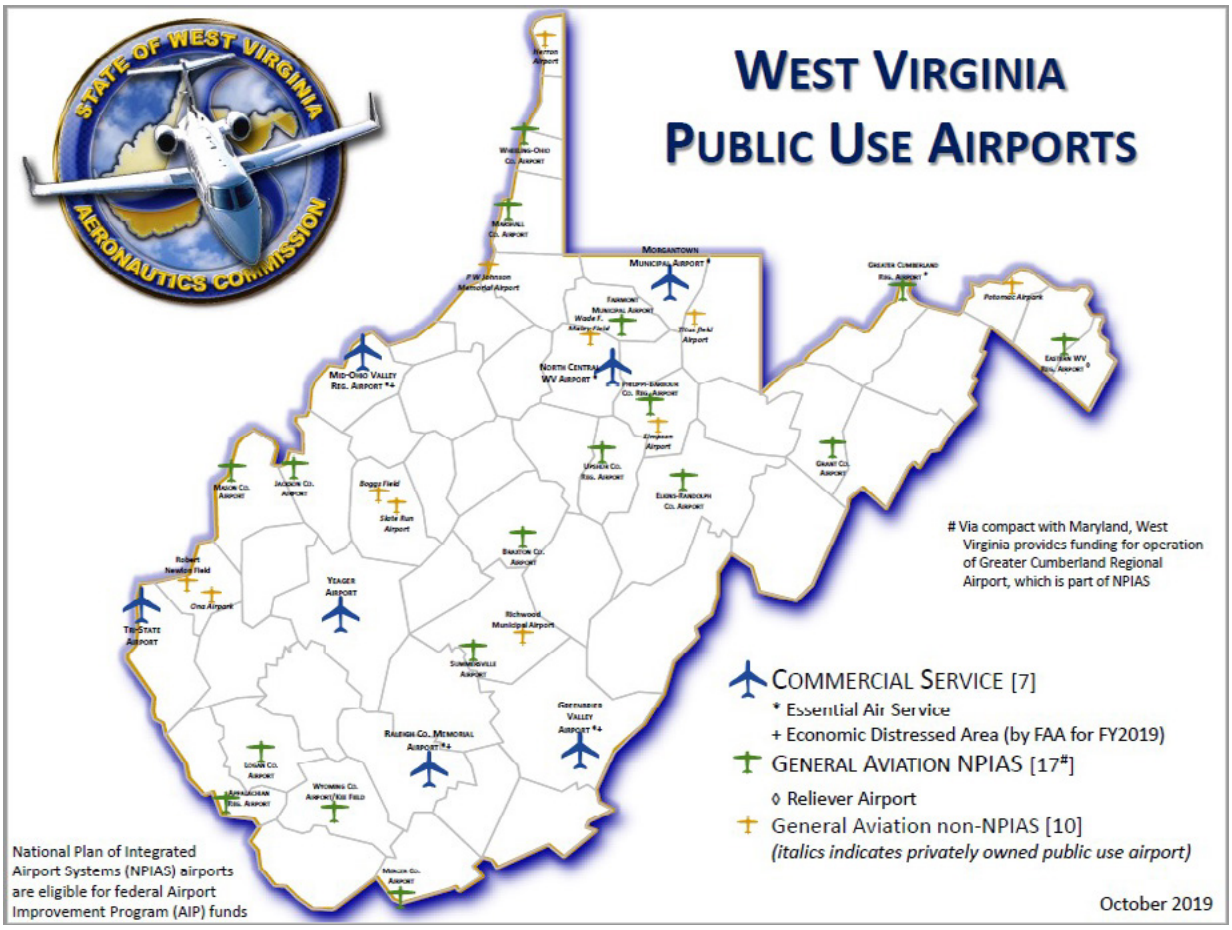
West Virginia's airports serve as critical infrastructure supporting the state's connectivity, economy, education, and community well-being. These airports not only offer essential passenger services to major destinations across the country, but also play strategic roles in sectors such as aerospace, military support, tourism, and workforce development. West Virginia hosts a network of airports that facilitate commercial and general aviation across the state, including seven commercial airports, which handle most of the state's aviation traffic. In addition to these commercial facilities, the state has seventeen general aviation airports included in the National Plan of Integrated Airport Systems (NPIAS) and ten private, non-NPIAS general aviation airports. Airports across the state foster partnerships with educational institutions to provide Federal Aviation Administration (FAA) -certified flight training and technical aviation programs, strengthening the pipeline for aviation careers. Many serve as hubs for emergency services, military operations, and youth aviation initiatives, such as outreach programs and flying events. Additionally, several airports are expanding their facilities and services to support general aviation, cargo logistics, and economic development through collaboration with local colleges, aerospace companies, and tourism.

Table 1: West Virginia's Airports and Locations

Commercial Airports	Abbreviation	Location
West Virginia International Yeager Airport	CRW	Charleston, WV
Huntington Tri-State Airport	HTS	Huntington, WV
Morgantown Municipal Airport	MGW	Morgantown, WV
Greenbrier Valley Airport	LWB	Lewisburg, WV
Raleigh County Memorial Airport	BKW	Beckley, WV
North Central West Virginia Airport	CKB	Bridgeport, WV
Mid-Ohio Valley Regional Airport	PKB	Parkersburg, WV

Source: FAA

Figure 1: West Virginia's Public Use Airports

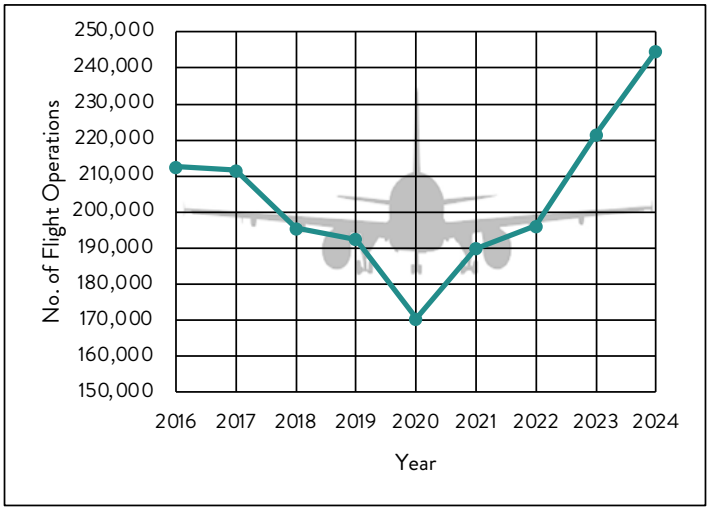


Source: WV Aeronautics Commission

CONDITION AND CAPACITY

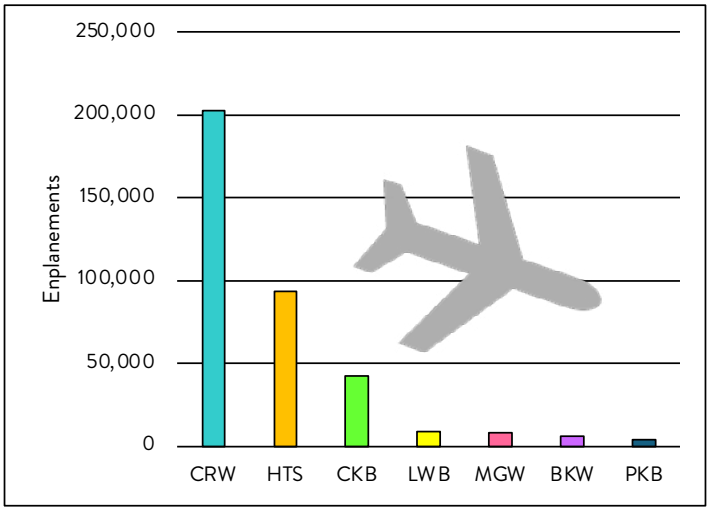
In 2024, West Virginia's seven commercial airports completed approximately 250,000 flight operations and 350,000 passenger enplanements. The majority of the flight operations (68%) involved Yeager Airport, North Central, and Morgantown Municipal with 26%, 18%, and 24% respectively. Yeager and Huntington Tri-State lead in passenger enplanements, with 55% and 26% of the state's enplanements, respectively. Furthermore, West Virginia airports have seen modest increases in air traffic and passengers between 2023 and 2024, where North Central Airport had a significant increase in flight operations from 19,111 in 2023 to 44,213 in 2024. Overall, West Virginia airport travel has returned to pre-pandemic conditions.

Figure 2: Flight Operations 2016-2024



Source: FAA

Figure 3: 2024 Airport Enplanements



Source: FAA

Aviation plays a significant role in West Virginia's economy by generating substantial business activity, employment, and economic value. Civil aviation-related goods and services contribute approximately $1.63 billion in business revenues annually, including freight and passenger flights. Industry accounts for about 1% of the state's Gross Domestic Product, reflecting its vital presence in the overall economy. Based on a 2020 study, cargo handling alone contributes an estimated $47.35 million to the state's economy, and general aviation supports 10,729 jobs and provides $55.11 million in payroll, highlighting its importance not only in transportation, but also as a major source of employment and income across the state.

West Virginia's commercial service airports feature well-maintained asphalt, with grooved runways that are all reported to be in good condition. Runway lengths vary to accommodate different aircraft sizes, with several airports capable of handling larger aircraft. North Central Airport has the longest runway at 7,800 feet, sufficient for larger aircraft. Mid-Ohio Valley Regional Airport, Huntington Tri-State Airport, and Greenbrier Valley Airport have runways exceeding 7,000 feet. Both Raleigh County Memorial and Yeager both offer approximately 6,700 feet of runway. The runway extension project at Yeager Airport has been put on hold because of environmental concerns. Morgantown Municipal's runway currently measures 5,199 feet and is undergoing an extension to better accommodate larger aircraft, in which the runway extension is forecasted to be complete as early as 2028, depending on funding.

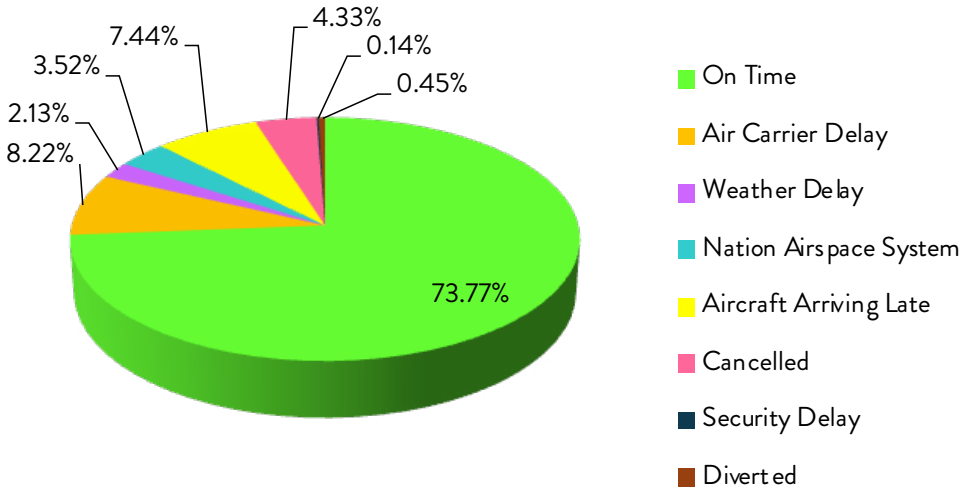
The seven commercial airport terminals across West Virginia are aging, with most over 50 years old. However, most are in the process of upgrading or building new facilities. North Central Airport is constructing a new terminal in AeroTech Park, set to open in late 2025. The new terminal will triple the size of the old terminal. Yeager Airport is executing a multi-phase terminal modernization. Phase 1 has been completed and included baggage handling and bathroom renovations, where the second phase will focus on pre-security area renovations. Huntington Tri-State Airport is guided by a long-term master plan that focuses on incremental upgrades and aviation education facilities. Greenbrier Valley Airport's terminal is being renovated alongside hanger construction and Raleigh County Memorial Airporty recently expanded its passenger hold area along with developing land for an industrial park. Mid-Ohio Valley Regional Airport's recent efforts were focused on terminal roof replacement as well as parking lot restoration. Morgantown Municipal Airport plans to continue with their runway extension project and is also considering options for future terminal upgrades through remodels or new construction. Collectively, these initiatives reflect a statewide effort to revitalize air travel infrastructure and support economic growth.

Figure 4: Paving at Yeager Airport

Source: CRH

Delay statistics across West Virginia's airports between 2023 and 2024 reveal varying levels of operational efficiency. Approximately 74% of flights operated on time, with delays primarily caused by air carrier delays (8.2%) and late-arriving aircraft (7.4%), while weather and National Airspace System (NAS) issues contributed 2.1% and 3.5%, respectively. Cancellations averaged 4.3%. The North Central, Yeager, and Huntington Tri-State Airport performed near the national average of 78% for on-time flights. Morgantown Municipal Airport, however, experienced significantly more disruptions, with only 61.54% on time and a cancellation rate of 12.18%. The runway extension should allow for larger aircraft and improve service reliability.

Figure 5: Average WV Airport Delay Statistics (2023-2024)



Source: Bureau of Transportation Statistics

OPERATION AND MAINTENANCE, FUNDING AND FUTURE NEED

West Virginia's commercial airport runways are maintained based on FAA requirements. Every federally funded airport is required to keep a pavement maintenance program with regular inspections. Terminals and other landside infrastructure are managed based on airport master plans and are approved and funded on a project-to-project basis.

West Virginia airports are funded through a mix of federal, state, local, and private sources. The primary federal funding comes from the FAA, which supports infrastructure and safety projects. West Virginia has benefited from increased funding levels through the Infrastructure Investment and Jobs Act (IIJA). Between Fiscal Year 2022 and 2025 West Virginia airports have been allocated $33.4 million in Airport Infrastructure Grants. Additionally, they received Airport Terminal Program grants in the amount of $19.8 million. Meanwhile, the West Virginia state government has contributed $5.7 million in additional grants. Airports also collect Passenger Facility Charges (PFCs) from travelers, which help fund specific FAA-approved improvements.

State and local governments contribute additional funds or issue bonds, while airports generate revenue through airline fees, concessions, parking, and leases. West Virginia airports are seeing growth in passenger numbers, which helps to unlock federal funding to support infrastructure expansion. Airports that surpass 10,000 annual enplanements are considered primary airports and secure additional FAA funding. Yeager, Huntington Tri-State, and North Central Airports all exceeded 10,000 enplanements in 2024. Greenbrier Valley and Morgantown Municipal Airports had approximately 9,000 and 8,000 enplanements, respectively, in 2024. Both Raleigh County Memorial and Mid-Ohio Valley Regional Airport are well below the threshold. Additionally current limits on the PFCs, which have had a federally mandated cap of $4.50 per passenger in place since 2001, hamper airports' ability to self-fund critical projects. The Airports Council International reports that West Virginia airports will require $132 million in infrastructure upgrades from 2025 to 2029.

Figure 6: NCWV 2025 Terminal Upgrades

Source: Bridgeport CVB

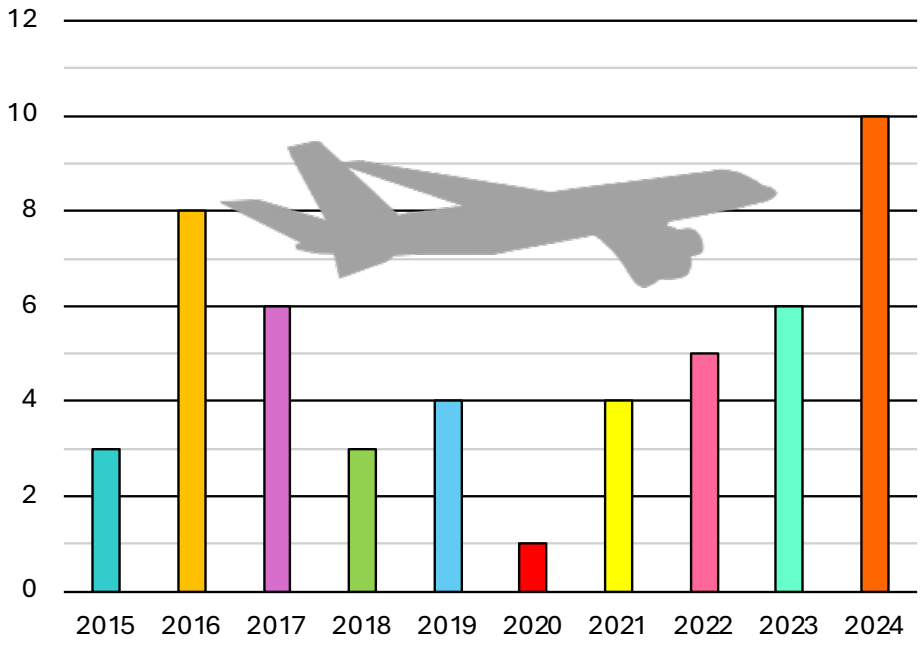
PUBLIC SAFETY AND RESILIENCE

Over the past ten years, there have been fifty-two aviation incidents investigated by the National Transportation Safety Board (NTSB) in West Virginia. These incidents caused twenty fatalities and twelve serious injuries. Seven of these incidents involved a commercial airport and resulted in three fatalities and one serious injury. The probable cause of the incidents was primarily pilot error and mechanical failures. Additionally, the FAA reported 326 wildlife strikes at West Virginia commercial airports over the last ten years. These strikes involved primarily small and medium-sized birds. However, twenty-three of the strikes were from larger animals, such as wild turkeys, raccoons, and whitetail deer. As required by the Transportation Security Administration (TSA), all seven commercial airports in West Virginia have perimeter fencing. In recent years, some smaller airports have also proactively added or upgraded fencing.

Airports across West Virginia have made notable progress in strengthening public safety and resilience through a combination of emergency preparedness and infrastructure improvements. A cornerstone of these efforts has been the FAA's requirement that commercial service airports conduct full-scale emergency simulations every three years. These exercises have included realistic scenarios, such as simulated aircraft disasters, crash landings, and fires, often involving actors portraying injured passengers. These agencies include fire and police departments, emergency medical service units, sheriff departments, and 911 centers. West Virginia's airports play a vital role in emergency response and recovery operations. They serve as critical hubs for military aircraft, supplies, medical aid, and emergency personnel during catastrophic events.

In addition to emergency training, infrastructure upgrades have played a central role in public safety enhancements. Huntington Tri-State Airport, for instance, launched a multi-phase runway safety area (RSA) improvement project to address terrain and erosion risks discovered during earlier wildlife mitigation work. Moreover, the runway extension project at Morgantown Municipal Airport will also have safety benefits.

Figure 7: Aviation Investigations in WV 2015-2024



Source: NTSB

INNOVATION

West Virginia airports are involved in several innovative initiatives. At Yeager Airport, efforts include a wildlife management system using trained border collies to clear birds and other wildlife from the airfield. These border collies have reduced bird strikes at the airport by about 70%. The Mid-Atlantic Aerospace Complex (MAAC), located at North Central Airport, has developed into an aerospace innovation hub by hosting top aerospace companies and education partnerships. Morgantown Airport plans to implement solar-powered robotic mowers to manage airfield maintenance more efficiently and reduce labor costs. Additionally, terminal upgrades at several airports will include the latest technology to improve passenger experience and safety.

Figure 8: Hercules and Ned patrol Yeager Airport in Charleston, WV

Source: WV International Yeager Airport

Aviation

C-

RECOMMENDATIONS TO RAISE THE GRADE

- Improve on-time performance where delays and cancellations exceed national averages. Specifically prioritizing the runway extension project at Morgantown Municipal Airport.
- Find additional funding to accelerate expansion and improvement projects.
- Modernize Passenger Facility Charges (PFCs) and tie them to inflation.
- Further leverage the modernization of airport terminals to increase passenger traffic through state airports.
- Airports should develop a consistent data-driven asset management and maintenance plan to help prioritize new projects and extend the life of existing infrastructure.

Photo: West Virginia International Yeager Airport Terminal Building.

Source: Yeager Airport

DEFINITIONS

ENPLANEMENT: the number of passengers who board an aircraft at a specific airport

PASSENGER FACILITY CHARGES (PFC): a fee that commercial airports in the U.S. can charge passengers to fund airport improvements. These fees are collected by airlines on behalf of the airport.

CRW: Yeager Airport (CRW) in Charleston

HTS: Tri-State Airport in Huntington

MGW: Morgantown Municipal Airport in Morgantown

LWB: Greenbrier Valley Airport in Lewisburg

BKW: Raleigh County Memorial Airport in Beckley

CKB: North Central West Virginia Airport in Clarksburg/Bridgeport

PKB: Mid-Ohio Valley Regional Airport in Parkersburg

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS): is an inventory of U.S. aviation infrastructure assets. It identifies existing and proposed airports that are significant to national air transportation in the U.S. and are eligible to receive federal grants under the Airport Improvement Program.

FAA: Federal Aviation Administration

NTSB: National Transportation Safety Board

TSA: Transportation Security Administration

NAS: National Aviation System

MAAC: Mid-Atlantic Aerospace Complex

RSA: Runway Safety Area, is a prepared, graded surface surrounding a runway designed to reduce damage and risk to aircraft during an undershoot, overrun, or excursion.

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Bridges

D+

Photo: Corridor H Bridge (Bridges and Tunnels)

GRADE COMPARISON

2020 WV: D+
2025 WV: D+
Nat'l: C

BRIDGES

EXECUTIVE SUMMARY

West Virginia's bridge infrastructure plays a crucial role in the state's transportation network for commercial traffic; however, it faces significant challenges due to aging structures, funding gaps, and environmental vulnerabilities. Of the state's 7,348 bridges, approximately 19% are poor, requiring urgent investment for repair or replacement. The West Virginia Division of Highways (WVDOH) maintains over 95% of the state's bridges, making it one of the few states responsible for maintaining most of the bridges within its borders. Despite increased federal funding—$548 million from the Infrastructure Investment and Jobs Act over 5 years—the state still faces a funding shortfall due to challenging terrain and increased construction costs. Resiliency remains a key concern, as frequent flooding and extreme weather events threaten bridge stability, and comprehensive flood mitigation strategies are underdeveloped. WVDOH has embraced innovation that improves efficiency, extends bridge lifespans, and optimizes maintenance. However, ongoing investment and strategic planning will be essential to ensure the safety and longevity of West Virginia's transportation network.

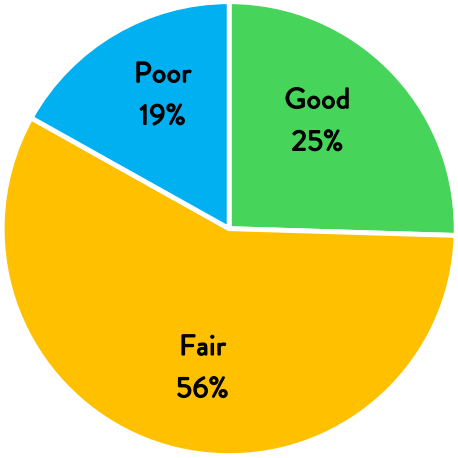
Figure 1: I-79 Tygart River Bridge Construction in Fairmont

Source: WVDOT

CONDITION AND CAPACITY

Bridges play a vital role in West Virginia, providing essential access across its mountainous terrain and numerous rivers, with 7,348 bridges in total as of October 2024. The average age of a bridge in West Virginia is 46 years, compared to the national average of 42 years. Approximately 19% of the state-maintained bridges are classified as poor, meaning they require significant investment for repair or replacement. These bridges are not inherently unsafe; however, some require more frequent inspections than are required by federal guidelines to ensure public safety. Poor bridges account for 501,964 square meters of structurally deficient bridge deck, which is approximately 13% of the bridge deck in WV. The state also classifies bridges based on conditions such as Good, Fair, and Poor. The following is the number of bridges in each classification in the state's inventory (not including bridges that are not maintained by the state): 1,945 are Good, 4,041 are Fair, and 1,289 are Poor. With ongoing construction throughout the state, these numbers are projected to improve in the near future. West Virginia has placed a strong emphasis on bridge infrastructure, as part of its broader transportation strategy, prioritizing the replacement and rehabilitation of outdated structures. With public safety being a primary concern, the WVDOH consistently inspects bridges and develops plans to make necessary repairs, ensuring that bridges are safe for the public. If, for some reason, a bridge is unsafe for the public, the WVDOH has the authority to close the bridge until it is deemed safe again through repairs or replacement. There are approximately 25.2 million bridge crossings daily, with approximately 3 million being on poor bridges.

Figure 2: WV Bridge Classifications



Source: WVDOT data

OPERATION & MAINTENANCE, FUNDING, AND FUTURE NEED

West Virginia is experiencing a surge in bridge funding, thanks to recent federal legislation such as the Infrastructure Investment and Jobs Act (IIJA). The state is expected to receive a total of $548 million in dedicated bridge funding between 2022 and 2026 to replace, rehabilitate, preserve, and build bridges under the IIJA. WVDOH was also awarded $88 million for the Market Street Bridge Replacement Project that connects WV Route 2 in Follansbee, West Virginia and Market Street in Steubenville, Ohio. The structure, built in 1904, no longer meets modern standards. The replacement bridge will allow for safer, more efficient movement of people and goods along this regionally significant route, connecting communities and supporting the area's economic vitality.

While a gas tax of about $0.36 per gallon helps support bridge and highway maintenance, and toll revenues from the West Virginia Turnpike fund repairs for its 116 bridges, the state still faces significant funding challenges. West Virginia has not raised its gas tax since 2017, yet it still ranks as having the 16th highest gas tax in the United States. Although these funding sources provide a substantial boost, the current bridge infrastructure needs additional funding as inflating costs outpace available resources. Historically, West Virginia has underinvested in bridge maintenance, leading to a backlog of repairs, but the new federal funding is helping address this issue.

Figure 3: Wellsburg Bridge Span

Source: WVDOT

WVDOH has made bridge repairs a priority, setting up a 10-year plan to reduce the percentage of bridges in poor condition and significantly decrease the number of deficient bridges. Currently, WVDOH is working toward improving bridge conditions in the state and aims to reduce the percentage of poor bridges from 19% to around 4%. The WVDOH has implemented a bridge maintenance and preservation plan to slow deterioration, including timely repairs and regular upkeep. For new and replacement bridges, the state follows strict design standards to ensure durability, adhering to the latest American Association of State Highway and Transportation Officials Load and Resistance Factor Design (AASHTO LRFD) Bridge Specifications and the West Virginia Department of Highways' Structural Directives. While funding has improved recently with the IIJA, ongoing investment will be necessary to maintain bridge safety and prevent future disasters. Beyond construction, the WVDOH's expanded Transportation Asset Management Plan (TAMP) takes a comprehensive approach by including not only pavements and bridges but also drainage systems, culverts, signals, and guardrails. Proactive strategies, such as sealing joints and applying anti-icing treatments, help preventing deterioration and extending the lifespan of these critical assets.

Figure 4: Chuck Yeager Bridges

Source: Bridges and Tunnels

RESILIENCE AND PUBLIC SAFETY

West Virginia's transportation infrastructure faces ongoing challenges due to its unique geography, increasing climate-related impacts, and aging structures. The ability of the state's roadways and bridges to withstand natural disasters and long-term environmental stress is critical to maintaining a functional and reliable transportation network. While the Statewide Transportation Improvement Program (STIP) acknowledges environmental sustainability as a performance-based planning requirement, there is limited publicly available information regarding formalized sustainability policies for infrastructure design and construction; however, sustainable designs are incentivized through federal funding. West Virginia has not fully implemented a structured sustainability design process for transportation projects.

Research conducted by WVDOH has addressed the risks and improvements needed to enhance the state's resilience against natural disasters. One of the greatest threats to West Virginia's infrastructure is flooding, which is becoming more frequent and severe. Elkview, WV experienced historial levels of flooding in 2016 and is considered one of the worst natural disasters in the state's history. The state's steep terrain and extensive river systems make many bridges and roadways vulnerable to scour damage, where water erodes the foundation of structures, potentially leading to failures. Increased storm intensity and rainfall pose risks to navigable waterways and low-lying transportation corridors. Research has identified flooding as a growing concern, emphasizing the need for adaptive infrastructure designs and proactive maintenance strategies.

From the WVDOH standpoint, public safety remains a foremost priority. Ensuring the structural integrity

of roads and bridges not only supports mobility and economic activity but also safeguards lives during extreme weather events. In response, WVDOH incorporates risk assessments and safety-driven engineering standards into project planning and maintenance practices, particularly in areas prone to flooding and geotechnical instability. These measures, while not always framed within a formal sustainability policy, are integral to protecting the public and ensuring a resilient transportation network.

As infrastructure continues to age, an increasing number of bridges across the state are subject to posted load restrictions, which limit the weight of vehicles allowed to cross. These restrictions are critical safety measures intended to prevent structural failures, but they also pose significant challenges. Load-restricted bridges can disrupt access for emergency vehicles such as ambulances and fire trucks, delay school transportation routes, and complicate freight logistics, particularly in rural areas where alternative routes may be limited or non-existent. In some cases, detours increase response times or force heavier vehicles to traverse longer, less efficient paths, affecting both safety and economic productivity. Addressing these restrictions through targeted investments and bridge rehabilitation is essential to maintain reliable and safe access for essential services.

While maintaining the state's aging bridges, the lack of widespread investment in seismic retrofitting and flood-resistant designs could leave certain structures vulnerable to extreme weather events. While West Virginia acknowledges the importance of resilience in transportation planning, there is a need for stronger policies and dedicated investment in sustainability initiatives. Leveraging research and developing formal strategies to mitigate flood risks, address load-restricted infrastructure, reinforce vulnerable structures, and integrate sustainable design principles will be crucial in ensuring the long-term durability and safety of the state's transportation infrastructure.

Figure 5: Monument Place Bridge, built in 1817 it is the oldest bridge in WV

Source: WVDOT

Figure 6: Herns Mill Covered Bridge

Source: Bridges and Tunnels

INNOVATION

West Virginia is modernizing its bridge infrastructure with innovative materials and construction techniques to enhance durability, reduce maintenance, and optimize costs. WVDOH increasingly employs Accelerated Bridge Construction (ABC) methods, using pre-cast concrete and slide-in bridge (also known as lateral slide) construction to minimize public disruption and speed up projects. Although some of these materials come with higher upfront costs, they provide greater longevity and improved performance over time. WVDOH also reduces maintenance by eliminating expansion joints with integral/semi-integral abutments and link slabs and integrating corrosion-resistant materials like galvanized reinforcing for decks, epoxy-coated reinforcing, and ultra-high-performance concrete (UHPC), extending bridge lifespans up to 100 years. The WVDOH has also used drone technology to assist in gathering data during bridge inspections.

Sustainability efforts repurpose old bridge components for temporary structures and erosion control. Data-driven decision-making enhances resource allocation and maintenance efficiency. By embracing advanced materials, predictive maintenance, and sustainable practices, West Virginia is strengthening its transportation network for the future.

Fostering inter-state communication offers an innovative approach to bridge infrastructure by enabling the sharing of data, best practices, and coordinated strategies for resilience. Collaboration across state lines can accelerate innovation, improve emergency response, and support more consistent, forward-thinking design standards in regions facing similar environmental challenges.

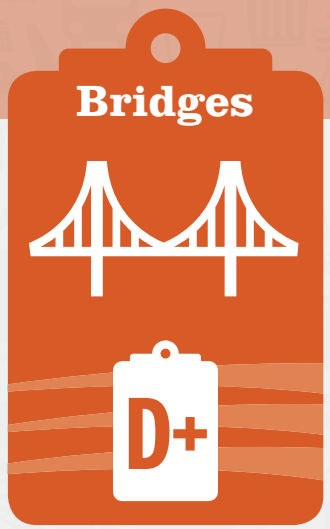
Figure 7: I-64/Nitro Bridge Construction

Source: Brayman Construction Corporation

The West Virginia Department of Transportation (WVDOT) recently received funding through the federal Strengthening Mobility and Revolutionizing Transportation (SMART) grant program, funded through the IIJA. Through this grant, the WVDOH installed a Structural Health Monitoring (SHM) system on the East Huntington Bridge, a cable-stayed bridge that spans the Ohio River. This advanced SHM system allows the WVDOH to quickly assess the structural integrity of the bridge following damage or a natural disaster. Traditionally, any potential damage to a bridge requires a thorough manual inspection to determine the severity and necessary actions. However, this system enables engineers and inspectors to identify major structural issues in real time, significantly improving response times, and enhancing public safety. West Virginia is currently the only state to receive funding under the SMART grant program specifically for a transportation infrastructure SHM project. Building on the success of this initial implementation, WVDOH intends to apply for a Stage 2 SMART grant to expand this technology to additional bridges across the state. By investing in real-time structural monitoring, West Virginia is leading the way in applying innovative solutions to modernize infrastructure and ensure the safety of its transportation network.

Figure 8: New River Gorge Bridge

Source: National Park Service



RECOMMENDATIONS TO RAISE THE GRADE

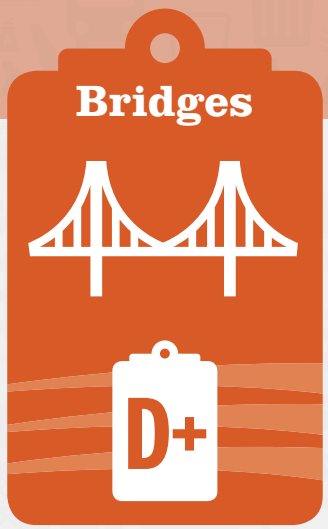
- The WVDOH should formulate a comprehensive strategy to strengthen bridge infrastructure by diversifying funding sources, improving cost efficiency, and focusing on long-term durability. In addition to leveraging federal and state support, explore options like public-private partnerships, infrastructure bonds, and user-based fees to help close the funding gap. Streamlining costs through bulk purchasing, strategic scheduling, and innovative materials.

- Invest in preventative maintenance—including more frequent inspections on "at risk" structures, predictive monitoring technologies, and timely repairs—to extend the life of existing bridges and reduce the need for costly emergency interventions.

- Enhance construction standards by adopting corrosion-resistant materials, resilient design principles, and redundancy in critical systems to improve structural reliability. Address labor shortages and speed up critical repairs by investing in workforce development initiatives, alongside modern construction techniques such as modular assembly and accelerated project delivery, can help address labor shortages and speed up critical repairs.

- Public support and policy momentum are key to long-term success. Increasing transparency and community and building legislative backing can raise awareness and secure sustained investment in bridge infrastructure.

- To fully integrate resiliency into infrastructure planning, West Virginia must move from research to action by formalizing sustainability policies and prioritizing flood-resistant, climate-adaptive designs across all transportation projects.



DEFINITIONS

STRUCTURALLY DEFICIENT: A bridge that has significant wear or damage and needs major repairs or replacement. It doesn't mean it's unsafe to use, but it does need regular inspections and attention.

BRIDGE DECK: The surface of the bridge that people drive or walk on.

SCOUR DAMAGE: When fast-moving water erodes the ground or support under a bridge, weakening its foundation.

LOAD AND RESISTANCE FACTOR DESIGN (AASHTO LRFD): A national engineering standard that helps ensure bridges are strong and safe under different weights and conditions. Created by AASHTO, a transportation organization.

ULTRA-HIGH-PERFORMANCE CONCRETE (UHPC): A very durable and strong type of concrete that resists cracking, water, and corrosion better than regular concrete.

ACCELERATED BRIDGE CONSTRUCTION (ABC): A faster method of bridge building using pre-made parts that are installed on-site to reduce construction time and road closures.

PRE-CAST CONCRETE / SLIDE-IN CONSTRUCTION: Bridge components made off-site in a factory and then moved into place, sometimes slid into position, allowing for quicker and more efficient construction.

LINK SLABS: A type of concrete connection that allows sections of a bridge to expand and contract without using traditional joints, reducing maintenance needs.

INTEGRAL/SEMI-INTEGRAL ABUTMENTS: An abutment that connects the bridge superstructure (beams/deck) directly to the abutment structure, thus eliminating the expansion joint.

EPOXY-COATED REINFORCING: Steel rebar inside concrete coated with a protective epoxy layer to prevent rust and extend the bridge's life.

GALVANIZED REINFORCING: Steel rebar inside concrete coated with a layer of zinc for corrosion protection to extend the lifespan of the rebar and the bridge's life.

CORROSION-RESISTANT MATERIALS: Materials designed to withstand damage from moisture, chemicals, and age, helping infrastructure last longer.

TRANSPORTATION ASSET MANAGEMENT PLAN (TAMP): A planning tool used by transportation departments to monitor, maintain, and prioritize infrastructure like bridges and roads.

BENTLEY ASSETWISE BRIDGE INSPECTION SYSTEM: A digital system used to track the condition of bridges, schedule inspections, and plan repairs more efficiently.

SEISMIC RETROFITTING: Strengthening old bridges or buildings to make them more resistant to earthquakes.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP): A detailed plan showing which transportation projects a state will fund and build over several years.

FUNCTIONALLY OBSOLETE: Bridge's design is outdated and no longer meets current standards for traffic capacity, lane width, or other geometric features.

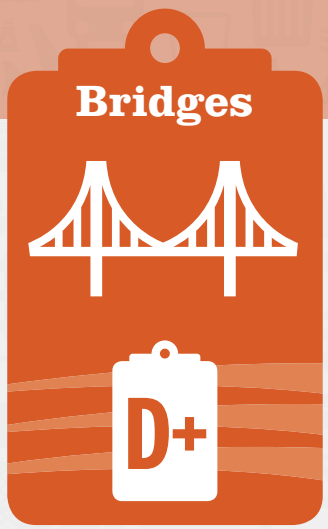


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Photo: Broadband Tower in WV (WV Public Broadcasting)

BROADBAND

EXECUTIVE SUMMARY

Broadband access is currently low or unreliable throughout West Virginia, though plans are already underway to bridge that divide. In 2021, West Virginia dedicated a large portion of its American Rescue Plan Act (ARPA) funds to broadband build out. Nearly 50 grants were awarded to projects across the state that will result in more than $275 million worth of fiber construction by the end of 2026. Additionally, the state is allocating $625 million of its $1.2 billion Broadband Equity, Access, and Deployment (BEAD) funds, which will close all remaining coverage gaps. About 94% of BEAD projects are proposed as fiber-to-the-premises, with the remaining 6% relying on low-Earth orbit satellite service—currently the highest share of fiber deployments among all states that have released BEAD plans. Therefore, with bold investments from ARPA and BEAD, West Virginia is not just catching up; it's on track to become a national leader in broadband access.

BACKGROUND

The Federal Communication Commission (FCC) defines broadband as a high-speed internet connection with at least 100 Megabits per second (Mbps) download speed and 20 Mbps upload speed (as of March 2024). It is vital for a wide range of uses in the modern landscape, from remote working and learning to virtual health appointments and online banking, and everything in between – truly everyday necessities for most. West Virginia recognizes the importance of this resource for its citizens but has historically faced difficulties in securing widespread access due to its rural population and mountainous terrain. The high cost of building broadband networks and a comparatively low number of customers to pick up along a route have been significant factors in creating what's now becoming a digital divide for the state. Where access does exist, residents are served through a mixture of fiber optic cable, coaxial cable, digital subscriber line (DSL), and satellite technologies – some of which are more reliable than others, creating further inequities.

CONDITION & CAPACITY

The overall condition and capacity of the country's broadband networks are a concern due to the constant developments in internet technology and ever-changing landscape. In West Virginia, according to Ookla's H1 2025 Broadband Speed and Performance Report, less than 60% of speed test users in the mountain state meet the Federal Communication Commissions (FCC) minimum broadband standard of 100 Mbps download / 20 Mbps upload. This is well below the national average, and while satellite broadband has expanded rapidly with the addition of services such as Starlink, its availability is limited in parts of the state due to the federally designated National Radio Quiet Zone (NRQZ) surrounding the Green Bank Observatory. The Quiet Zone restricts radio frequency emissions to protect sensitive research that the astronomy community and other research communities utilize, thereby limiting satellite usage in the region. Further, the mountainous terrain and often long stretches between users make options like satellite and cellular service less reliable – or even possible. Therefore, fiber optic cable is the best option for servicing residents uniformly and effectively across the state. It is, however, not a widely available commodity across the state with only 48% of the population having access to fiber optic internet, based on FCC reports through the end of 2024.

Figure 1: Green Bank Observatory

Source: Green Bank Observatory

Table 1: Number of providers by type

Provider Type	Number of Unique Providers Available
Fiber	30
Cable	12
Copper	10
Licensed Fixed Wireless	6
Licensed-by-rule Fixed Wireless	4

Source: TRIP, "Keeping West Virginia Moving Forward - April 2025," 2024.

There are an estimated 2,906 different Internet Service Providers (ISPs) that operate in the United States of America. According to the West Virginia Office of Broadband, the state has access to far fewer – 62 total unique providers ranging from fiber to fixed wireless:

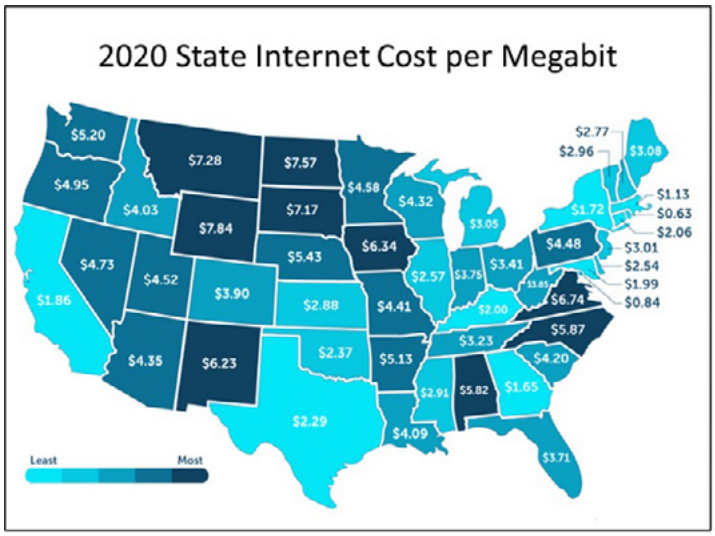
Even with dozens of providers in the state, though, service remains problematic. The state currently experiences a median download speed of 90 Mbps and the median upload speed is 12 Mbps, based on 2025 Ookla speed test data. While the nation's median speeds were approximately 70% higher in both upload and download speeds based on the same data.

Not only is speed a concern, but so is cost. The average monthly bill in West Virginia is $79.99 - about $5 above the national average. The state was also in the upper half of those paying the most per megabit in 2020, as seen in Figure 2. While these cost differentials may not seem like much on the surface, they are absolute barriers to access in one of the most impoverished states in the nation.

Oftentimes one of the most compelling drivers of cost is competition. With a relatively small number of ISPs in the state, the advantage lies with the providers rather than residents. Driving competition, however, is difficult in a state with high barriers to entry for ISPs – many private sector providers need a certain population density to operate. With rough terrain and sparse pockets of potential customers, the cost to build networks in West Virginia is typically too high to justify. The unfortunate result for the people of the state is that not only is there a lack of service in many places, but for those who do have service, 50% report being dissatisfied or very dissatisfied with their internet service – more than double the national dissatisfaction rate of 22%.

Beyond West Virginia's terrain and rural challenges, a major hurdle to constructing the broadband routes necessary for improving broadband is coordinating with electric companies. The bulk of utility poles are owned by electric companies, creating regulatory problems when ISPs wish to access these poles for broadband expansion. This is required for nearly every project, as most fiber is deployed along power poles due to the aerial construction option resulting in a much more cost-effective outcome than buried, particularly when working in mountainous, rocky terrain. To attach to poles, though, ISPs must acquire an attachment permit for each pole through a pole application process. Through this process, each pole's age, class, loading parameters, and available attachment space is investigated to determine if a new attachment can be authorized. This can be a lengthy process, with some cases taking up to a year to receive pole attachment permit approvals. This creates immense bottlenecks for companies wishing to expand to new areas.

Figure 2: State Internet Cost per Megabit



Provider	Average Rate
Frontier	$50-$155
Xfinity	$20-$300
T-Mobile	$60
Breezeline	$20-$60
Hughesnet	$50-$80
Optimum	$40-$70
Shentel	$65-$200
Starlink	$90-$100
Spectrum	$50-$90

Source: HighSpeedInternet.com

Even more time-intensive and costly is the potential need to physically replace these poles. The average lifespan of a wood utility pole is 40 years, with most poles in West Virginia installed in the late 1980s and early 1990s. As a result, many poles need replacement due to age alone. Additionally, if the attachment of fiber to the existing pole means the pole will fail wind/ice loading regulations, minimum distance between communication and power lines can't be met, or other issues result, the ISP, in some cases, is responsible for paying for the pole to be replaced in its entirely. This lengthy and costly system has been a topic of debate in the state, with multiple active cases currently in front of the West Virginia Public Service Commission. Resolution of these issues will help move projects forward in a more timely and cost-effective manner, but decisions on what that looks like for the future are still pending.

Figure 3: WV's Satisfaction for Internet Services Provides

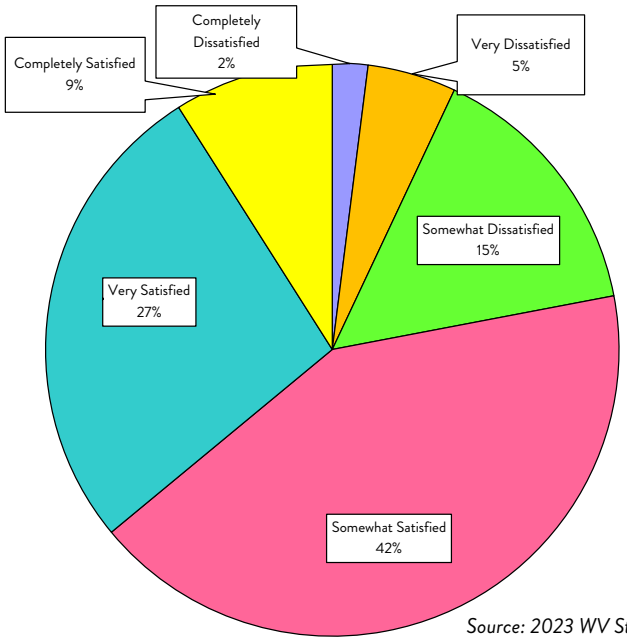
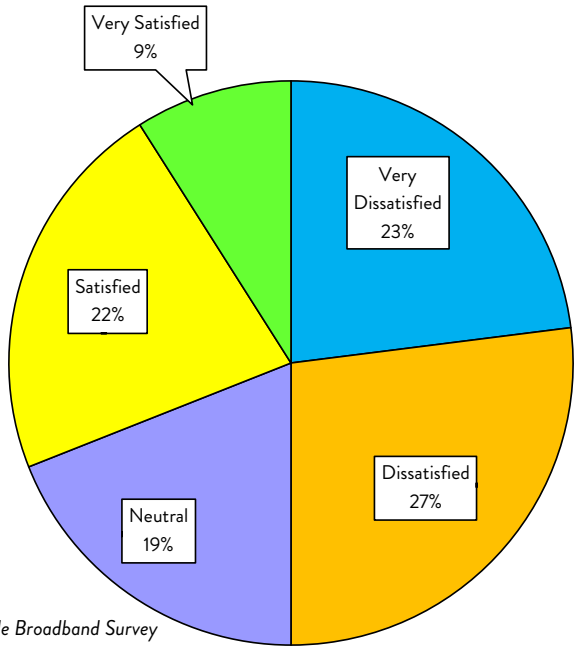


Figure 4: WV Resident Overall Satisfaction with Current Home Broadband Service



Source: 2023 WV Statewide Broadband Survey

Figure 5: Broadband tower in Upshur County

Source: WBOY

OPERATION & MAINTENANCE

Most newer systems require minimal maintenance, while older infrastructure is increasingly expensive to maintain. Broadband providers in West Virginia are tasked with ensuring the long-term reliability and performance of the state's high-speed internet infrastructure. Their responsibilities begin with maintaining network integrity through routine inspections of lines, splice points, and associated equipment, as well as implementing preventive maintenance programs to minimize service disruptions. Providers must respond promptly to outages caused by weather, accidents, or equipment failures, deploying emergency restoration crews, and maintaining adequate spare parts to restore service quickly. Compliance with state and federal regulations is essential, including adherence to West Virginia Code §31G for construction and operation in public rights-of-way and underground facility damage prevention laws.

To maintain optimal performance, providers conduct regular system testing, monitor speed and latency, and perform hardware and software upgrades to keep networks ready for the future. Detailed documentation on maintenance and upgrading activities is required for regulatory audits. Additionally, providers must uphold service level agreements, communicate clearly with customers during outages or scheduled maintenance, and report performance data to the West Virginia Office of Broadband and federal agencies. These ongoing responsibilities ensure that significant investments through programs like ARPA and BEAD deliver lasting value and position of West Virginia as a leader in broadband connectivity.

FUNDING

Fortunately, there have been a variety of federal and state funding sources available for West Virginia broadband projects over the last several years. This has provided the boost needed to facilitate building fiber projects in some of the state's severely underserved areas – without grant funding assistance, it's generally not fiscally advantageous for Internet Service Providers to build in the area. The Broadband Loan Insurance Fund provides benefits for the companies who invest in broadband in the state by helping them acquire the necessary loans needed for expansion. As of mid-2023, an additional $100 million of state funding was allocated to start the West Virginia Broadband Development fund. The state has combined state and federal sources to finance broadband expansion projects all over the state.

At the state level, West Virginia has created four grants as part of former Governor Jim Justice's Billion-Dollar Broadband Strategy and the West Virginia Broadband Investment Plan. These programs include the Wireless Internet Networks (WIN) program, the Major Broadband Project Strategies (MBPS) program, GigReady, and the Line Extension Advancement and Development (LEAD) program.

Former Governor Justice announced preliminary approvals for these programs, and the post-award notification process was announced on February 7, 2024. To date, more than $275 million has been awarded through these programs, and a total of 47 projects have been funded.

At the federal level, four entities have historically been instrumental in providing funding for broadband projects in the area: the United States Department of Agriculture (USDA), the United States Economic Development Administration (USEDA), the Appalachian Regional Commission (ARC), and the United States Department of Housing and Urban Development (HUD). Some of the key programs from these groups include:

- USDA ReConnect Loan and Grant Program
- USDA Community Connect Grant Program
- USEDA Public Works and Economic Adjustment Assistance
- ARC POWER Grants
- HUD Community Development Block Grants

The National Telecommunications and Information Administration (NTIA), however, has had the largest impact nationwide. While they have made individual awards – such as a $25 million grant to Appalachian Power for middle mile construction across five West Virginia counties – the most noteworthy outcome is their Broadband Equity, Access, and Deployment (BEAD) program. This initiative was created as part of the federal Infrastructure Investment and Jobs Act (IIJA), with $42.45 billion dedicated to broadband planning, deployment, and adoption projects across the United States.

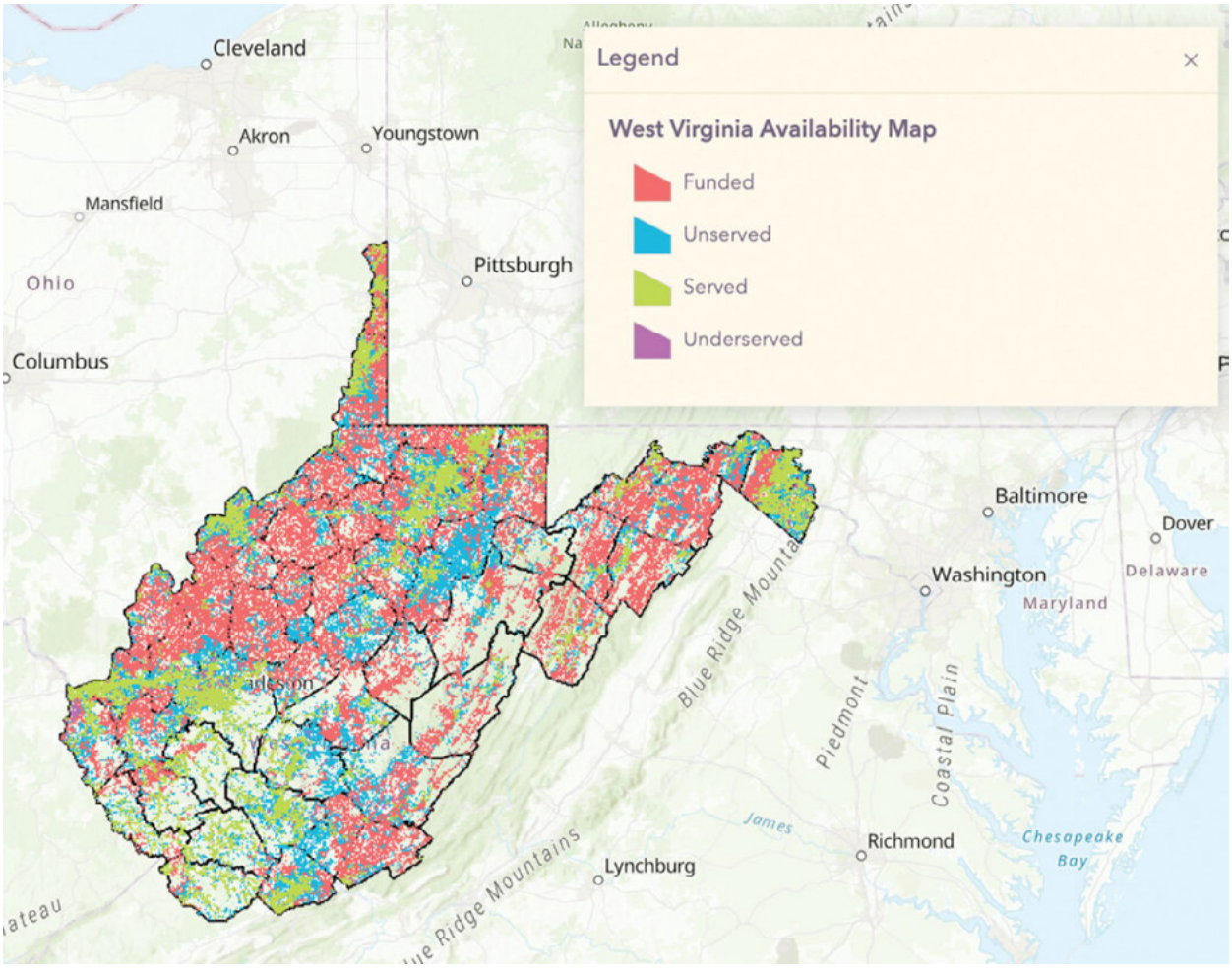
Table 2: WV Broadband Investment Plan Allocations, 2021

West Virginia Broadband Investment Plan Initial Funding Allocations		
WIN	$10 Million	Used to help expand services to understerved and unserved areas.
MBPS	$40 Million	Used to fund the largest state projects, aimed at providing internet to many addresses.
Gig Ready	$40 Million	This incentive helps provide an opportunity for local government agencies to receive funds through ARPA.
LEAD	$10 Million	Emphasizes focus on projects providing sufficient internet access to underserved areas.

Source: WV Broadband Enhancement Council

While the process of receiving this funding was complex, West Virginia was quick to tackle the challenge, being one of the first states in the country to reach the table when the program opened. The state is set to receive up to $1.2 billion to fund broadband construction projects in every corner of West Virginia when funds are released in 2026. Approximately 96% of these projects are set to be fiber-based, while the remaining areas will be covered by satellite. The projects completed under BEAD are designed to bring connectivity to every broadband serviceable location (BSL) in the state – a feat that would otherwise not be possible in such a rural, mountainous area.

Figure 6: West Virginia Broadband Availability and ARPA Funding Map, 2025



Source: WV Office of Broadband

FUTURE NEED

According to the U.S Census Bureau, West Virginia's population dropped 3.2% from 2010 to 2020. However, the service needs for broadband in the state are increasing as it ranks 47th out of 50 states in broadband service availability based on the state's 5-year BEAD action plan. Despite the decline in population, this tremendous need for more reliable broadband service has driven West Virginia to commit to facilitating broadband expansion. There is, however, a long way to go in accomplishing that feat – according to the 2023 Regional Optical Communications (ROC) study report, more than 14,824 miles of fiber and $1.2 billion are needed to meet the broadband infrastructure needs across West Virginia. This would expand access

to more than 105,000 broadband serviceable locations in the state currently lacking reliable internet, creating a fully served landscape. Thanks to the allocated state funding, this is well underway. Once all BEAD projects are constructed, the goal of full connectivity for the state of West Virginia should be achieved. This mirrors the FCC's strategic plan to get 100% of Americans access to sufficient broadband.

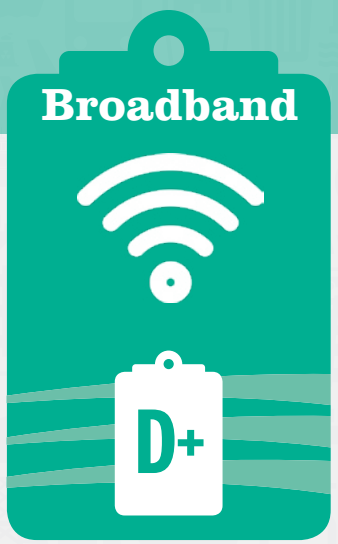
PUBLIC SAFETY, RESILIENCE, & INNOVATION

Broadband upgrades are critical to reducing emergency response times in rural areas. Enhanced connectivity also allows ambulances to use tools like built-in Wi-Fi to locate emergency callers and access patient charts in real time, which can help save lives. While weather events have minimal impact on cable, fiber, and DSL, satellite connections are more vulnerable. Power outages have a greater impact on satellite connections than hard wire connections. As more households move to satellites, more interruptions can occur. With the growth in popularity of Wi-Fi calls, this is an even bigger hurdle. This highlights the importance that a secure and reliable connection can reach each household in the state even with the topography of the state resulting in installation difficulties.

Cybersecurity threats are becoming increasingly evident as broadband expands to new customers. Although West Virginia has not yet experienced any major statewide cyberattacks, the state has been proactive in protecting against them by garnering approximately $14 million under the federal IIJA. This funding is being used to provide incentives to promote the detection of attacks and the state's response, develop the cybersecurity workforce, and enhance the resilience of infrastructure such as utilities and drinking water.

Figure 7: Delivering Broadband Connectivity to Rural Areas

Source: Olena

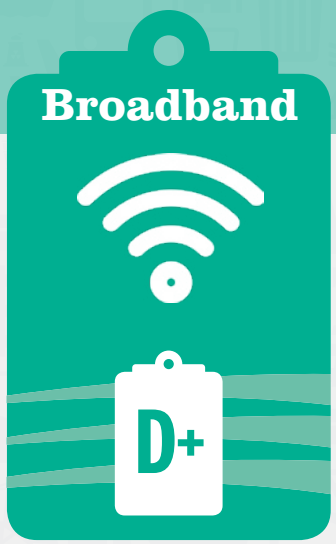


RECOMMENDATIONS TO RAISE THE GRADE

- Reduce Pole Attachment Permit approval times from start to finish.
- Work with state and federal lawmakers to prioritize funding for new construction.
- Develop an asset management plan and keep it updated. Asset management is vitally important to longevity and maintenance ease for broadband infrastructure and maintenance of broadband infrastructure.
- Utilize the Regional Optical Communications (ROC) report, a report that shows the monetary need for 100% broadband coverage in West Virginia. This report should be updated as projects are completed. Furthermore, develop a plan to fill gaps in coverage.
- Work with decision-makers to expedite permitting for Broadband. Install lines large enough to provide capacity for future expansion, to reduce re-permitting costs and time.
- Improve coverage for broadband across the state with the funding that is currently allocated for ARPA and the BEAD proposal.

Photo: Broadband tower in WV

Source: WV Public Broadcasting



DEFINITIONS

ACCESS – Access is the ability of a residence or business to connect to a Broadband source. Availability is the physical proximity of a Broadband source to a specific geographic reason.

ARPA – American Rescue Plan Spending

ACCESS- the physical proximity of a Broadband source to a specific geographic reason.

BROADBAND – Wired or wireless data streaming (internet) with operating streams of at minimum 100 megabits of download speed and 20 megabits of upload speed.

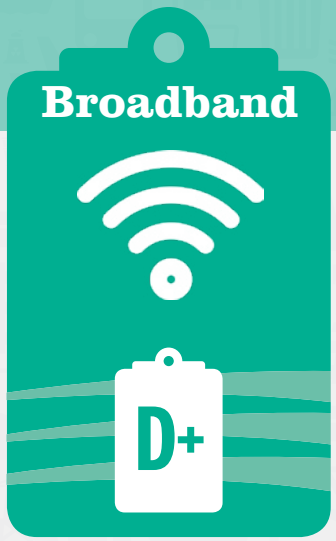
4G (MOBILE WIRELESS) - 4G data streaming runs at speeds in the neighborhood between 12 and 36 Megabits per second (Mbps). This equates to an approximately six-minute download time for a full-length movie.

5G (MOBILE WIRELESS) - 5G data streaming can run at speeds of up to 300 Mbps or more. A full-length movie can be downloaded in as little as 15 seconds. Urban areas are the best fit for 5G wireless.

FIBER OPTIC BROADBAND – Wired technology that converts electrical signals to light and then transmits it through tiny glass fibers. The FCC states that fiber optic broadband can transmit data by tens or hundreds of Megabits per second (Mbps) faster than DSL or cable modems.

WIRELESS BROADBAND – Typical internet connection to a consumer's home or business through a modem. The modem connects the customer's location to the service provider's facility. This type of broadband can be either mobile or fixed.

SATELLITE BROADBAND – As defined by the FCC, satellite broadband is another type of wireless broadband. This broadband can be especially applicable to serve remote and sparsely populated areas. While up to 10 times faster than dial-up internet, satellite broadband can still be slower than DSL or cable modem internet. One downside is that extreme weather conditions can disrupt satellite service.



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Dams

D+

GRADE COMPARISON

2020 WV: D
2025 WV: D+
Nat'l: D+

Photo: Hawks Nest Dam (Bridges and Tunnels)

DAMS

EXECUTIVE SUMMARY

Dams in West Virginia are used for flood control, industrial use, municipal water supply, power generation, and recreation. The state has 532 dams, which average 60 years in age. Of those, 461 are classified as high hazard. Ownership is varied, with the majority owned by private organizations or local utilities. Condition assessments show that 49 dams are in poor condition, 31 in fair, while 23 lack any rating, limiting risk management efforts. Financial support is available through state and federal programs, including $49 million from the Infrastructure Investment and Jobs Act for federal dams, yet the total estimated cost to rehabilitate all dams is $1.08 billion. Oversight is led by the West Virginia Department of Environmental Protection (WVDEP) and various federal agencies, which ensure compliance through inspections, maintenance plans, and emergency preparedness requirements. Addressing aging infrastructure, improving data collection, and closing funding gaps are essential to safeguarding communities and sustaining dam functionality statewide.

CONDITION & CAPACITY

Dams in the United States serve multiple purposes centered on the regulation and containment of water. In West Virginia, they play a critical role in flood control, while also supporting industrial activities such as mining, power generation, and municipal water supply. Additionally, dams contribute to the state's recreation sector, facilitating boating, fishing, swimming, and camping, which in turn supports local tourism revenue.

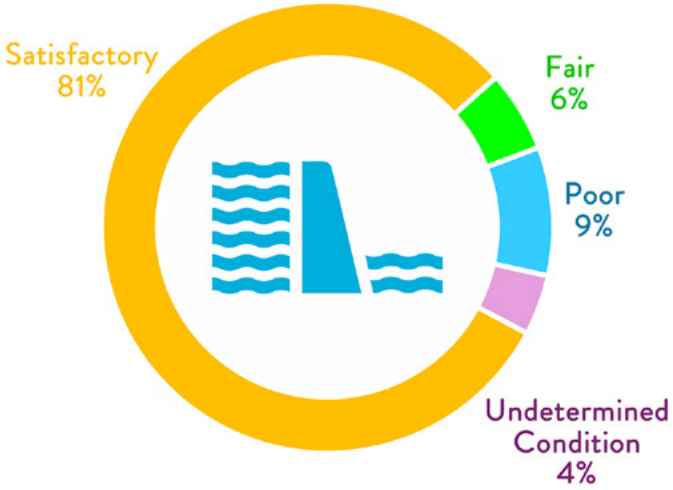
West Virginia is home to 532 dams, with an average age of 60 years, slightly below the national average of 64. Hazard classification of dams relates to the likelihood for human loss of life if the dam were to fail. Classifications range from High (probable loss of life) to Low (no possible loss of life). According to the WVDEP, 461 dams (87%) are classified as high hazard, 48 as significant hazard (9%), and 23 (4%) as low hazard, reflecting varying levels of risk based on potential downstream impacts.

Ownership is distributed among five categories: private, federal, state, public utility, and local government. Private entities own the largest share with 46% dams. Local governments own 36%, followed by the state with 8%, the federal government with 5%, and public utilities with 5%.

Given the aging nature of the infrastructure, condition assessments are increasingly important. Of the 532 dams with reported condition data, 49 are in poor

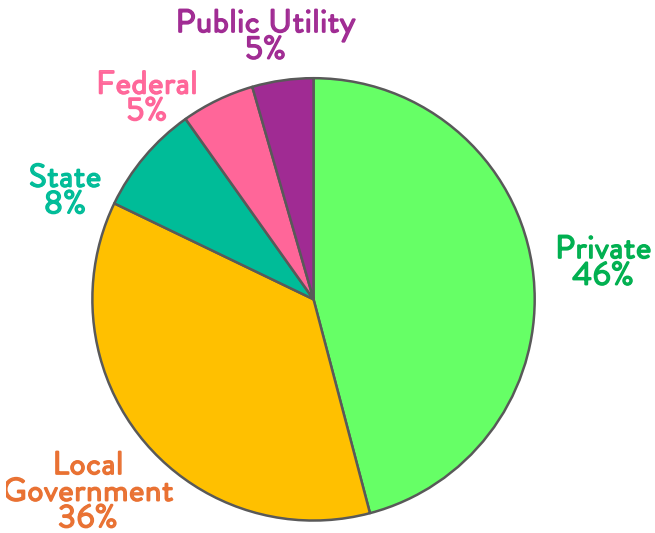
condition, 31 in fair and 23 without an assessment. An additional 429 are listed as satisfactory, though without funding for maintenance or upgrades, these ratings are likely to decline over time. Many of the downgraded condition ratings are due to safety standards that were set in place after most dams were built. The lack of funding to upgrade results in many dams being noncompliant with newer safety standards. Without timely upgrades for these aging dams, these structures will become more vulnerable. Furthermore, the lack of documented condition ratings limits the ability for the public to conduct accurate risk assessments. This lack of data, coupled with increasing precipitation and snowmelt, presents a growing challenge for flood control and infrastructure resilience.

Figure 1: WV Dam Conditions



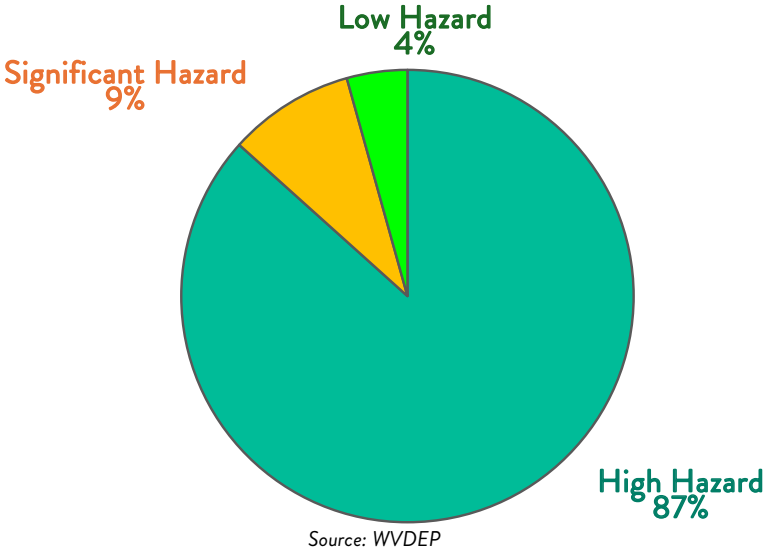
Source: WV DEP, NID

Figure 2: WV Dam Ownership



Source: NID

Figure 3: WV Dams Hazard Rating



Source: WVDEP

Figure 4: North Bend State Park Dam

Source: Davin White, West Virginia Conservation Agency

OPERATION & MAINTENANCE, FUNDING, & FUTURE NEED

The Dam Safety Rehabilitation Revolving Fund Program provides financial support for dam repairs in West Virginia, primarily through loan-based assistance. However, available funding remains significantly below what is required to address the needs of the state's aging infrastructure. Proper maintenance is vital for dam systems, ensuring reliable operation and strengthening flood resilience—an effort that can save lives while also delivering significant economic benefits.

West Virginia has 33 federally owned dams, managed by agencies including the U.S. Army Corps of Engineers, the Mine Safety and Health Administration, the Federal Energy Regulatory Commission, and the U.S. Forest Service.

Among the 45 state-owned dams, 33 are identified as needing repair or rehabilitation, with an estimated cost of approximately $30-45 million. Some of these anticipated projects may be eligible to receive support by federal grant through the Rehabilitation of High Hazard Potential Dams (HHPD) Program. West Virginia was the recipient of a $2.75 million (Federal cost-share amount) award during the Fiscal Year 2024 application period.

Figure 5: Herbicide drone spraying at Elkwater Fork Dam

Source: Davin White, West Virginia Conservation Agency

Municipally owned dams are owned by local governments, such as cities, towns, etc. While privately owned dams fall under the responsibility of individual owners, they may qualify for financial assistance through the Dam Safety Rehabilitation Revolving Fund, if appropriations are made back to this fund in the future.

Overall, the total estimated cost to rehabilitate all dams in West Virginia is approximately $1.08 billion, based on data from the March 2025 edition of the report titled "The Cost of Rehabilitating Dams in the U.S." by the Association of State Dam Safety Officials.

Figure 6: Boom installation at North Bend State Park Dam

Source: Davin White, West Virginia Conservation Agency

Figure 7: Summersville Dam

Source: USACE

PUBLIC SAFETY, RESILIENCE, & INNOVATION

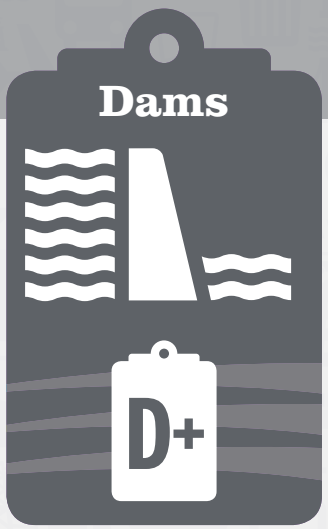
West Virginia's topography provides ideal conditions for dam construction, resulting in many dams distributed across the state. To ensure these structures perform their intended functions—such as flood control, water supply, and recreation—they must be properly designed, regularly maintained, and effectively regulated.

Dam safety oversight in the state is primarily the responsibility of the WVDEP, under the divisions of Water & Waste Management and Mining & Reclamation. Federally owned dams located throughout the state are regulated by various federal agencies.

To promote safe operation, the WVDEP issues a Certificate of Approval (CoA) to dams that meet established engineering, inspection, and operational standards. To maintain a valid CoA, dam owners must complete routine inspections, implement a Monitoring and Emergency Action Plan (MEAP), maintain a preventative maintenance schedule, and resolve any outstanding safety violations.

Among these requirements, the MEAP is a critical component of public safety. MEAPs are required for all high hazard (Class 1) dams and some significant hazard (Class 2) dams. In the event of a partial or complete dam failure, the MEAP outlines procedures for timely warnings and emergency response, which can be vital for protecting lives within the downstream inundation area. In West Virginia, 85% of required dams currently have an up-to-date MEAP on file.

The majority of dam innovation is associated with preparedness, risk assessment, failure prevention. West Virginia's Dam Safety program is continuously working with dam owners to keep MEAPs up to date. The program also currently provides inspections annually, when possible, by staff engineers and inspectors. This has provided dam owners with additional risk assessment and failure prevention information to compliment their required private engineer inspections.

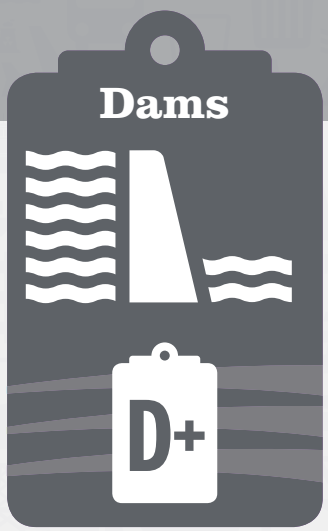


RECOMMENDATIONS TO RAISE THE GRADE

- Develop an asset management plan to maintain current data on infrastructure conditions and support the strategic allocation of resources, ensuring that the most critical and at-risk assets receive attention before reaching a state of failure.
- Dam owners and investors could pursue the establishment of hydroelectric power to generate revenue for maintenance and upgrades, while helping the state become more self-sustaining.
- Dam owners could conduct further studies to enhance sustainable design, improve long-term performance and safety, and increase overall resiliency.
- Dam owners could expand weather monitoring efforts to help prevent dams from reaching critical water levels.
- Update all dam information and data in National Inventory of Dams to help develop a better risk assessment of Dams in West Virginia.

Photo: Upper Deckers Creek Dam

Source: Davin White, West Virginia Conservation Agency



DEFINITIONS

FEDERALLY OWNED DAMS – dams that are owned by federal government agencies.

HIGH HAZARD POTENTIAL DAMS – Dams where failure or mis-operation will likely cause loss of human life.

SIGNIFICANT HAZARD POTENTIAL DAMS – Dams where loss of human life is unlikely from failure or mis-operation but can cause economic loss or environmental damage.

LOW HAZARD POTENTIAL DAMS – Dams where failure or mis-operation results in low economic and/or environmental losses with loss of human life being unlikely.

MONITORING AND EMERGENCY ACTION PLANS (MEAP) – This document provides a plan to monitor a dam under an array of conditions so that if an emergency occurs at the dam, it can be promptly reported to those affected. This document also includes a plan to notify and evacuate downstream residents to safety in the event of dam failure.

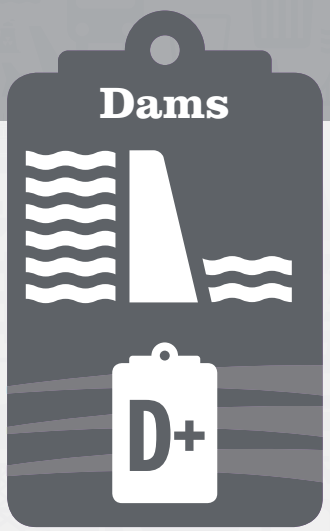
MUNICIPALLY OWNED DAMS – dams that are owned by local governments.

NATIONAL INVENTORY OF DAMS (NID) - The National Inventory of Dams website, also referred to as the NID, provides users with easy access to all the dam-related information needed — quickly, reliably, and with powerful tools to make your user experience rewarding and efficient.

PRIVATELY OWNED DAMS – dams that are owned by an individual, private company, or other non-governmental entity.

STATE OWNED DAMS – dams that are owned by state agencies.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP) - The West Virginia Department of Environmental Protection enforces state and federal environmental laws in West Virginia to help protect our air, water, and land.



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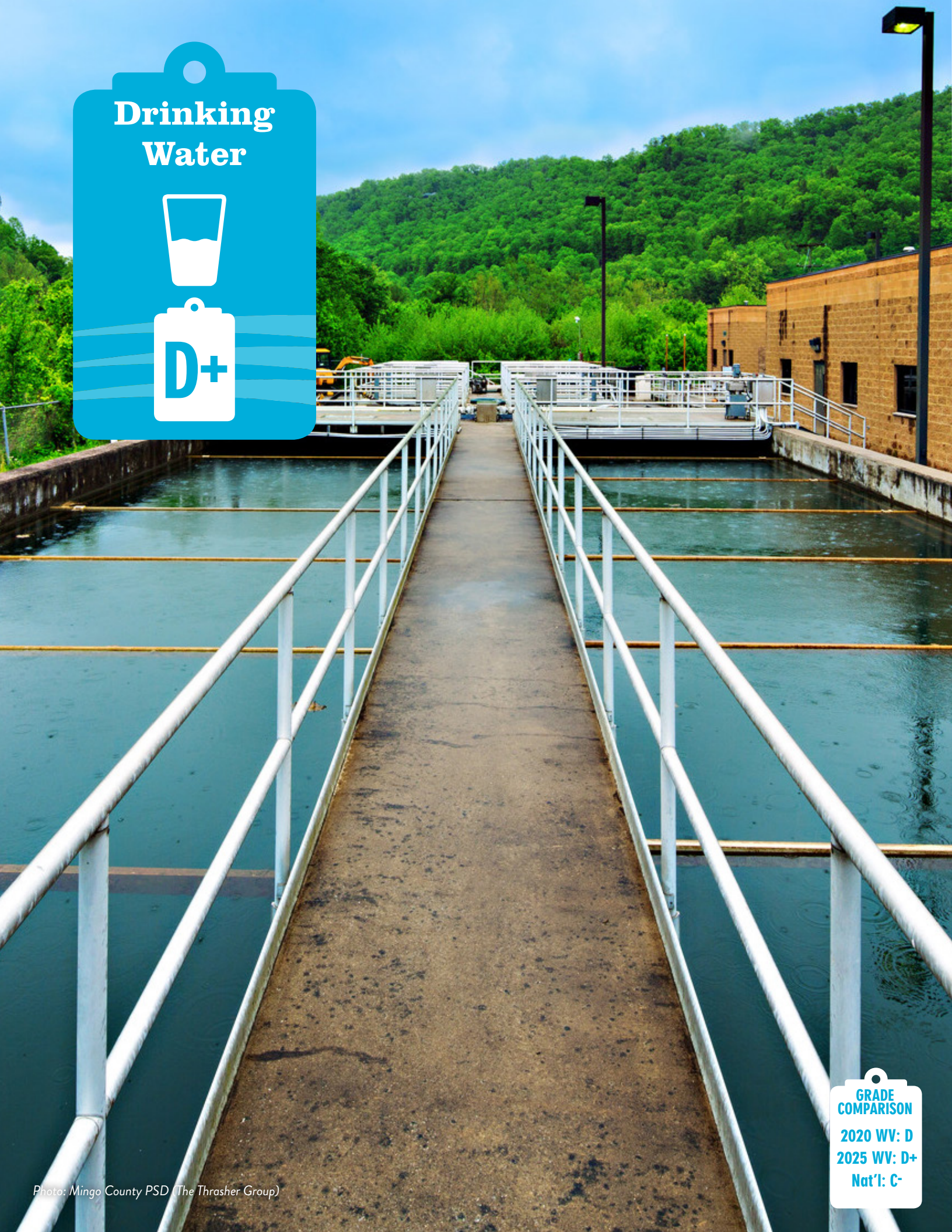


Photo: Mingo County PSD (The Thrasher Group)

DRINKING WATER

EXECUTIVE SUMMARY

Providing safe, clean, and reliable drinking water is a top priority. However, West Virginia's drinking water infrastructure faces a number of challenges, including aging systems, high water loss, and significant funding gaps. Despite treatment capacity exceeding current demand, a declining population makes funding and sustainability difficult. In 2023, West Virginia's water systems were assessed and found to be 83% viable, 14% marginal, and 3% failing. Some systems lose over 50% of water due to leaks, and the state's rocky terrain complicates maintenance. Regular sanitary surveys help ensure compliance with the Safe Drinking Water Act. Funding comes from a mix of federal, state, local, and private sources. Despite nearly $1 billion in federal investments, a funding gap of $897 million remains. West Virginians face the highest water bills in the country, and the state's mountainous terrain proves challenging in pumping and storing water. Without additional funding, utilities can only address the most urgent needs.

CONDITION & CAPACITY

Safe and reliable drinking water infrastructure is vital to West Virginia. The state currently has 469 community water systems and non-transient, non-community water systems, serving over 1.5 million residents. In 2023, at least 250,000 residents in West Virginia relied on private wells or cisterns. Private wells are not monitored by the Environmental Protection Agency (EPA), making it difficult to determine not only an accurate number of private wells being used but the conditions of the water.

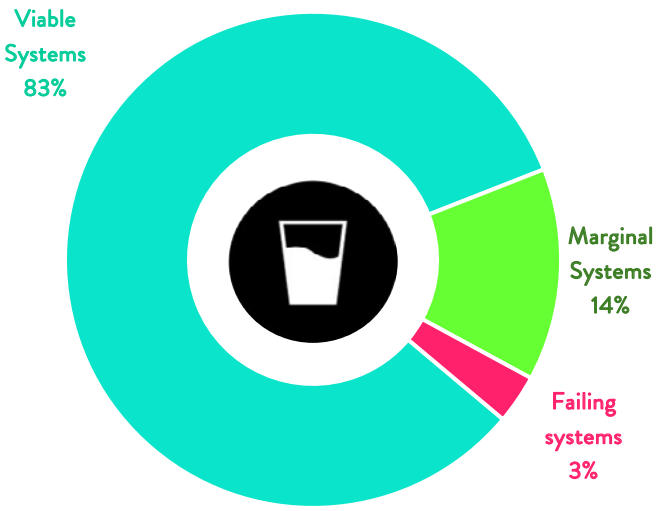
Each day, approximately 148 million gallons of water is withdrawn for domestic use, with the average resident using approximately 80 gallons per day, slightly lower than the national average of 82-100 gallons per day. These numbers are shifting due to the state's declining population, which impacts water infrastructure in multiple ways. While water treatment systems can supply more than the current demand, maintaining an adequate ratepayer customer base to support needed infrastructure investments is increasingly difficult. According to the 2023 report to the Governor, 389 (83%) of the 469 community water systems and non-transient, non-community water systems in West Virginia are viable systems with adequate technical, managerial, and financial capacity; 65 (14%) are marginal systems and 15 (3%) are failing systems.

In 2020, the West Virginia Legislature passed SB 739, giving the Public Service Commission (PSC) new authority to investigate distressed water and wastewater utilities and to evaluate nearby capable systems that could provide technical, managerial, and financial capacity.

Figure 1: City of Fairmont water treatment plant

Source: Strand Associates

Figure 2: Water Systems in West Virginia



Source: 2023 Report to the Governor

The statute has already been used in cases such as the Page-Kincaid PSD, which was acquired by West Virginia American Water in 2021. It also enabled the PSC to investigate and ultimately direct the Elkins Water Board to assume operations of the Whitmer Water Association after the utility staff and board resigned in 2022. Elkins began full operations of the Whitmer system in January 2024; however, in April 2025, the Elkins Water Board voted to discontinue management and operation of the Whitmer Water System.

Aging infrastructure presents another significant challenge. Much of West Virginia's drinking water infrastructure has exceeded or is nearing the end of its design life. Respondents related to drinking water infrastructure and utility operations identified maintenance of aging treatment, pumping, storage, and distribution systems as a key challenge. A large

percentage of the water in West Virginia is non-revenue, meaning that although the costs to produce water are incurred, no revenue is received from a customer to recover those costs. A significant amount of treated water is lost during distribution due to leaks throughout the system, with some systems in the state reporting water losses exceeding 50%. West Virginia's steep topography, shallow water tables, abundant surface water, and extensive pipe systems make leak detection and repairs challenging. Pipes running across streams further hinder leak detection, while the mountainous terrain necessitates pumping, which increases system pressure and leads to additional maintenance needs. Furthermore, the state's sparse population results in a disproportionate amount of pipe needed to serve a customer, further burdening infrastructure maintenance.

The West Virginia Public Water System Capacity Development Program, administered by the WV Bureau for Public Health, summarizes activities completed, currently underway, and planned. The program supports public water systems in making improvements to their technical operations (including infrastructure), finances, and management so they can consistently provide drinking water that meets federal and state standards as effectively and efficiently as possible. The Capacity Development Assessment is a detailed evaluation of a water system's technical, managerial, and financial capability. The evaluation effectively confirms adequate capacity of viable systems or identifies the developmental needs of marginal or failing water systems.

Figure 3: Mingo County PSD

Source: The Thrasher Group

Figure 4: Water line replacement in Clarksburg, WV

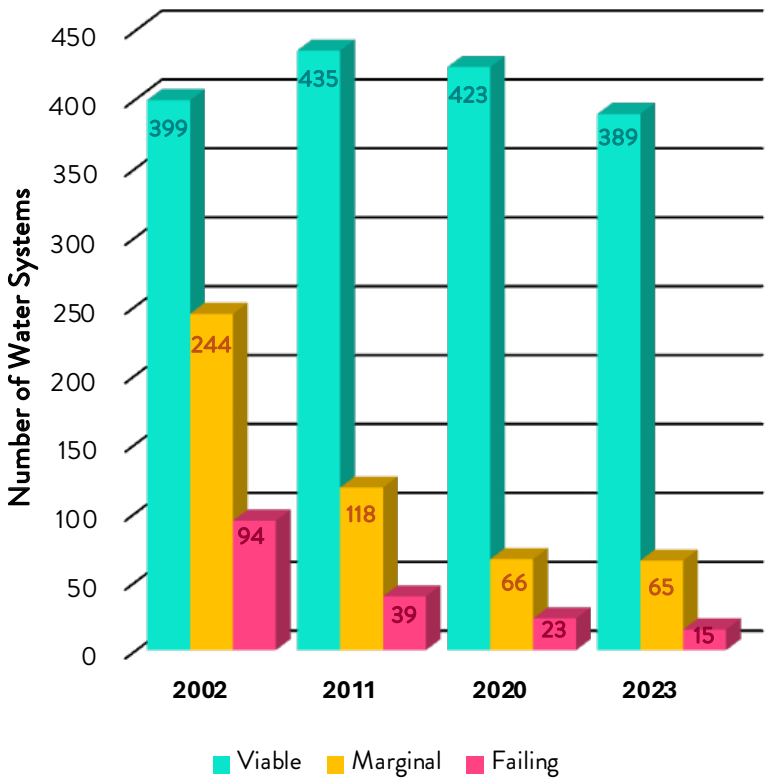
Source: Exponent Telegram

Following a water system evaluation, assistance is provided through state agencies or professional or trade organizations to help the water system with tools and resources needed to implement the recommendations. This assistance has been effective at improving the system's operations. In addition, water systems are routinely referred to outside partner agencies/ organizations for their expertise.

The statewide baseline process identifies water systems' viability status (i.e., viable, marginal or failing) and those needing assistance to improve their capability. The 2023 data show a continuing trend in which populations are shifting to larger, more viable water systems, while populations served by smaller systems that are often marginal or failing, are decreasing. As a result of this trend, more than 160 of the smallest, and often failing, water systems have been absorbed into larger, more capable utilities since 2002 through acquisition, consolidation, or managed mergers.

The 2023 baseline data show that for systems which have more than 1,000 customers, there is one failing system and 13 marginal systems. West Virginia's failing and marginal systems pose a constant threat of disruption to their customers' drinking water supply. Such interruptions threaten the customers' health and welfare and are an impediment to economic development in areas served by these systems. While West Virginia still has 80 marginal or failing water systems, the 2023 baseline data shows steady improvements in water systems' capacities.

Figure 5: Water Systems Trends



Source: Annual Water Resources Report

OPERATION & MAINTENANCE AND FUNDING

Funding and financing for the state of West Virginia's drinking water infrastructure comes from local ratepayers, federal, state, local, and other sources. State programs administered through the West Virginia Water Development Authority and the West Virginia Infrastructure & Jobs Development Council (IJDC) provide low-interest loans and grants. Federal partners, including the EPA, USDA Rural Development, the Appalachian Regional Commission, and the US Economic Development Administration, supply supplemental funding for eligible projects.

Despite the listed funding sources, a significant funding gap remains between the infrastructure improvements needed and the funding to make those improvements. Ratepayer revenue is insufficient to meet current infrastructure operational needs, hindering the state's ability to maintain, extend, and upgrade water infrastructure. Current funding needs for water infrastructure approved by the West Virginia IJDC are approximately $897 million for water projects, according to the 2023 needs survey. A recent West Virginia University study reported that water professionals in West Virginia indicate that maintaining user rates high enough to sustain water infrastructure is one of the top challenges facing the water industry. Because many West Virginia systems serve small and shrinking populations, costs are spread across fewer customers, making it difficult to generate sufficient rate revenue to replace aging infrastructure or maintain adequate reserves.

In response, some utilities, such as West Virginia American Water, have proposed innovative funding mechanisms for infrastructure replacement and/or upgrades. The Distribution System Improvement Charge or DISC allows the Company to collect rate increments from customers and then use those funds for infrastructure repairs and replacement. Although rate increases can help decrease the gap, they are not enough to fully address long-term infrastructure needs or meet current operational requirements without significant rate shock to customers.

Figure 6: Water line repairs

Source: WV Rural Water Association

Operational capacity is an equally significant challenge. Many systems struggle with limited staffing, shortages of certified operators, and equipment past its useful life. Smaller utilities often rely on reactive repair, since they lack the resources to invest in preventive maintenance, GIS-based asset inventories, computerized maintenance management systems, or long-term capital planning. These operational gaps increase the likelihood of service disruptions and contribute to escalating maintenance costs over time.

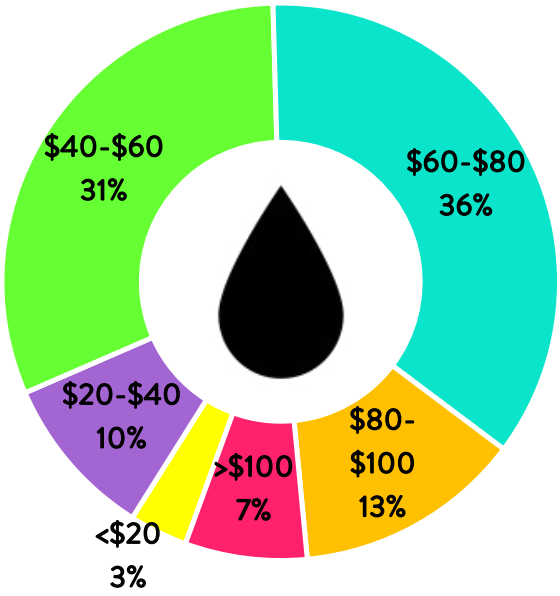
In recent years, West Virginia has seen historic investments from the federal government in water-related projects. West Virginia received nearly $1 billion in water and sewer funding through the Infrastructure Investment and Jobs Act (IIJA) and American Rescue Plan Act (ARPA). From 2017 through 2024, the state invested approximately $736 million in water and sewer projects. In September 2024, the legislature approved another $225 million for water and sewer projects

and brought the state's spending to a total of $961 million in seven years. These totals include both direct appropriations and state administered grants and loans through the WDA and WVIJDC. Additionally, the state's Economic Enhancement Grant Fund (EEGF), which was created in 2022 and administered by WDA, has also funded many drinking water projects, directing more than $67 million to improvements as of late 2024.

West Virginia continues to rely on the Drinking Water State Revolving Fund (DWSRF) as a major financing mechanism. The DWSRF has provided the state with more than $386 million in capitalization grants over the program's history, with recent awards exceeding $69 million annually through the IIJA. DWSRF requires at least 15% of funds toward small systems and disadvantaged communities, enabling rural utilities to access financing they otherwise could not obtain.

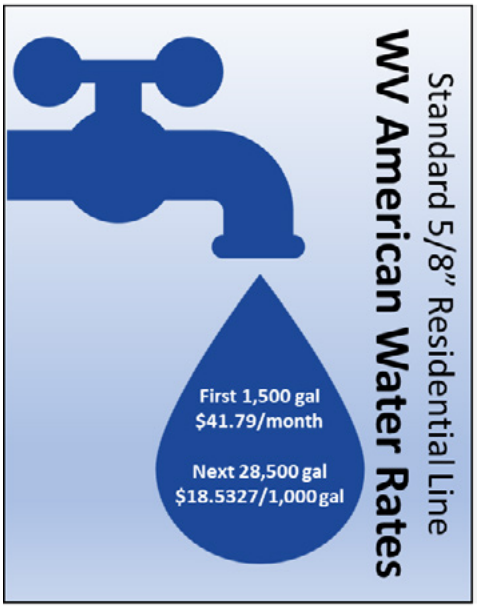
Despite these investments, most rate revenue continues to be directed toward operation and maintenance, along with debt service and required reserves, leaving limited capacity for utility-funded capital improvements. Without continued external funding and expanded asset-management practices, many of the state's small and rural systems will continue to struggle to maintain reliability, meet regulatory standards, and replace aging infrastructure.

Figure 7: WV PSD Water Utility Rate per 4500 gallons



Source: Public Service Commission

Figure 8: WV American Water rates for standard 5/8" residential line



Source: WV American Water

Figure 9: Glade Creek Water Treatment Plant in Beckley, WV

Source: Chapman Technical Group

FUTURE NEED

As water infrastructure ages and Safe Drinking Water Act compliance requirements evolve, utilities must balance the cost of capital projects and infrastructure improvement costs with the rates consumers are willing to pay. The closer rates are to an unacceptable limit, the less likely utilities will be to take on debt to fund a capital infrastructure plan. Utilities will be more likely to take on capital projects only if grant money can be allocated. In the absence of grant funding, utilities may only undertake projects of high urgency.

As of June 30, 2023, the West Virginia IJDC identified approximately $1.0 billion in funding needed to maintain water systems, with roughly $108 million committed. This funding will address current critical infrastructure deficiencies by utilizing preventative maintenance to ensure safe drinking water across the state. Additionally, expanding water services to unserved households is another focus of future needs. The estimated cost to provide water service to each unserved household is roughly $33,301. There are an estimated 63,890 unserved households, and the total cost to expand water services in these areas is approximately $2.1 billion.

Figure 10: Water main break in Clarksburg, WV

Source: Exponent Telegram

PUBLIC SAFETY, RESILIENCE & INNOVATION

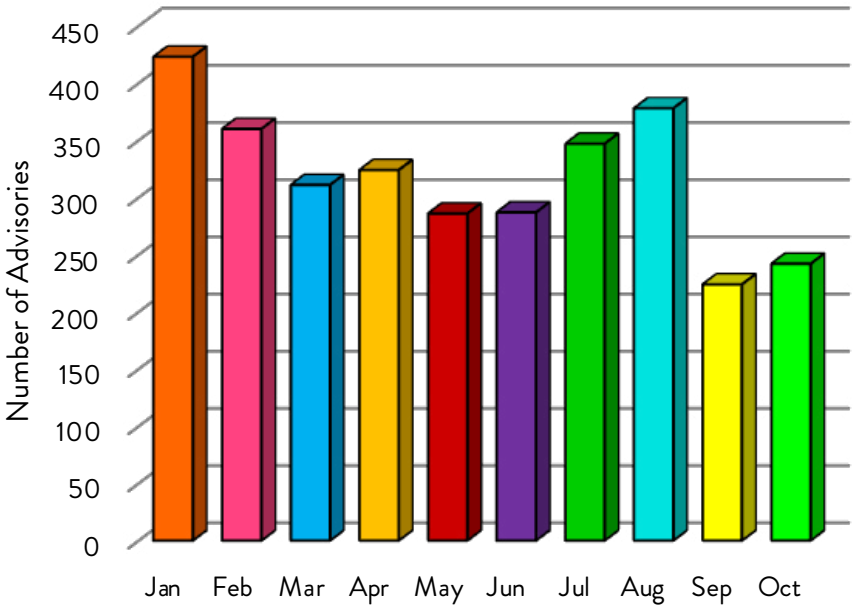
Ensuring safe drinking water remains a top priority. West Virginia is plagued with significant challenges regarding the safety of drinking water. The state's utilities conduct regular water sanitary surveys to comply with both state and federal regulations under the Safe Drinking Water Act (SDWA). The SDWA requires that the Environmental Protection Agency implement a laboratory certification program to test drinking water for compliance with the Act. The West Virginia Department of Health determines whether a Public Water System (PWS) complies with all state rules and federal regulations pertaining to the Safe Drinking Water Act. This determination is based on the results of the chemical and contaminant monitoring required for each PWS. If a system is out of compliance, a violation is issued requiring the PWS to conduct public notification activities to inform the public that there was a problem, what happened, and what is being done to fix it. Certified public and private laboratories are inspected triennially and must maintain satisfactory participation in annual proficiency test water studies.

According to the West Virginia Department of Health and Human Resources, there have been nearly 3,200 boil water advisories from January 1, 2025, to November 1, 2025. These boil water advisories further support residents' concerns about the safety of their drinking water. Extreme weather events in January and February caused many main breaks which result in Boil Water Advisories being issued for the period from the break, through repair completion and the receipt of water samples which are in compliance with the Safe Drinking Water Act. The extreme drought which impacted much of the state throughout 2024 also impacted the number of line breaks. It is also an indicator of systems with old pipes that have passed their useful life and are more likely to break during weather changes.

West Virginia American Water has launched a statewide lead-service-line identification effort that includes an interactive public map, customer self-reporting tools, and a commitment to replace customer-owned lead lines at no direct cost once identified. At the same time, public service districts across West Virginia are completing their required lead-service-line inventories under the federal Lead and Copper Rule Revisions, using customer surveys, online forms, and technical assistance from the state and partners such as WV Rural Water

Association (WVRWA) and WV Rural Community Assistance Program. For example, the Clarksburg, West Virginia, Water Board is replacing 4,434 lead service lines at no cost to the property owner. Together, these efforts represent a coordinated statewide push to identify, document, and ultimately replace remaining lead lines in both large and small systems.

Figure 11: 2025 Boil Water Advisories



Source: WV DHHR

Figure 12: Water line replacement in Clarksburg, WV

Source: The Exponent Telegram

West Virginia has implemented plans to prepare for natural disasters and extreme weather related to drinking water infrastructure. Flood management plans, such as the West Virginia Conservation Agency's flood plan, have been implemented to help protect water infrastructure from destruction by extreme weather events. The West Virginia Division of Homeland Security and Emergency Management oversees the state's emergency operations, including contingency plans for drought. When drought occurs, contingency plans are available, and water-use restrictions can be implemented through the Public Service Commission's Water Rules.

Conserving water resources is a key priority for West Virginia. Both utilities and the state are working to conserve resources with initiatives such as the Safe Water for West Virginia Program, the requirement of Source Water Protection Plans, and the partnership between West Virginia American Water, the Environmental Protection Agency, and other partners to form the West Virginia Forests & Drinking Water Partnership. The Safe Water for West Virginia Program was launched to support public engagement and education regarding the protection of drinking water sources. Source Water Protection Plans include management strategies to reduce the risk of contamination of drinking water sources and encourage public participation in protection efforts. The West Virginia Forests & Drinking Water Partnership maintains the goal of protecting source waters and educating and involving the public in the protection of the state's source waters.

Innovative technologies, such as ultra-membrane water treatment plants, are still relatively new to West Virginia. Another innovative technology is automated water monitoring systems, which replace manual data collection by using small internet nodes that gather data from connected appliances. This approach is more effective and efficient, saving taxpayers money by eliminating hands-on monitoring and providing real-time updates to enable faster responses. Automated monitoring systems have been successfully installed across various utilities. As West Virginia navigates its water infrastructure challenges, innovative funding and technologies are essential to ensuring a sustainable and safe water supply for future generations.

Figure 13: Ultra membrane water treatment plant in Fairmont, WV

Source: City of Fairmont

RECOMMENDATIONS TO RAISE THE GRADE

- Develop and actively implement drinking-water asset-management plans that identify aging and high-risk infrastructure and guide routine maintenance, capital planning, and cybersecurity improvements. These plans, which are required and eligible under the DWTRF program, should be living tools that utilities regularly update and apply to prioritize line replacements, reduce water loss, and strengthen system resilience.

- Allow water systems to institute small; periodic rate increases over time without regulatory oversight. This will lessen the rate shock to customers and will improve the utility's ability to generate revenue to keep up with operation and maintenance.

- Encourage the restructuring of water systems into more viable regional systems to improve the capacity, financial sustainability, and efficiency of water systems using all available means including the distressed utilities statute and the U. S. EPA Water System Assessment and Restructuring Rule, when finalized.

- Launch educational campaigns to raise awareness about water conservation programs and the importance of supporting water infrastructure.

Photo: Mingo County PSD

The Thrasher Group

DEFINITIONS

BOIL WATER ADVISORY: A public health recommendation to boil tap water before consumption due to potential contamination.

DRINKING WATER VIEWER: An online public platform in West Virginia that provides compliance and quality data on public water systems.

DWSRF (DRINKING WATER STATE REVOLVING FUND): A federal-state partnership program that provides low-interest loans and grants to communities for drinking water improvement projects, including water treatment upgrades and extensions.

DWTRF (DRINKING WATER TREATMENT REVOLVING FUND): The DWTRF program was authorized by federal and state governments to assist public water systems in financing the cost of the infrastructure needed to achieve or maintain compliance with Safe Drinking Water Act requirements and protect public health.

INFLATION REDUCTION ACT (IRA): A federal law that provides funding and tax incentives to support clean energy, climate resilience, infrastructure improvements, and environmental initiatives, including water and energy efficiency projects.

NON-REVENUE WATER: Treated water that is produced but not billed due to leaks, theft, or metering errors.

NON-TRANSIENT NON-COMMUNITY WATER SYSTEMS: These serve at least 25 of the same people over six months per year (e.g., schools or workplaces) but are not residential.

RATEPAYER: A customer who pays for utility services like water or electricity—often used in public utility contexts.

SAFE DRINKING WATER ACT (SDWA): Federal law that ensures the quality of Americans' drinking water. It authorizes the EPA to set standards for drinking water quality and oversee states and water suppliers.

SOURCE WATER PROTECTION PLANS: Plans created to safeguard drinking water sources from contamination, often required by law after major contamination events.

ULTRA-MEMBRANE WATER TREATMENT: A high-efficiency filtration process that effectively removes suspended solids and pathogens.

WATER INFRASTRUCTURE FINANCE AND INNOVATION ACT (WIFIA): A federal program that provides low-interest, long-term loans for water infrastructure projects.

WEST VIRGINIA INFRASTRUCTURE AND JOBS DEVELOPMENT COUNCIL (WVIJDC): A West Virginia state entity that funds and coordinates infrastructure projects including water and sewer systems.

WEST VIRGINIA WATER DEVELOPMENT AUTHORITY (WDA): The WDA administers a variety of programs to provide long-term, short-term and private-activity financing at favorable interest rates for design, construction, improvement and acquisition of wastewater and water systems.

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Energy

D+

GRADE COMPARISON

WV: D+

Nat'l: D+

Photo: John Amos coal fired Power Plant, St Albans, West Virginia (2018 Mark's Photo)

ENERGY

EXECUTIVE SUMMARY

West Virginia ranks fifth in the nation for energy production, generating nearly twice as much energy as it consumes. The state remains heavily dependent on coal, which supplies nearly 90% of electricity, with natural gas production and shale reserves also playing a lesser role. Renewable resources—including wind, hydro, and solar—account for less than 7% of the energy mix. In 2022, the repeal of the state's nuclear ban opened the door to new options. Aging pipelines, frequent power outages, and flooding highlight pressing needs for system upgrades. While utilities have invested nearly $1 billion since 2012 to improve reliability, interruptions remain common. Federal funding, including through the Infrastructure Investment and Jobs Act (IIJA), is providing opportunities for grid modernization and renewable energy development. To ensure a resilient energy future, West Virginia must diversify its energy mix, modernize infrastructure, and invest in innovation.

CONDITION AND CAPACITY

West Virginia's energy infrastructure is extensive and productive, reflecting decades of investment in mining, generation, transmission, and pipeline systems. The state's total electric generating capacity is approximately fifteen gigawatts. Of this, roughly twelve and a half gigawatts come from coal-fired units, about one gigawatt from natural-gas-fired units, and slightly more than half a gigawatt from renewable resources. Although the current capacity exceeds in-state demand, the system's heavy reliance on decades-old coal units presents operational constraints. Many of these units were commissioned between the 1960s and 1980s and, despite numerous retrofits, now face aging turbine components, boiler wear, analog control systems, and growing maintenance backlogs.

Coal production remains central to West Virginia's economy and identity. In 2023, the state produced roughly eighty million tons of coal from mines in forty-three counties. Production has rebounded from pandemic lows, but long-term trends show a gradual decline tied to market competition, geological complexity, and shrinking workforces. Transportation bottlenecks along the Kanawha, Monongahela, and Ohio River corridors continue to influence cost structures and delivery timelines. Despite these challenges, coal remains cost-competitive for baseload generation within the PJM Interconnection, particularly where plants have reliable access to fuel.

Figure 1: WV Energy Generation by Source

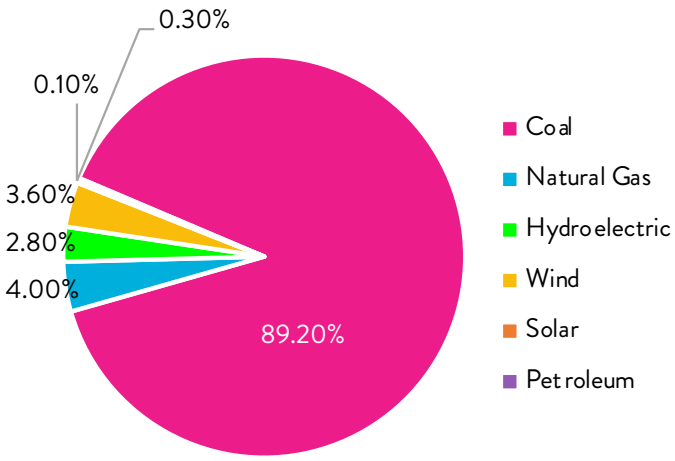
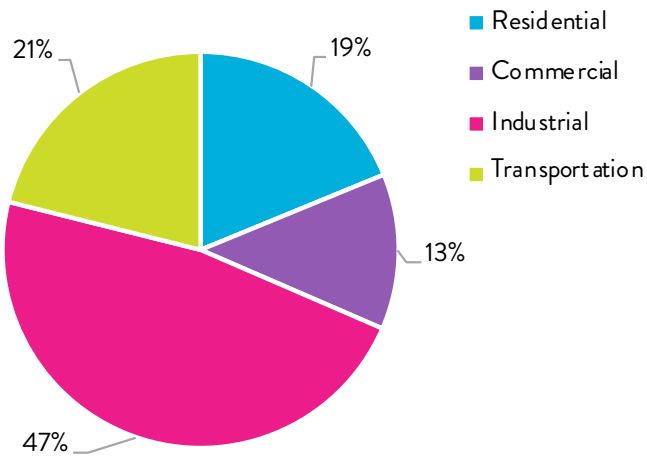


Figure 2: WV Energy Consumption by End-Use Sector



Source: EIA

Natural gas development has expanded dramatically over the last decade. West Virginia is now the fifth-largest natural-gas-producing state in the nation, with annual production exceeding three trillion cubic feet. Proven reserves surpass thirty trillion cubic feet, providing long-term fuel security and opportunities for industrial development. Natural-gas-fired generation, although still a small part of the statewide mix, can offer operational flexibility to support both baseload and renewable resources. Crude-oil production, while modest, has returned to early-twentieth-century output levels, reaching approximately nineteen million barrels per year.

Renewable energy contributes a comparatively small but gradually increasing share of generation. About seven hundred megawatts of wind capacity operate along the Allegheny Highlands, taking advantage of favorable ridgeline conditions. Hydropower facilities along the Ohio River provide approximately four hundred sixty megawatts of consistent, dispatchable output. Distributed solar, including rooftop and community systems, now exceeds fifteen megawatts and is expected to grow as interconnection standards, and net-metering rules are refined. Former mining sites offer significant pumped-hydro storage potential, which could provide long-duration storage to complement intermittent resources.

Transmission and distribution infrastructure forms the backbone of West Virginia's energy system. Two major investor-owned utilities—American Electric Power and FirstEnergy—serve most of the state and collectively operate more than twenty-five thousand miles of distribution lines and roughly six thousand miles of high-voltage transmission lines. Nearly 40% of utility poles, transformers, and conductors exceed their intended service life. Despite more than one billion dollars invested in reliability improvements since 2012, outage-frequency and duration indices remain above national averages, particularly in rural areas where feeders are long, and redundancy is limited

Transmission planning occurs within the PJM Interconnection framework. The state's export-oriented fleet requires robust interconnection to neighboring states, yet several 138-kV and 230-kV corridors are approaching thermal limits. Many substations continue to rely on legacy analog relay equipment, limiting situational awareness, and fault-clearing speed. Upgrading these facilities with digital relays, advanced fault recorders, and high-temperature low-sag conductors would increase reliability and operational headroom.

Figure 3: Wind Turbine in Keyser, WV

Source: NPR

Pipeline infrastructure exhibits similar age-related vulnerabilities. West Virginia contains roughly 3,500 miles of interstate pipelines and nearly eleven thousand miles of intrastate and distribution lines. Approximately half of this network was predated in 1970. Corrosion, soil movement, and scour from severe flooding remain persistent risks. The Mountain Valley Pipeline, expected to enter service in 2025, will expand takeaway capacity to southern markets and enhance regional supply flexibility. Regulators have intensified integrity-management oversight, focusing on leak detection, high-consequence areas, and coordination between operators and emergency-response agencies.

Academic and industrial research supports ongoing modernization. The West Virginia University Energy Institute conducts research on carbon sequestration, hydrogen production, advanced materials, and energy storage systems. Feasibility studies for small modular reactors and pumped-hydro storage indicate that the state's legacy energy infrastructure could be repurposed to support future needs.

Recent national benchmarking indicates that the average customer in West Virginia now experiences approximately 2.4 outages per year, placing the state among the higher-frequency outage regions in the country.

Figure 4: Atlantic Coast Pipeline Construction in Upshur County

Source: WV News

Figure 5: Black Rock Wind, located in Grant and Mineral counties

Source: WV News

OPERATION & MAINTENANCE, FUNDING, AND FUTURE NEED

Operation and maintenance practices across West Virginia's energy infrastructure reflect decades of reliable service, but they now face increasing pressure from aging assets, rising costs, and evolving regulatory requirements. Coal-fired units rely on a combination of predictive and corrective maintenance. Boiler components, steam turbines, environmental-control systems, and fuel-handling equipment often require major overhauls. Spare parts for older units are increasingly difficult to obtain, and control-system obsolescence complicates routine maintenance and troubleshooting. Although these plants provide reliable baseload power, long-term sustainability will require substantial reinvestment or strategic retirement planning.

Electric-utility funding relies on rate of recovery through the Public Service Commission. Between 2019 and 2024, residential electricity rates increased by roughly 30%. Although rates remain below national averages, affordability concerns are significant in regions with lower incomes or higher energy burdens. Rate adjustments resulting from fuel-cost recovery, storm-restoration surcharges, and environmental-compliance riders contribute to volatility. Transparent long-term planning, cost prioritization, and asset-management frameworks are essential to minimize sudden rate spikes and avoid cumulative deferred maintenance.

Federal funding supplements, but does not replace, utility investment. Through recent federal legislation, including the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA), West Virginia has received funds for transmission hardening, wildfire and

flood mitigation, cybersecurity upgrades, substation modernization, and distribution automation. Through this legislation, nearly $650 million in funding has been announced to accelerate the deployment of clean energy. These funds have enabled the deployment of advanced sensors, voltage-regulation equipment, and improved outage-management systems. West Virginia has received $25 million in IIJA funding for orphaned well plugging; an additional $60.4 million has been awarded formula and performance grants. However, long-term needs far exceed current funding levels. Critical components such as large power transformers have procurement lead times exceeding eighteen months, complicating replacement planning and emergency response.

Electric-load forecasts predict flat demand through at least 2035 due to demographic trends, efficiency improvements, and stable industrial activity. Flat demand reduces the need for new baseload generation but highlights the importance of reinvesting in existing infrastructure. Priority needs include reconductoring of aging lines, transformer and breaker replacement, system hardening against severe weather, distribution-level automation, and enhanced cybersecurity across operational-technology systems.

Economic diversification will influence future energy planning. The renewable-powered aerospace manufacturing facility under development by BHE Renewables in Raleigh County demonstrates how advanced manufacturing and modern distribution infrastructure can pair with renewable and storage resources to support industrial growth. Similar opportunities exist at former mine sites and retired power-plant locations with existing interconnection points, water infrastructure, and available land.

Long-term planning should integrate diversification, reliability, resilience, and affordability. Coordinated efforts among utilities, regulators, researchers, and industry stakeholders will be necessary to ensure that the state maintains reliable generation while preparing for next-generation energy technologies.

Table 1: Recent IIJA-Funded Orphaned Well Projects

Funding Source	Project Name	Wells Plugged	Contractor	Project Costs	Project Status
IIJA-IG	Region I	40	Next LVL Energy LLC	$5,173,909	Complete
IIJA-IG	Region II	20	Coastal Drilling East LLC	$2,376,160	Complete
IIJA-IG	Region III	40	Next LVL Energy LLC	$5,090,789	Complete
IIJA-IG	Region IV	20	WPS Environmental LLC	$2,359,000	Complete
IIJA-IG	Region V	20	WPS Environmental LLC	$2,350,900	Complete
IIJA-IG	Region VI	20	Next LVL Energy LLC	$2,331,720	Complete
IIJA-IG	Region VII	22	Coastal Drilling East LLC	$2,540,000	Complete
IIJA-IG	Region VIII	20	Northwind Site Services, LLC	$2,518,556	Complete

Source: WVDEP

Recent state policy actions, including the passage of House Bill 2014, the Power Generation and Consumption Act, reflect increasing interest in expanding energy generation to support large energy users in West Virginia, including data centers and other energy-intensive facilities. Nationally, growing demand from data centers has emerged as a significant driver of increased electricity consumption, placing additional pressure on aging transmission and distribution systems and accelerating the need for grid modernization. These demand increases can contribute to higher system costs and upward pressure on energy rates, while also heightening attention to the environmental impacts of power generation and delivery. As West Virginia considers new generation and large-load development, future energy needs will depend on ensuring that grid capacity, reliability, affordability, and environmental considerations are addressed in parallel to avoid exacerbating existing infrastructure constraints.

Figure 6: Solar Panel Farm at Marlowe in Berkeley County, WV

Source: FirstEnergy

PUBLIC SAFETY, RESILIENCE, AND INNOVATION

West Virginia's energy system faces persistent threats from severe weather events, rugged terrain, and asset aging. Flooding, landslides, derechos, and heavy snow have repeatedly damaged transmission and distribution lines, contributed to extended outages, and stressed emergency-response capabilities. Some substations located within floodplains have been elevated or flood-proofed, but many remain vulnerable. Narrow mountain roads and remote access routes delay restoration efforts, particularly after widespread storm damage.

Outage duration has increased in recent years due to more frequent severe weather and the cumulative effects of aging infrastructure. Utilities have begun deploying drones for line inspections, vegetation-management analytics, and advanced outage-management systems that integrate real-time data. These technologies improve situational awareness and help prioritize restoration work, but their deployment remains incomplete, particularly among smaller utilities and electric cooperatives.

Methane emissions from aging distribution pipelines, abandoned wells, and legacy oil-and-gas fields pose ongoing safety and environmental risks. As of November 2025, the WVDEP has issued 206 permits for well

plugging-with 202 completed. State agencies and research institutions are testing drone-mounted LiDAR and laser spectroscopy to detect fugitive emissions across challenging terrain. These technologies offer improved detection accuracy compared to traditional ground-based surveys, though widespread deployment will require additional funding and standardized data-management systems.

Innovation contributes to resilience through diversification and new technology deployment. The repeal of the state's nuclear moratorium in 2022 enables evaluation of small modular reactors as replacements for aging coal units. Early studies indicate that multiple former power-plant sites may be suitable for SMR deployment due to existing transmission infrastructure, water access, and available land. The Appalachian Climate Technology Coalition supports workforce development, microgrid deployment, carbon-management research, and advanced manufacturing initiatives across twenty-one counties, helping to diversify the region's economic base.

Growing digitalization of the grid also underscores the need for strengthened cybersecurity across transmission, distribution, and pipeline systems. Modern grid-management technologies, advanced metering infrastructure, substation automation, and remote-monitoring platforms expand both operational capability and vulnerability. Threats from ransomware, phishing, and coordinated cyber intrusions have increased nationally, prompting utilities to enhance network segmentation, multi-factor authentication, intrusion detection, and incident-response planning. Research and workforce development at institutions, such as Marshall University and West Virginia University, support these needs by advancing cyber-physical system security, conducting vulnerability assessments, and training specialists in industrial-control-system protection. As utilities deploy more digital assets and integrate distributed energy resources, cybersecurity must remain a core component of long-term infrastructure planning.

Figure 7: The Appalachian Climate Technology Coalition Projects

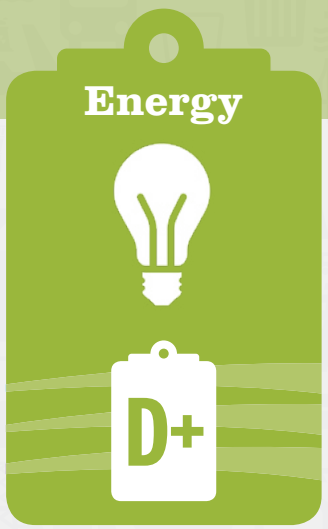
Source: ACT NOW

Private-sector investment demonstrates emerging confidence in advanced energy solutions. The BHE Renewables aerospace manufacturing hub in Raleigh County operates on a dedicated renewable microgrid supported by battery storage and backed by a natural-gas generator for reliability. Hybrid microgrids such as this may become increasingly important as more industries require high-reliability power with resilient local generation and storage.

Participation in the Eastern Interconnect enhances regional stability. West Virginia's dispatchable baseload units play an important role in balancing variable renewable resources across neighboring states, providing voltage support and frequency regulation during system disturbances. Maintaining a diversified portfolio of baseload and flexible resources will be critical as regional energy systems evolve.

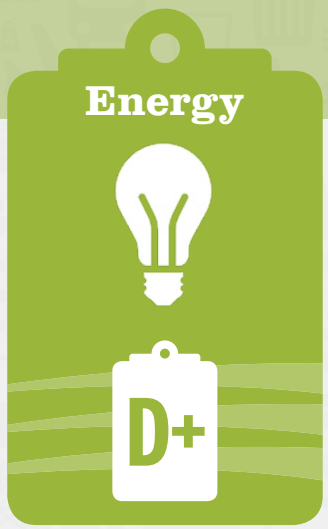
Figure 8: Belleville Locks and Hydroelectric Dam on the Ohio River

Source: USACE



RECOMMENDATIONS TO RAISE THE GRADE

- Improving West Virginia's energy system requires coordinated, long-term investment across generation, transmission, distribution, and pipelines. Priorities include reconductoring aging 69-, 138-, and 230-kV lines, replacing deteriorated structures, upgrading substations, and expanding vegetation management to improve reliability and support renewable integration.
- Pipeline integrity efforts should accelerate replacement of pre-1970 steel lines, especially in corrosion, landslide, and flood-prone areas. Expanding continuous leak detection, adding automated shutoff valves, and improving geohazard monitoring will enhance safety and environmental performance as natural gas production grows.
- Coal-fired generation upgrades should focus on high-efficiency, low-emissions technologies. Thermal-efficiency improvements extend unit lifespans and reduce emissions per megawatt-hour, while early-stage carbon-capture technologies offer potential long-term compliance pathways.
- Renewable and storage deployment should grow, leveraging the state's untapped wind potential, hydropower upgrades, emerging solar opportunities at brownfields and former mine sites, and development of pumped-hydro and battery-storage facilities.
- Diversifying the generation mix will strengthen resilience. Small modular reactors, flexible natural-gas units, hybrid microgrids, and carbon-management systems provide pathways to broaden the technological base, with pilot projects and feasibility studies guiding investment.
- A long-term diversification strategy should evaluate advanced nuclear options, including SMRs and next generation microreactors. With the nuclear-development ban repealed and several coal plants retiring, West Virginia is positioned to assess nuclear alternatives that offer enhanced safety, small footprints, and carbon-free baseload capability.
- Utility asset-management and resilience planning should be standardized statewide, with common metrics, planning frameworks, and reporting requirements to identify high-risk assets and prioritize upgrades. Transparent reporting can strengthen public understanding and support.
- Through coordinated modernization, diversification, and risk-reduction strategies, West Virginia can maintain reliable electricity exports while adapting to emerging opportunities and challenges in the energy sector.



DEFINITIONS

RESILIENCE – The ability of energy systems to withstand, absorb, recover from, and adapt to disruptive events such as severe weather, flooding, landslides, and equipment failures.

TRANSMISSION – The high-voltage transport of electricity from generating facilities to distribution networks that serve end users.

HIGH-EFFICIENCY LOW-EMISSIONS (HELE) TECHNOLOGY – Advanced coal-generation technology designed to improve thermal efficiency and reduce pollutants relative to older coal plants.

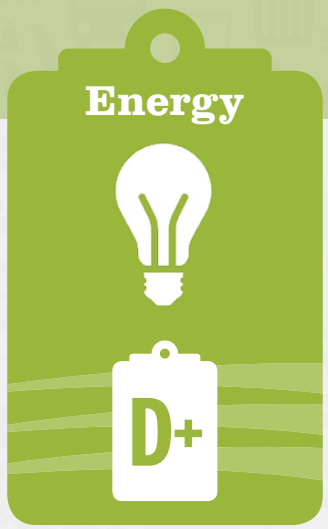
CARBON CAPTURE, UTILIZATION, AND STORAGE (CCUS) – Technologies and processes that capture CO_2 from power plants or industrial sources for reuse or permanent geological storage.

DISTRIBUTED ENERGY RESOURCES (DER) – Small-scale generation or storage technologies located close to load, including rooftop solar, community solar, small wind, battery storage, and demand-response assets.

MICROGRID – A localized electrical system capable of operating autonomously from the main grid to enhance reliability, stability, and resilience.

SMALL MODULAR REACTOR (SMR) – A compact, factory-fabricated nuclear reactor designed for scalable deployment, enhanced safety, and integration with existing infrastructure.

PJM INTERCONNECTION: A regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia, including West Virginia.



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Hazardous Waste
D
GRADE COMPARISON
WV: D
Nat'l: C

HAZARDOUS WASTE

EXECUTIVE SUMMARY

As of 2023, West Virginia tracked 179 hazardous waste sites and ranked 21st among U.S. states and territories for hazardous waste released per square mile. Oversight of hazardous waste is led by the West Virginia Department of Environmental Protection (WVDEP) Division of Water and Waste Management Hazardous Waste Program, with 114 Large Quantity Generators regulated under the Resource Conservation and Recovery Act (RCRA). The state also manages 8,840 registered underground petroleum storage tanks and 42,240 active aboveground storage tanks. West Virginia has 14 Superfund sites—11 on the National Priorities List—with only three sites having received certificates of completion; all 14 lie within 100-year floodplains, and seven sites face severe storm or flood risk. Cleanup and prevention are supported through federal grants, state fees, and targeted investments, alongside recent brownfield revitalization efforts. To raise its grade, West Virginia must strengthen asset management, expand permitting and prevention measures, and improve public awareness and accountability around hazardous waste sites.

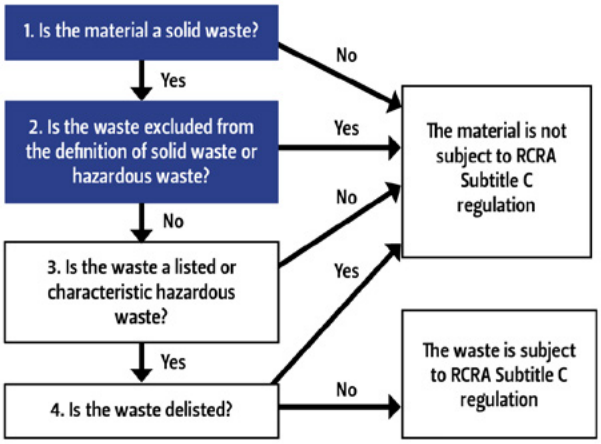
CONDITION & CAPACITY

Hazardous Waste sites are tracked by the Toxic Release Inventory (TRI). As of 2023, there were 179 facilities in West Virginia. The primary agency for monitoring, permitting, and funding these hazardous waste sites in West Virginia is the Division of Water and Waste Management's Hazardous Waste management program as well as the National Environmental Protection Agency (EPA). West Virginia lists 114 Large Quantity Generator sites under the RCRA program; this allows the EPA to control Hazardous Waste sites from cradle-to-grave. In West Virginia, there are 8,840 registered and federally regulated underground petroleum storage tanks both active and closed. Meanwhile, there are 42,240 active aboveground storage tanks in the state.

In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA. Afterward, Congress set aside money to be used to handle emergency and hazardous waste sites in need of long-term clean up; this trust fund is called Superfund. The state of West Virginia is home to 14 Superfund sites. West Virginia has 11 Superfund sites on the NPL, while the other three have received a certificate of completion. In 1995, the West Virginia Department of Environmental Protection, Environmental Enforcement Section, began a program providing Industrial Facility Closure Guidance to evaluate industrial sites and manufacturing facilities that are moving, closing, ceasing operations, or have closed due to environmental impacts

or potential to leave contamination. This initiative's purpose is to reduce the number of problems requiring State and Federal government funding under CERCLA, Superfund, and other similar programs. According to the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database, WV has 111 sites registered in the Superfund Enterprise Management System, 92 are not on the National Priorities List, of those 26 require needed or ongoing assessment, 57 have been referred to a clean-up program, and 9 require no further action.

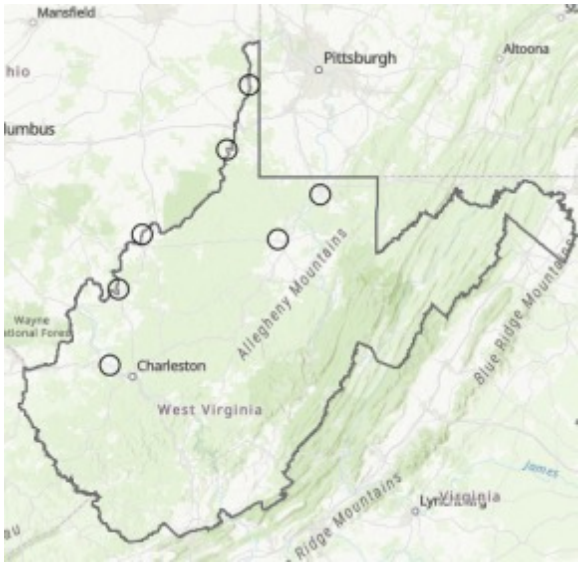
Figure 1: US EPA Hazardous Waste Identification Process



Source: EPA

A brownfield is a type of waste site with a potential presence of hazardous waste, pollutants, or contaminants. It is estimated that brownfields are present at 20% - 50% of all industrial real estate properties. In 1996, the West Virginia Voluntary Remediation Program (VRP) was established to promote the voluntary clean-up and development of abandoned, contaminated properties. This offers some environmental liability protection under state law. As of September 2025, 315 projects have been initiated since the program's inception-covering 8,514 acres. Of those projects, nearly 87% have been awarded a certificate of completion, yet accounting for only 4,684 acres.

Figure 2: Superfund sites in reuse



Source: EPA

OPERATION & MAINTENANCE, FUNDING & FUTURE NEED

West Virginia received more than $8.6 million in funding between 2012 and 2016. This funding is used for remediating hazardous waste sites and ensuring safe drinking water. West Virginia receives funding for its hazardous waste infrastructure through several sources. A portion of this funding is specifically allocated for hazardous waste cleanup, while the remainder is directed toward future needs related to hazardous waste prevention and remediation.

Under WV HB2943, a Hazardous Waste Management Fee, capped at $700,000 per year, was approved to support, in part, the matching requirements for federal grants. These fees are paid by facilities that generate, treat, store, or dispose of hazardous waste. The annual fee is based on the generator's status (Large, Small, or Very Small Quantity Generator) with the fee increasing based on the volume the facility handles.

Figure 3: Pullman Square in Huntington, WV, previously used for urban commercial and industrial purposes

Source: WVDEP

Figure 4: The property completed environmental cleanup through the VRP in 2002. Today it is the site of a lifestyle center.

Source: WVDEP

West Virginia has benefited from increased funding through the Infrastructure Investment and Jobs Act (IIJA). Between the fiscal years 2023 and 2025, West Virginia received nearly $5 million in federal grant funding for hazardous waste prevention and cleanup efforts. Additionally, in January 2022, West Virginia's senators announced that the West Virginia DEP would receive $277,642 grant from the U.S. EPA to support the state's hazardous waste management program. In 2025, $2 million in funding to start the Arbuckle Creek Superfund site cleanup. These funds will go toward cleaning up decades-old site and soil contamination from a local business that built electrical substations for the mining industry. Some of the contaminants are PCBs, metals, volatile organics, semi-volatile organics, and dioxins.

In 2021, through the Brownfield program, West Virginia received nearly $3 million. Among those funded, 85% of the recipients are first-time grantees. The funding was targeted toward cities with smaller populations, and the majority of those cities meet the micro-community threshold of 10,000. The WVDEP's Brownfield Revolving Loan Fund (RLF) awarded its first low-interest loan to the city of Wheeling to help remediate and redevelop the former Penn-Wheeling Closure site. Authorized by the West Virginia Legislature, the Voluntary Remediation and Redevelopment Act leveraged loan funding from the EPA. Under the terms of the grant cooperative agreement, $750,000 of these funds must be directed toward hazardous waste cleanup. The perks of this loan program are the low interest rates of 0-1.5% for government and nonprofit borrowers and 1-3% for private sector businesses; the loan can also be negotiated for repayment terms of up to 10 years. The RLF continues to be funded through federal grants annually, in 2025 West Virginia received $5 million across eight communities in West Virginia and a $2 million grant to the WVDEP to fund assessments state-wide.

Figure 5: Penn Wheeling Closure Site

Source: Bel-O-Mar Regional Council

The state also generates funding from the oil and gas severance tax, which is 5% of the gross value of natural gas and oil. Ninety percent of the revenue from tax is deposited in the general fund; and the first $24 million collected, including the tax from coal and other minerals, is allocated to debt services for infrastructure bonds. Counties and municipalities receive 10% from the tax, and of that percentage, 75% is distributed to counties that produce oil and gas while the other 25% is distributed to other counties and municipalities based on population density. The state also benefits from the Leaking Underground Storage Tank Fund (State Code 22-17-21). This program assesses a fee of up to $25 per tank annually to underground petroleum storage tank owners. These funds are used to respond to leaking underground petroleum storage tanks.

General funds are able to be used for hazardous waste management through legislative approval. This allows the general fund to be used for more general state priorities while promoting polluter accountability to fund cleanup efforts.

In May of 2024, the EPA announced $7.4 million in brownfield grants for West Virginia. Six different regions will be affected: Wheeling, Huntington, Morgantown, New River Gorge, Raleigh County, and Region 1 Environmental Assessments for Bluefield, Mullens, and Kimball. These funds are part of the EPA's Brownfields Multipurpose, Assessment and Cleanup (MAC) Grant Programs.

Figure 6: North 25th Street Glass and Zinc Superfund Site in Clarksburg, WV

Source: WV Public Broadcasting

PUBLIC SAFETY, INNOVATION, & RESILIENCE

Proper hazardous waste management is critical for public safety. Professionals must work to find innovative and resilient solutions to prevent the spread of hazardous substances and to prevent exposure to hazardous substances. Extreme weather is often the reason for the accidental release of hazardous chemicals. According to the Government Accountability Office (GAO), seven sites in West Virginia are impacted by severe storms or are located in floodplains. These sites are in the West Virginia cities of Leetown, Clarksburg, Fairmont, Follansbee, Moundsville, Ravenswood, and Nitro. All Superfund sites in West Virginia are within a 100-year flood plain. It is very important to develop a sustainable plan for hazardous waste management to protect our ecosystem and preserve resources for future generations. To support more sustainable hazardous waste management, WVDEP issues permits for facilities and activities to ensure releases to air, water, and soil remain within acceptable standards. Permit compliance helps ensure applicants follow state and federal environmental laws while minimizing environmental impacts. WVDEP also runs annual public clean-up initiatives for small-scale hazardous waste management and illegal dumping cleanups. Programs, like WV Make It Shine and the Pollution Prevention and Open Dump Program, help remove thousands of tons of material, including hazardous materials and items that are difficult to dispose of, like appliances.

Figure 7: Chemours Chemical Plant in Belle, WV experienced a minor ammonia leak in August 2025.

Source: Charleston Gazette

Table 1: WV Superfund Sites

Site Name	Location	Contaminants of Concern
Allegany Ballistics Laboratory	Mineral County	Hazardous manufacturing and chemical waste from federal facility
Big John Salvage – Hoult Road	Fairmont Marion County	Heavy metals and industrial waste from salvage operations
Fike Chemical Inc	Nitro, Kanawha & Putnam Counties	Soil and groundwater contamination from chemical plant wastes
Follansbee Site	Follansbee Brooke County	Industrial and metal-related contamination
Hanlin-Allied-Olin	Moundsville Marshall County	Chemical manufacturing wastes; soil and groundwater contamination
Leetown Pesticide	Jefferson County	Pesticide mixing and storage contamination in soil
North 25th Street Glass and Zinc	Clarksburg Harrison County	Lead, zinc, and arsenic contamination from glass and zinc production
Ordnance Works Disposal Areas	Morgantown Monongalia County	Historic ordnance and chemical waste contamination
Paden City Groundwater	Paden City Wetzel County	Groundwater contamination with perchloroethylene (PCE)
Ravenswood PCE Ground Water Plume	Ravenswood Jackson County	Groundwater contamination with tetrachloroethylene (PCE)
Sharon Steel Corp (Fairmont Coke Works)	Fairmont Marion County	Coal tar, heavy metals, and coke/ steel plant industrial waste

Source: EPA

The EPA developed hazardous waste recycling regulations to reduce the generation of hazardous waste. These regulations promote the reuse and reclamation of useful materials in a manner that is safe and protective of human health and the environment. Hazardous waste reuse, recycling, and reclamation can avoid environmental hazards, protect scarce natural resources, reduce the nation's reliance on raw materials and energy, and provide economic benefits. Data from the 2019-2023 biennial reports show an 18% reduction in hazardous waste generation. Off-site transfer, incineration, and fuel blending account for 89% of the treatment methods. There have been technological strides in the last few years to handle municipal solid waste and food waste. In 2023, however, West Virginia generators shipped all but eight tons of their waste out of state; those eight tons were aerosol cans being recycled in Morgantown, West Virginia.

RECOMMENDATIONS TO RAISE THE GRADE

- Improve and implement more public awareness about hazardous waste as well as educating what hazardous waste sites are located nearby. Educating the public would encourage and put pressure on our state's political advocates so they can assist with existing issues as well as hold major waste generators accountable.

- Conduct further research to find more innovative, sustainable, and cost-effective approaches for cleaning Hazardous Waste sites. As a state, West Virginia receives insufficient funds to assist with hazardous waste clean-up. Finding more innovative and cost-effective ways to use the amount of money given would tremendously help the state.

- Provide transparent data on the number and status of brownfields in West Virginia. The state does not have a definitive count or comprehensive tracking system to identify all brownfield sites or their locations. Expanding available information on these sites, including how many exist, how many have been remediated, and how many are being reused, would improve understanding and support more effective management.

Photo: Skitter Creek Bridge chemical spill cleanup

Source: WVDOT

DEFINITIONS

BROWNFIELD - a former industrial or commercial site where future use is affected by real or perceived environmental contamination.

BROWNFIELDS REVOLVING LOAN FUND - The Office of Environmental Remediation administers the Brownfields Revolving Fund (RLF) to offer low-interest loans to eligible local government entities, nonprofits, and private sector businesses to assist them in the cleanup of properties contaminated with petroleum or hazardous substances.

INDUSTRIAL REAL ESTATE - can be broadly defined as all land and buildings which accommodate industrial activities including production, manufacturing, assembly, warehousing, research, storage, and distribution.

INFRASTRUCTURE - The basic physical and organizational structures and facilities needed for the operation of a society or enterprise.

INNOVATIVE - Featuring new methods; advanced and original.

LARGE QUANTITY GENERATOR (LQG) – An LQG is a business or facility that generates more than 1,000 kilograms (2,200 pounds) of non-acute hazardous waste or more than 1 kilogram (2.2 pounds) of acutely hazardous waste per month

PETROLEUM STORAGE TANK - is any one or combination of aboveground storage tanks, underground storage tanks, and all connecting underground pipes that contain petroleum products, including any fuel used for the propulsion of a motor vehicle or aircraft.

REMEDIAL - giving or intended as a remedy or cure.

RESILIENT - Able to withstand or recover quickly from difficult conditions.

SUPERFUND - is a United States federal environmental remediation program established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The program is administered by the Environmental Protection Agency.

SUSTAINABLE - Able to be maintained at a certain rate or level.

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Inland Waterways

D

GRADE COMPARISON

WV: D

Nat'l: C-

Photo: Robert C Byrd Locks (USACE)

INLAND WATERWAYS

EXECUTIVE SUMMARY

West Virginia's inland waterways are a critical link in the national freight network, with 425 miles of navigable rivers moving 45.7 million tons of cargo valued at $3.4 billion in 2021. The system, operated by the U.S. Army Corps of Engineers (USACE) and supported by the Maritime Administration (MARAD), has sustained commerce for over two centuries. However, much of the state's lock and dam infrastructure has surpassed its intended service life, and decreasing barge traffic has complicated the case for major reinvestment. Ongoing operation and maintenance are federally funded, while rehabilitation and new construction rely on a 50/50 cost share with the Waterways Trust Fund. USACE is advancing asset management and predictive analysis to prioritize limited resources, but aging facilities remain vulnerable. To raise the grade, continued federal investment, improved road and rail access to port facilities, and expanded economic development along the waterways are essential.

CONDITION AND CAPACITY

The U.S. inland waterway network is comprised of approximately 12,000 miles of inland navigation channels, operated and managed by the U.S. Army Corps of Engineers (USACE), in coordination with the Maritime Administration (MARAD). An inland waterway in West Virginia is an impounded, navigable river that is used to transport goods and people. The state has six of forty-six named rivers making up 425 miles of inland, navigable waterways: the Ohio River, Monongahela River, Kanawha River (including two miles of the Elk River), Little Kanawha River, and Big Sandy River tributaries. These rivers play a role in supply chains in West Virginia, and the transportation of different supplies and materials is primarily used for energy and construction.

This river system connects the state to a domestic transportation network while also connecting commercial navigation from the eastern third of the country, down to the Mississippi River basin, and eventually to the Gulf Coast. The most significant routes of waterway freight movement happen on the MARAD designated Marine Highway Routes. Set up in 2007, these routes are a network of maritime expressways that provide an alternative to highways as well as rail transportation networks. West Virginia now has three Marine Highway Routes: M-70, M-79, and M-23 (Table 1).

The Kanawha River is not currently part of the Marine Highway network, but it parallels Interstate Routes I-64 and I-77 from its confluence at the New and Gauley rivers; it should be eligible from the Kanawha Falls to the Ohio River for Marine Highway designation.

Table 1: US Marine Highway System in WV

Marine Highway	Year Designated	Name	Landside Route Served	Total Length	WV Length
M-70	2010	Ohio, Mississippi, and Missouri Rivers	Interstate 70	822 Statute Miles	277 Miles
M-79	2023	Monongahela and Allegheny Rivers	Interstate 79	325 Statute Miles	38 Miles
M-23	2025	Big Sandy River	U.S. Route 23 and Interstate 70	27 Statute Miles	27 Miles

Source: Maritime Administration

These rivers are also important to the state's recreation and tourism-which include fishing, boating, kayaking, and other activities on scenic and clean waterways. For example, West Virginia has a variety of designated water trails around the state, offering routes that provide boaters with recreational, historical, and educational opportunities.

Since the 19th century, Dams and locks have been used to maintain optimal water levels for towboats and barges navigating West Virginia's inland waterways since. For two centuries, cargo and commodities have passed through the state's locks and dams, with most of the early "slack water" facilities replaced with construction upgrades during the twentieth century. West Virginia currently has thirteen locks and dams operated by the USACE. Seven of these are operated by the USACE Huntington District; six are operated by the USACE Pittsburgh District (Table 2).

Table 2: Inland Waterways Locks and Dams in West Virginia

Lock and Dam	River	USACE District	Annual Cargo (Million Tons)	Construction Date	Age (Years)	Condition
Morgantown	Monongahela	Pittsburgh	0.8	1964	61	Fair
Hildebrand	Monongahela	Pittsburgh	0.3	1960	65	Fair
Opekiska	Monongahela	Pittsburgh	0.3	1964	61	Fair
Winfield	Kanawha	Huntington	11.6	1937	88	Good
Marmet	Kanawha	Huntington	8.0	1934	91	Good
London	Kanawha	Huntington	1.1	1934	91	Good
New Cumberland	Ohio	Pittsburgh	24.8	1959	66	Fair
Pike Island	Ohio	Pittsburgh	340.8	1963	62	Fair
Hannibal	Ohio	Pittsburgh	40.3	1975	50	Good
Willow Island	Ohio	Huntington	39.6	1976	49	Good
Belleville	Ohio	Huntington	41.8	1968	57	Good
Racine	Ohio	Huntington	41.8	1971	54	Good
Robert C. Byrd	Ohio	Huntington	35.6	1937	88	Good

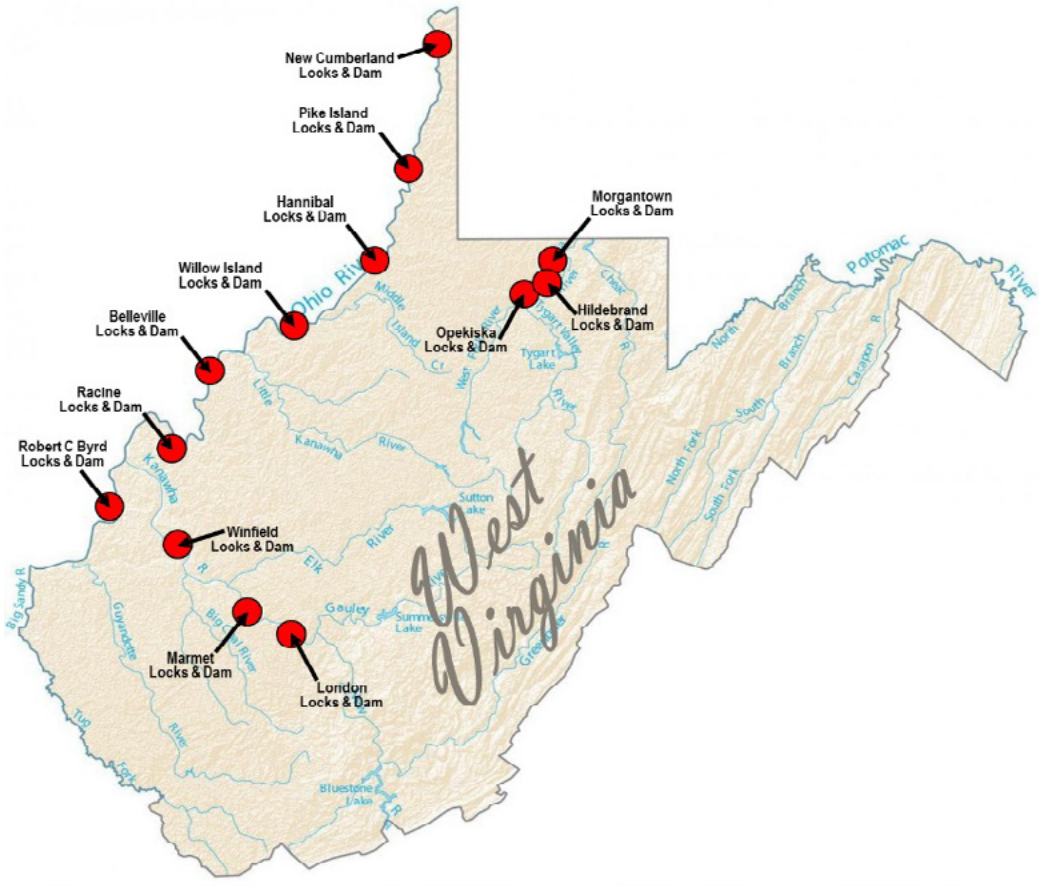
Source: WVDOT

Most of the locks and dams in West Virginia are nearing or have exceeded their average 50-year life expectancy. The USACE is currently working to modernize locks across the Ohio River Basin, the busiest of the West Virginia waterways, including the New Cumberland Locks and Dam. Renewable energy facilities are also being considered at dams on the Ohio and Monongahela Rivers.

In 2021, 45.7 million tons of freight traveled on West Virginia's inland waterways, valued at $3.4 billion. This is the equivalent of 1.1 million trucks taken off the roads. The top commodities by weight were 25.7 million tons of coal, lignite, and coal coke; 5.2 million tons of: sand, gravel, clay, and silt; and 1.3 million tons of petroleum products. These materials being transported on West Virginia rivers resulted in $17.1 billion in Gross State Product.

Despite the efficiencies provided by inland waterways transportation, West Virginia's waterways have seen a decrease in the moving tonnage. The 2023 West Virginia State Freight Plan predicts a significant decrease in tonnage over the next thirty years due to the decline in coal freight-this is in addition to the declining population of the state. There is, however, an anticipated increase in the value of tonnage expected-driven by the rise in higher per-unit-price commodities such as pharmaceuticals, precision instruments, and electronics.

Figure 1: West Virginia Locks and Dams on Inland Waterway System



Source: Recreated from USACE ERDC data

OPERATION & MAINTENANCE, FUNDING, AND FUTURE NEED

West Virginia's Inland Waterways are primarily funded through the USACE and federal appropriations which can fluctuate from year to year. Operation and maintenance (O&M) of dams, locks, and navigation channels are supported through the federal budget and authorized by the Water Resources Development Act (WRDA), which Congress typically aims to reauthorize every two years. The 2024 WRDA increased the maximum amount of funds that the USACE may contribute to small projects for emergency streambank and shoreline protection, aquatic ecosystem restoration, and the removal of debris to rivers and channels. Additionally, it established a new authority for the Corps to partner with communities in WV to restore rivers and streams that have been impacted by acid mine drainage.

Figure 2: USACE Roller Gate Repairs

Source: USACE

Figure 3: Towboat and Barges on the Monongahela River near Morgantown, WV

Source: AECOM

The USACE prioritizes preventative maintenance in order to prevent reactive repairs that may cause closures and disruptions. In 2025, the USACE Huntington District scheduled roller gate repairs at the Winfield Locks and Dam and inspection and dewatering at the Marmet Locks and Dam. The Winfield project was completed with no closure. Water surrounding the roller gate was pumped away from the riverbed so that repair crews could access the area to cut away and repair rusted and corroded steel structures. At the Marmet Locks and Dam, the main chamber was closed for dewatering, but the auxiliary chamber remained open for watercraft passage. Marmet's auxiliary chamber is smaller than the newer main chamber, requiring additional time for large barges to move through the lock. To prevent major delays, additional assistance was scheduled to be available to aid in the breakdown of tows for easier movement.

New construction and major rehabilitation project funding is split equally between the Inland Waterway Trust Fund (IWTF) and general appropriations. The IWTF receives revenue from a fuel tax charged to users of the inland waterways system. Rehabilitation and new construction costs are funded by a 50/50 split with the Waterways Trust Fund, an account that is funded by $0.29 per gallon diesel fuel tax on barge tows. This tax was last raised by nine cents in 2015.

It is important to note that most of the recent projects within the USACE budget for West Virginia are O&M projects. This means there are no new construction projects taking place-only a focus on existing locks and dams, most of which have already reached their life expectancy. A considerable amount of funds to the state are going towards the Kanawha River for locks and dams, which are receiving $17 million for O&M projects. The funds will be used for commonly performed O&M work including dredging, surveys, inspections, and assessments. In 2025, the Huntington District scheduled maintenance for Captain Anthony Meldahl Locks and Dam, Winfield Locks and Dam, and Marmet Locks and Dam. Overall, West Virginia locks and dams are expected to have increased O&M costs each year until the state has construction of more sustainable locks and dams.

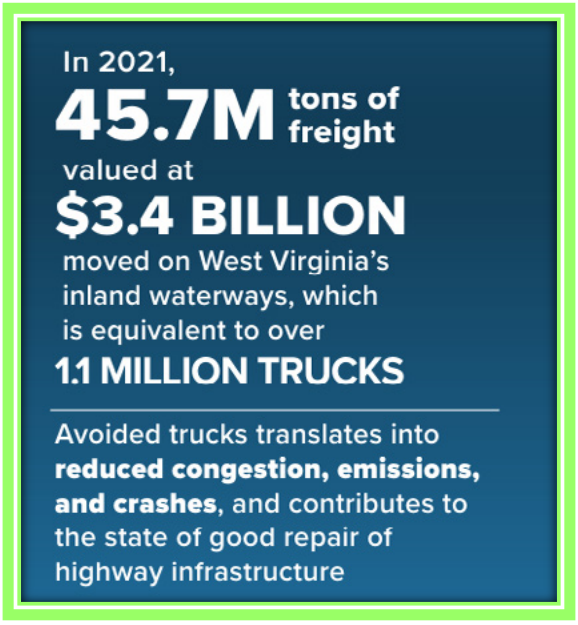
RESILIENCE & INNOVATION

Recent events across West Virginia's lock and dam systems demonstrate both the challenges of aging infrastructure and the system's capacity to remain resilient during unpredictability. London Locks and Dam recently experienced an extended main chamber closure in fall 2025 after structural concerns were identified during a routine inspection. This required all traffic to shift to the auxiliary chamber, slowing waterway traffic, but avoiding a full system shutdown. The system returned to full operation once the structural repairs were completed, and safety for commercial and recreational traffic was assured. Similarly, a full river closure occurred at Winfield Locks and Dam in March 2025. This planned closure consisted of concrete pumping operations to support the auxiliary chamber lock wall ladder replacement. Both chambers were out of service during the working day, and navigation resumed shortly after the scheduled work window. Additionally, the Marmet Locks and Dam main chamber maintenance closure previously mentioned illustrates how proactive lock dewatering and inspections are used to prevent more severe unplanned outages. While disruptions do occur, these instances show that the USACE strives to adapt to circumstances, maintain partial service whenever feasible, and restore full functionality in a timely manner.

The U.S. Army Corps of Engineers' Regional Rivers Repair Fleet (R3F) is headquartered under the Huntington District and provides the Great Lakes and Ohio River Division with a shared, mobile workforce for major maintenance and emergency repairs on inland waterways. Command and control for the fleet is based in Huntington, WV, where it coordinates heavy, medium, and light repair fleets and the Marietta Repair Station to support work on regional navigation locks and dams, hydroelectric plants, and flood-risk-management dams across the Ohio River system. For West Virginia and the Huntington District, R3F is a key asset. Having the ability to mobilize in-house fleets improves the resiliency to restore infrastructure to service quickly in the event of an emergency. It can be swiftly deployed to the Kanawha and Ohio River locks and dams in the state to perform critical gate, miter, and mechanical repairs that keep navigation moving and reduce downtime following failures or major maintenance events.

The Inland Waterways Systems have federal and state laws in place to protect their sustainability during construction. These laws keep the waterways safe for recreation, public health, habitat, and commercial use. Furthermore, the USACE is attempting to implement the use of predictive analysis to mitigate the cause of failure to their assets in a more functional manner. This asset management technique is still being developed due to its complexity. The sheer amount of data obtained from hundreds of thousands of assessments completed takes time to refine and comprehend. The purpose of using predictive analysis is to look at the condition of a facility so that they know exactly what led to it being in that state, how to fix it, and project its future integrity.

Infographic 1



Source: National Waterways Foundation

PUBLIC SAFETY

West Virginia's Inland Waterways are recognized as one of the safest freight transportation modes, with barge transportation consistently outperforming other modes in terms of accident rates and environmental protection. Despite this safety record, challenges remain, including aging lock infrastructure, extreme weather events that increase barge breakaway risks, and growing volumes of hazardous cargo that require continued modernization and emergency preparedness. Multi-agency spill response plans and interstate coordination further reinforce the network's resilience along the Ohio River and its tributaries.

Figure 4: Fishing Access at Marmet

Source: Wonderful West Virginia

RECOMMENDATIONS TO RAISE THE GRADE

With an understanding that funding of operations of U.S. inland waterway network is determined and prioritized by the U.S. Congress, the following recommendations are made to raise the grade for West Virginia:

- Increase or sustain funding for the USACE to address operations, maintenance, and backlog needs for locks, dams and navigation channels to maintain a state of good repair and needed capacity.
- Continue biennial enactment of the Water Resources Development Act.
- Promote Marine Highway Route designation for the Kanawha River. This would reduce landside congestion by focusing public and private efforts on increasing the amount of freight transported on commercially navigable waterways.
- Use asset management processes to increase the efficiency of the construction and planning process of major waterways projects.
- Perform analysis to improve planning and resiliency by considering potential disruptive scenarios and impacts.

Photo: Kanawha River near Belle, WV

Source: AECOM

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Levees

D+

Photo: Huntington, WV (Jesse Thorton)

GRADE COMPARISON

WV: D+

Nat'l: D+

LEVEES

EXECUTIVE SUMMARY

West Virginia's 21 levee systems reduce the impact of flooding to over 34,000 people, $7.2 billion in property value and 200 miles of roads. These systems span 37.8 miles with an average age of 53 years. Most West Virginia levee systems are federally constructed, but they are all owned, operated and maintained by county and city government agencies, often with limited resources. State-level initiatives such as the proposed expansion of the Flood Resiliency Trust Fund signal progress, but funding remains a significant challenge. To ensure long-term protection, West Virginia must continue to refine its maintenance practices, expand access to financial support, and strengthen its role in managing and regulating levee systems with resilience and consistency.

CONDITION & CAPACITY

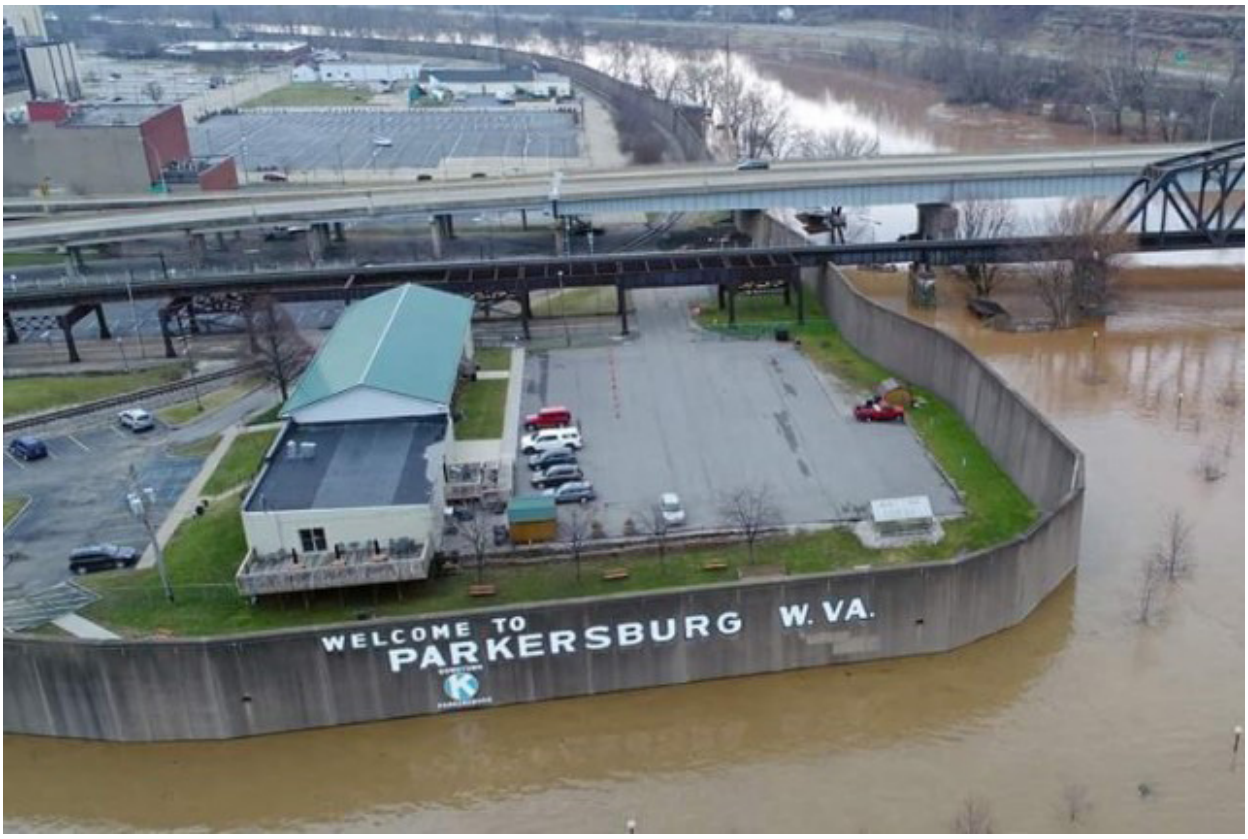
Levees are crucial in West Virginia because the state is prone to heavy rainfall and flash flooding due to mountainous terrain and numerous rivers. Properly maintained levee systems help protect communities, infrastructure, and farmland from devastating flood damage, reducing economic losses and ensuring safety. Data from the National Levee Database (NLD), an online resource created by the U.S. Army Corps of Engineers (USACE), shows a total of 21 levee systems in West Virginia, covering a total of 37.8 miles.

Most levee systems are a combination of earthen embankments and floodwalls built to provide protection from rivers and streams. Floodwalls are typically constructed from concrete but can be constructed from other structural elements such as steel sheet piles. Most levee systems in West Virginia are a combination of earthen embankments and floodwalls; two levee systems in West Virginia are floodwalls and six are earthen embankments.

The average age of West Virginia's levee systems is 53 years old, 8 years younger than the national average. Three of West Virginia's levee systems are over 80 years old and face challenges associated with their age. These levee systems were designed for past hydrological conditions, but climate change and increased precipitation have raised concerns about their effectiveness. Despite the average age, only one of West Virginia's levee systems is classified as high risk, not only due to its age-related condition but the high number of residents and properties at risk if the system fails. This levee system is awaiting an updated risk assessment based on recent upgrades. According to the NLD, it is anticipated that the new assessment will result in a lower risk rating.

Nine of the levee systems have been accredited by the Federal Emergency Management Agency (FEMA). FEMA accredits a levee if the certification and an adopted operations and maintenance plan confirm that the levee provides adequate risk reduction. This includes adequate protection from the base flood, which is defined as a one in one hundred chance of occurring per year.

Figure 1: Parkersburg, WV Floodwall

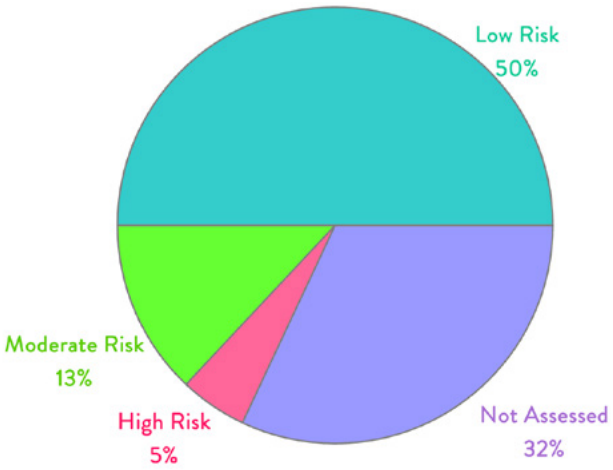


Source: USACE

OPERATION & MAINTENANCE

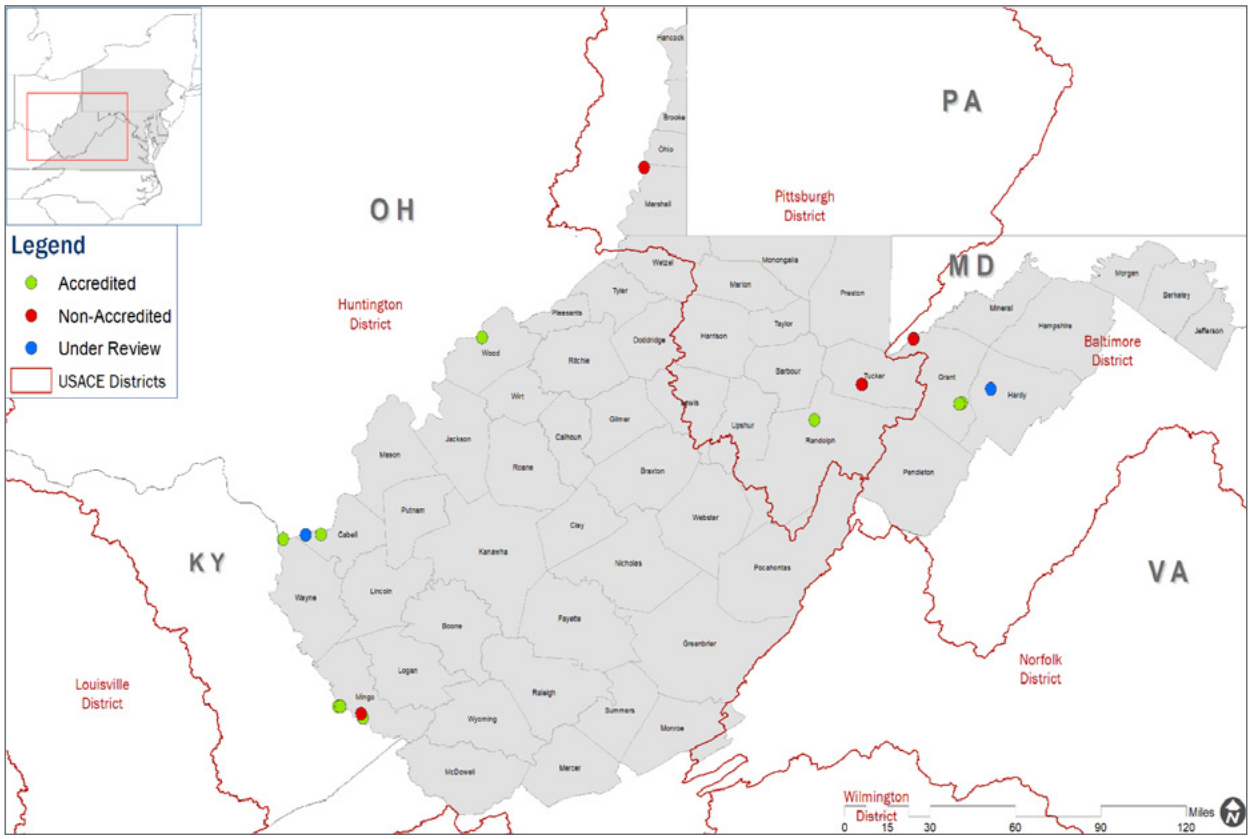
To ensure a levee system functions properly, regular operation and maintenance are essential. These efforts help maintain the system's condition and allow for timely repairs to any deficiencies found. Of the 21 systems in West Virginia, 18 were constructed by the federal government and subsequently transferred to county and city government agencies for their operation and maintenance. Five systems were locally constructed, operated, and maintained. Two levees (East Bayard and West Bayard) are listed in the NLD as both federally constructed and locally constructed.

Figure 2: USACE Risk Classification



Source: National Levee Database

Figure 3: FEMA Levee Accreditation Status for WV Levees



Source: FEMA

Most levee systems in West Virginia are included in USACE's National Levee Safety Program. This program was designed to improve the consistency and coordination of levee-related activities. The program focuses on several key areas, such as conducting inspections of federally constructed levees, assessing risks, and sharing important levee information. These activities help ensure that levee decisions are well-supported and defensible, while also raising awareness among communities and the public about levee safety.

Public Law 84-99 (PL 84-99) provides federal reimbursement for specific damages to levee systems that result from high water events. These levee systems are routinely inspected by USACE and must maintain an Acceptable or Minimally Acceptable rating.

Figure 4: Floodwall Erection in Huntington, WV

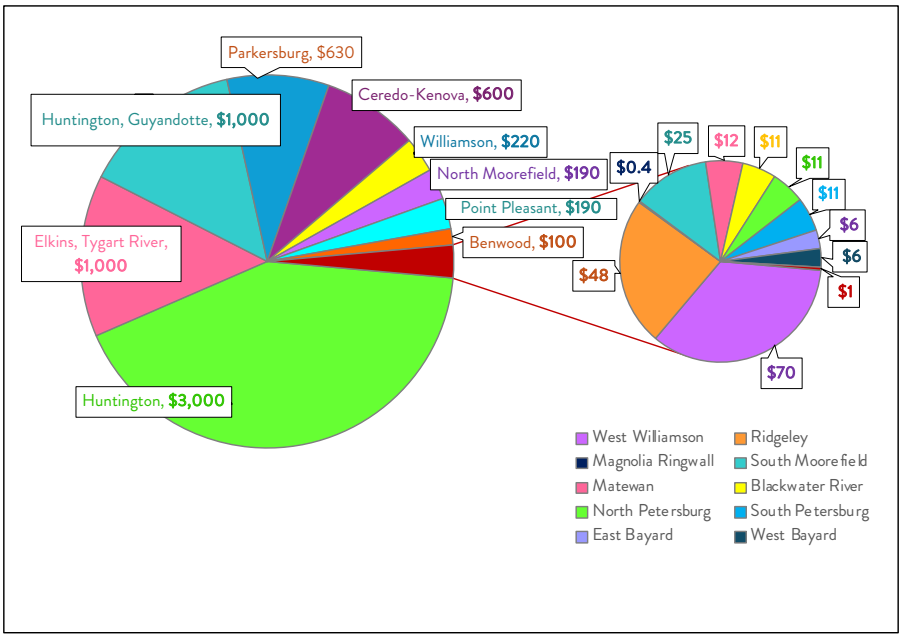
Source: WV Public Broadcasting

FUNDING & FUTURE NEED

While there are no specific estimates for the maintenance costs of West Virginia's levee systems, USACE projects a nationwide requirement of $21 billion to sustain the 15% of levee systems classified as high risk. Since maintenance responsibilities in West Virginia fall to the county, city, or town where each levee system is located, it is reasonable to infer that West Virginia's levee systems receive, on average, less funding due to the state's limited financial resources. House Bill 3502, proposed on March 18, 2025, aims to increase funding for West Virginia's Flood Resiliency Trust Fund from $40 million to $250 million to improve flood protection. The money will come from state savings and surplus tax funds. The bill also requires annual spending reports and ensures that at least 6% of federal disaster funds go toward long-term flood prevention. The bill died in the House Government Organization Committee.

In 2022, USACE allocated $191 million for a flood risk management project in Milton, West Virginia, which includes the construction of a levee system to protect residents of Milton and infrastructure from flood damage. A new partnership agreement was signed on August 11, 2025, estimating costs exceeding $400 million, and an anticipated construction start by 2027, with completion by 2032. This investment serves as an example that can help inform future funding needs for the state's levee systems, which will require attention soon, as the average age of the levee systems is now 53 years.

Figure 5: Value of Property Protected by WV Levees (millions)



Source: National Levee Database

PUBLIC SAFETY, RESILIENCE & INNOVATION

Public safety depends on levee maintenance. The citizens in the communities behind a levee system make up about 2% of West Virginia's total population. This protection extends to over 200 miles of roads and infrastructure valued at roughly $7.4 billion, according to the NLD. Furthermore, 107 critical structures are protected, which if lost, could have significant economic and societal consequences.

Figure 6: Huntington Levee

Source: Mead & Hunt

USACE provides design requirements and construction guidelines for newly constructed levee systems, but variations in local conditions and maintenance practices can lead to inconsistencies in performance. Inadequate hazard mitigation strategies and environmental protections leave floodplains particularly vulnerable to long-term damage. FEMA requires every levee within its program to have an emergency action plan (EAP), and these remain the most effective way of proactively addressing levee failures due to the little warning that may precede failure.

Historical data from the NLD indicates that floodwaters have reached 75% of the levee height in six instances, and overtopping has occurred just three times.

Not included in this data is the February 2025 flood along the Tug Fork in Southern West Virginia. Four levee systems in Williamson and Matewan were credited with saving the communities which they were constructed to protect.

This highlights both the resilience of these structures and the importance of continued maintenance to prevent future failures.

Figure 7: Williamson Floodwall

Source: Robert C. Byrd Center

RECOMMENDATIONS TO RAISE THE GRADE

- Ensure that a fixed percentage of the Flood Resiliency Trust Fund is allocated exclusively to levee system maintenance, upgrades, and emergency repairs. This guarantees that levee systems receive consistent funding even when the funds support multiple infrastructure types.
- Fully fund the National Levee Safety Program to support the development and maintenance of more reliable and resilient levee systems.
- Regularly collect and update levee system condition data as part of an asset management system. Mandate annual reporting on inspection results, maintenance activities, and funding needs, making the information publicly accessible.
- Incorporate a levee-specific component into the broader floodplain management plan, prioritizing high-risk levee systems and outlining clear, actionable steps for improvement.
- Establish a Community-Centered Levee Management Program. This program would integrate public input into both the design and the ongoing maintenance of levee infrastructure.
- Increase public awareness of flood risk and levee importance. Highlight opportunities to incorporate multi-use public recreational features into the design and enhancement of levee systems to maximize community benefits and increase public funding support.

Photo: Huntington, WV

Source: Jesse Thorton

DEFINITIONS

DISASTER (DR) DECLARATIONS – Formal declarations that allow federal resources to assist in recovery and management after a major disaster or event

EROSION – The gradual wearing away of soil or material, often exacerbated by water or weather conditions, which can weaken levee structures

EMERGENCY (EM) DECLARATIONS – Official statements issued by the government to provide emergency assistance or resources in response to a disaster or crisis

FLOOD MANAGEMENT PLAN – A strategy for addressing flood risks, including the maintenance and improvement of flood control systems like levees

FLOODPLAIN – An area of land that is prone to flooding, usually along rivers or coasts, where floodwaters can overflow during heavy rains

HAZARD MITIGATION – Efforts to reduce or prevent the impact of natural hazards (like floods) through planning, design, and construction strategies

LEVEE SYSTEM – A series of interconnected levees designed to protect an area from flooding by controlling water flow

NATIONAL LEVEE DATABASE (NLD) – A federal database maintained by the U.S. Army Corps of Engineers that tracks the status and condition of levee systems across the United States

OVERTOPPING – When floodwaters exceed the height of a levee, potentially causing it to fail or breach

RIPRAP – A layer of large stones or other materials placed on a slope or structure to prevent erosion and maintain stability

U.S. ARMY CORPS OF ENGINEERS (USACE) – A federal agency responsible for designing, building, and maintaining flood control systems, including levees, and providing technical support to reduce flood risk

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) – A U.S. federal agency responsible for coordinating the federal response to disasters and emergencies.

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Photo: Port of West Virginia

PORTS

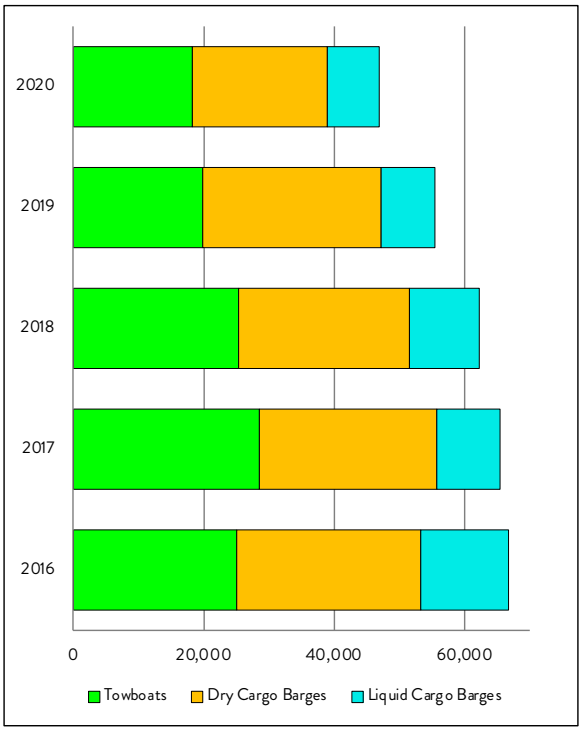
EXECUTIVE SUMMARY

While West Virginia's inland ports play a vital role in regional and national freight movement, they face significant challenges in infrastructure, coordination, and investment. The state has two federally recognized port districts—Huntington–Tri-State and Mid-Ohio Valley—used by the U.S. Army Corps of Engineers (USACE) to track waterborne commerce. The ports and waterways-dependent industries supported nearly 127,000 jobs and $1.8 billion in state and local tax revenue in 2021. Despite the economic importance of these ports and other waterway terminals, defunding and inactivity of the West Virginia Public Port Authority has left a gap in statewide leadership and strategic planning. Locally, most port facilities are privately owned and lack comprehensive asset management, while aging infrastructure and declining freight volumes signal a need for reinvestment.

Figure 1: Coal Loading Facility on the Kanawha River near Marmet, WV

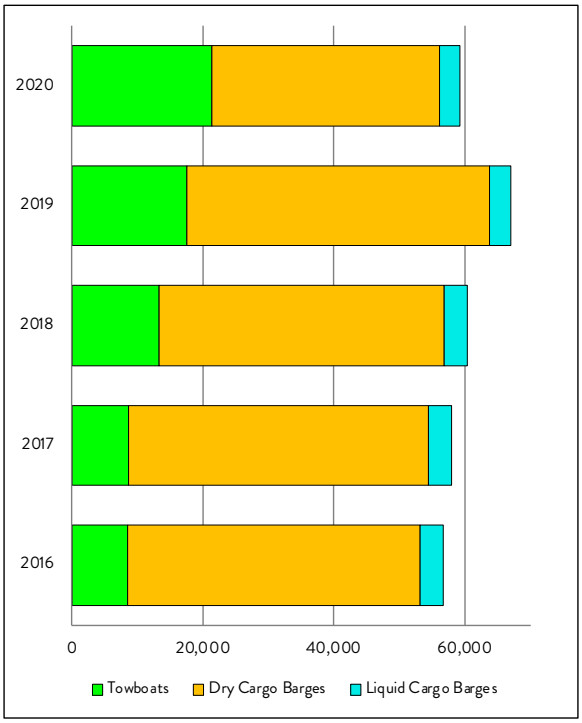
Source: AECOM

Figure 2: Port of Huntington Tri-State Vessels 2016-2020



Source: WVDOT

Figure 3: Mid-Ohio Valley Statistical Port Vessels 2016-2020



Source: WVDOT

CAPACITY & CONDITION

Ports in West Virginia accommodate shallow-draft commercial navigation vessels that use the nation's inland waterways to move goods between the eastern third of the country to the Mississippi River basin and Gulf Coast. In West Virginia, the navigable waterways include the Ohio River, Monongahela River, Kanawha River (including two miles of the Elk River), Little Kanawha River, and Big Sandy River tributaries.

West Virginia currently has two Statistical Ports: The Port of Huntington–Tri-State and the Mid-Ohio Valley Port Statistical District. The USACE defines a Statistical Port using Port Statistical Areas (PSA) as designated geographic regions used for the collection and reporting of waterborne commerce statistics. PSAs are not physical facilities owned and operated by a single entity.

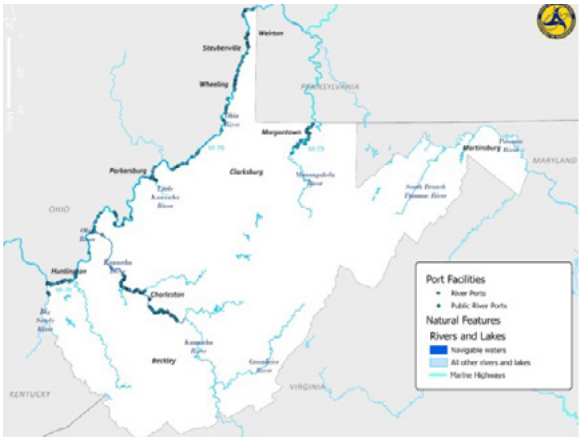
The Huntington–Tri-State PSA contains nearly 200 miles of the Ohio, Big Sandy and Kanawha Rivers, bordering West Virginia, Ohio, and Kentucky, and was once the largest inland shipping port in the U.S. after it obtained an expanded designation in November 2000. This PSA is supported by the Huntington District Waterways Association (HDWA), a collaboration of corporations, firms, partnerships, and individuals that support and promote the port area. The primary goods moving through the port include coal, petroleum, chemicals, steel, and other bulk products.

The Mid-Ohio Valley Statistical Port District was approved in 2021 and contains 220 miles of the Ohio River, bordering West Virginia and Ohio. It was created to fill a statistical gap between the Huntington Tri-State and Pittsburgh Port Districts. The designation allows USACE to assign tonnage and value data to the region, which previously lacked formal recognition. It is expected to become one of the largest inland ports by tonnage in the U.S., moving a similar amount of goods as the Port of Huntington–Tri-State.

In 2021, West Virginia's ports and waterways-dependent industries supported nearly 127,000 jobs and $1.8

billion in state and local tax revenue. However, at the same time, the state has struggled to provide organized, state-wide leadership through its West Virginia Public Port Authority (WVPPA). The WVPPA was created by the West Virginia Legislature in the early 1990s in part to promote inland river ports. With a vision to plan for the construction of high-priority river ports on West Virginia's inland waterways, the WVPPA studied and coordinated projects in Cabell, Hancock, Jackson, Kanawha, Monongalia, Wayne, and Wood Counties, with little success.

Figure 4: West Virginia Statewide Port and Inland Waterways Facilities



Source: WVDOT

Recently, the WVPPA was reorganized under the West Virginia Division of Multimodal Transportation Facilities (DMTF). This streamlined the execution and implementation of the state's multimodal transportation goals by consolidating existing multimodal authorities related to public ports, railroads, aeronautics, airports, and air navigation facilities. This is anticipated to enhance the efficiency and reduce related costs of the movement of goods and services to and from markets in West Virginia while encouraging the construction and completion of local infrastructure projects for all types of transportation systems. Overall, West Virginia's goal is consistent maintenance and utilizing the state's port development funds as a match for potential federal loans and discretionary grant applications.

One successful local port development - the Port of West Virginia - is a relatively new inland port development located on the Ohio River at Follansbee, WV, in the state's Northern Panhandle. This privately developed, multimodal terminal complex was designed to handle bulk, breakbulk, and containerized cargo and a former steel mill site to create a modern port, accommodating river, rail, and truck transportation modes. The Port of West Virginia is taking advantage of the relative efficiency of these modes, as one inland barge capacity equals 16 bulk rail cars or 70 tractor trailers. There are currently about 200 terminal facilities spread along West Virginia's inland waterways. Owned mostly by private businesses, some facilities are open to the public; however, the development of truly public, multi-function loading facilities in West Virginia has not seen widespread success. Many of the existing facilities are mooring structures and loading facilities, remaining from the heyday of the coal industry. Those that remain in service or have been added in recent years are primarily used for supplies and materials in support of energy and construction industries.

West Virginia ports currently do not have a comprehensive asset management plan. The condition of cranes, docks, piers, and navigational aids at loading facilities throughout the state is unknown. Knowledge of the specific condition and capacity of loading facilities would aid planners and state leaders in port promotion and investment decisions.

The amount of freight handled in West Virginia through ports has been trending down. For example, Huntington Tri-State PSA handled about 30 million tons of freight in 2020, which is down from the 2016 number of 37.4 million tons and a peak amount of 84 million tons in 2005. The 2023 West Virginia State Freight Plan predicts a significant decrease in tonnage over the next thirty years.

OPERATION AND MAINTENANCE, FUNDING AND FUTURE NEED

The USACE, in coordination with the Maritime Administration (MARAD), operates and maintains navigation channels and locks and dams, regulating water levels to ensure safe and efficient vessel movement and access to West Virginia ports. The USACE and MARAD also support economic development and national security through reliable waterborne transportation, providing environmentally sustainable infrastructure to ports, locks, and dams for inland navigation.

West Virginia currently has 13 locks and dams operated by the USACE, with an average age of 68 years, and most nearing or exceeding their average 50-year life expectancy. It is important to note that most of the recent projects within the USACE budget for West Virginia are operation and maintenance projects. This means there are no new construction projects taking place, only activities to maintain working order of navigational facilities. The need for investment in the inland waterways system's state of good repair is critical to sustain and develop inland ports in West Virginia.

The ability to load commodities onto and off barges and vessels requires costly specialized infrastructure and equipment. MARAD offers funding opportunities in the form of grants and loans to develop and expand port infrastructure on -designated Marine Highway Routes. MARAD grants available include the Port Infrastructure Development Program (PIDP) and America's Marine Highway Program (AMHP).

Figure 5: Port of West Virginia, Follansbee, WV

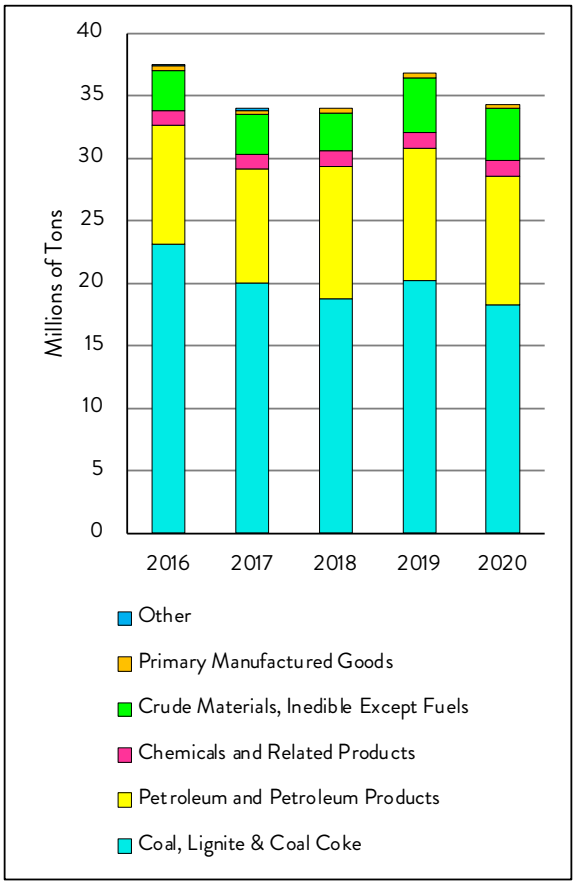
Source: Port of WV

West Virginia has three Marine Highway Routes, M-70, M-79, and M-23, located along the Ohio River, Monongahela River, and Big Sandy River, respectively. The Kanawha River is not currently part of the Marine Highway Route network but should meet the eligibility requirements.

Figure 6: Aggregate Loading Facility on the Monongahela River near Morgantown, WV

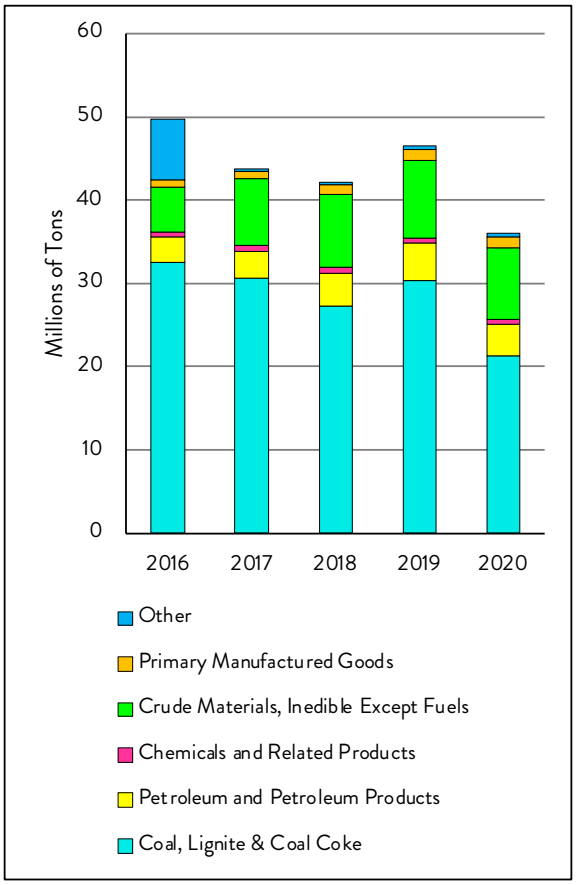
Source: AECOM

Figure 7: Port of Huntington Tri-State Commodities 2016-2020



Source: WVDOT

Figure 8: Mid-Ohio Valley Statistical Port Commodities 2016-2020

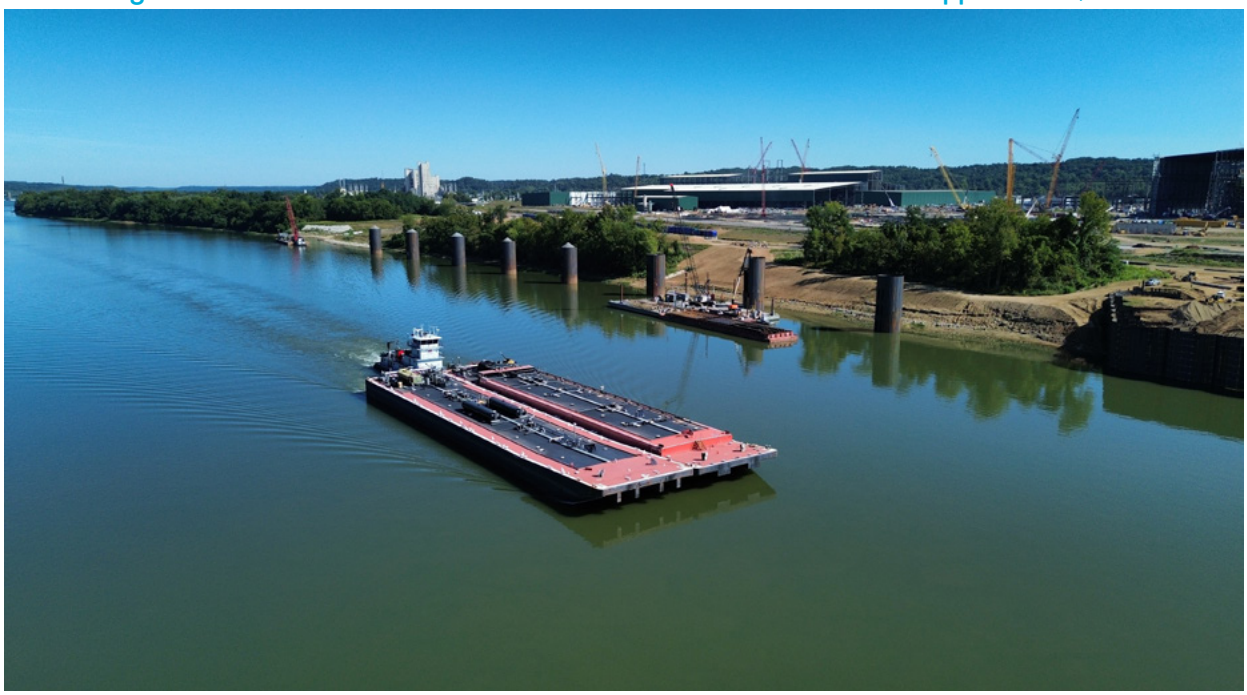


Source: WVDOT

West Virginia does not dedicate funding specifically to support port facilities. However, special funding has benefited the recent development of the Port of West Virginia, within the Mid-Ohio River Statistical Port District. The Port of West Virginia has leveraged the sale of tax-exempt bonds issued through the West Virginia Economic Development Authority and other support from the West Virginia Department of Commerce. Additionally, it has obtained funding through Congressionally Directed Spending requests through the West Virginia Congressional delegation and in 2024 received a $277,766 MARAD AMHP grant to develop a port master plan to prioritize infrastructure to enable a modal shift from truck to barge.

Another project coming online - Nucor Steel's new Apple Grove, WV sheet mill - is designed to make extensive use of the Ohio River for logistics and operations. The facility will include a barge dock along 7,500 feet of riverbank, just downstream of the Robert C. Byrd Locks and Dam will be capable of mooring up to 48 barges. This project also benefited from special funding from the State of West Virginia for property acquisition and infrastructure upgrades, including port enhancements.

Figure 9: Nucor Steel under construction on the Ohio River near Apple Grove, WV



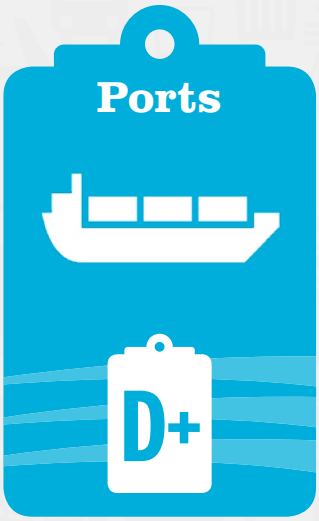
Source: AECOM

PUBLIC SAFETY, INNOVATION AND RESILIENCE

The waterway freight system promotes sustainability by reducing energy usage and air emissions per ton of freight moved, and improved system resiliency through redundancy. Looking toward the future, the 2023 West Virginia State Freight Plan outlines strategies such as supporting national investment in the inland waterway system that supports West Virginia, upgrading access to inland port facilities, and economic development along the waterways to improve safety, mobility and community health.

Improved connections to roads and rail are coordinated through the West Virginia Department of Transportation's (WVDOT) Division of Highways, in partnership with the Federal Highway Administration (FHWA). At a local level, improved roadway networks are planned by the metropolitan planning organizations (MPOs); agencies created by federal law to provide local input for urban transportation planning. Seven of the eight West Virginia MPOs border the inland waterways system.

When it was active, the WVPPA considered and promoted West Virginia's ports in competition with other states and regions. The WVPPA, in partnership with local port districts and other stakeholders, examined and developed marketing strategies for additional port development. Now, without an active statewide port authority, there is not much opportunity to promote development opportunities at West Virginia's ports on a on a strategic basis.



RECOMMENDATIONS TO RAISE THE GRADE

West Virginia ports are in dire need of upgrades, along with the creation of new infrastructure to accommodate existing ports. Recommendations to raise the grade include:

- Assess ports operation and maintenance needs and create an asset management plan for public and private ports. West Virginia ports currently do not have an asset management plan.
- Continue to pursue funding through federal and state grants, loans, private financing, and bond programs. Available funding for ports in West Virginia is limited and will need to be increased to improve the current state of ports and port districts.
- Seek expansion opportunities to improve the use of ports in West Virginia. The increased use of West Virginia ports would create more jobs and allow for more commerce throughout the state.
- Create a system through the WVPPA or other state agency to track and promote imports and exports at each port.

Photo: Port of West Virginia

Source: Port of West Virginia

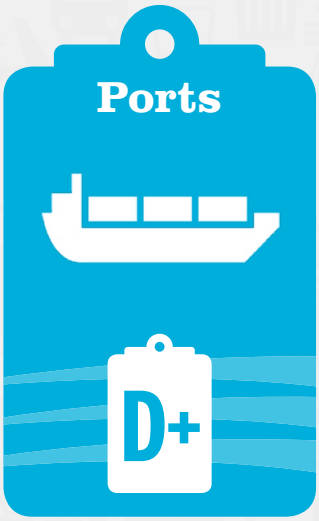


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Photo: Coal Loading Facility on the Kanawha River near Marmet, WV

Source: AECOM

Public Parks

C-

GRADE COMPARISON

WV: C-

Nat'l: C-

Photo: Babcock State Park (WV Tourism)

PUBLIC PARKS

EXECUTIVE SUMMARY

In 2022, West Virginia led the nation by becoming the first state in the country to release a collection of free vacation guides. Tourism is valued in West Virginia, and a recent $7 million investment in improvements to the Hawks Nest State Park lodge and museum exemplifies this. Although upgrades are being made to state parks, deferred maintenance creates a large public safety issue; one example is the aging 10 tunnels at the North Bend Rail Trail which are over 150 years old. Improving deferred maintenance and capital improvements are expected to increase annual visitors to West Virginia's state parks (7 million) and national parks (1.4 million), thus allowing growth in revenue.

Figure 1: Blackwater Falls State Park

Source: WV State Parks

CONDITION & CAPACITY

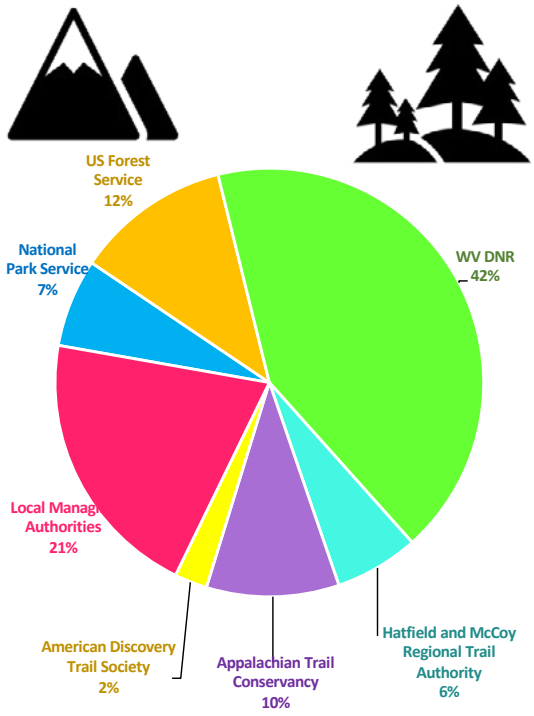
West Virginia welcomes more than 7 million visitors annually to their state parks and nearly 2 million to its national parks. With more than 1.6 million acres of land, residents and tourists are attracted to the many state and national parks, forests, and wildlife refuges year-round. The National Park Service (NPS) manages sixteen natural landmarks, four heritage areas, one scenic river, scenic trail, historic trail, two recreation areas, one historical park, and a park and preserve. West Virginia gained its first National Park and Preserve, New River Gorge, in late 2020. This designation by the National Parks Service has resulted in an increase of nearly 500,000 visitors to the park. In addition, there are 36 state parks, nine state forests, three state rail trails and many county, city, and municipal parks. In fiscal year 2024 (FY 2024), the West Virginia Division of Natural Resources (WVDNR) acquired an additional 231,004 acres, with the majority being for the new Summersville Lake State Park in Nicholas County.

West Virginia has more than 6,800 miles of public recreational trails. Of those, the NPS manages 601 miles, the US Forest Service 889 miles, the WVDNR 1,232 miles, the Hatfield McCoy Regional Trail Authority 564 miles, and Wood County 92 miles; other West Virginia counties, cities, schools, and non-profit organizations manage the remaining miles. State and national park visitation make up a large portion of tourism, making them a major economic contributor for West Virginia.

In FY 2023, visitors attracted to state parks and forests spent $483 million, which is higher than previous years, and an estimated 58% of the spending was made by out-of-state visitors. A survey conducted for West Virginia's Outdoor Recreation Plan found that 50% of all respondents were classified as casual or moderate park users, and 21% were classified as daily or frequent users.

West Virginia has an outdoor recreation plan, known as the West Virginia Statewide Comprehensive Outdoor Recreation Plan (WV-SCORP). This plan is developed and published every five years. The 2024-year WV-SCORP found that federal funds have been drastically cut since 1982, and many of the facilities erected at the time are now reaching the end of their life cycle.

Figure 2: Public Trail Managing Organizations by Mile



Source: WV Trail Inventory

OPERATION AND MAINTENANCE, FUNDING AND FUTURE NEED

State parks in West Virginia are estimated to need $76.5 to $100.7 million to complete outstanding maintenance and capital improvement projects. These projects include heating and cooling, structural repairs, internet improvements, demolition, and waste treatment. During the late 2010s, state parks generated approximately $21.4 million annually. These funds are generated through revenue from DNR license fees, camping fees, lodging, vehicle license plates, and set-asides from the state legislature. Unfortunately, rapidly deteriorating infrastructure has made state park maintenance difficult to keep up with, with only half of necessary funding generated from these programs.

Figure 3: Hawks Nest State Park

Source: West Virginia Parks

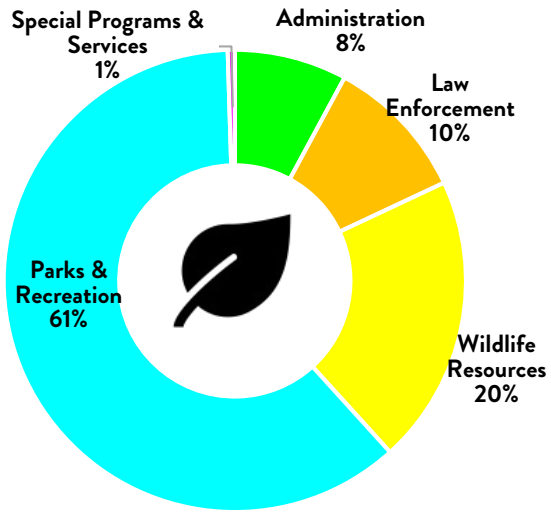
WVDNR is the lead agency responsible for maintenance of state parks, while wild and scenic rivers, along with national trails, are managed by the NPS. Although the division employs 63 superintendents and park rangers, West Virginia parks and trails rely heavily on volunteer labor for maintenance.

The West Virginia State Parks System contributes to the economy of the state. Total economic impact ranges between $400 million and $450 million, for every $1 of general tax revenue provided to state parks, $18.54 on average was generated that otherwise would not be present without the operation of state parks and forests. Guest satisfaction is high at state parks with 94% of survey respondents rating the parks as good to excellent. West Virginia offers a wide variety of activities and amenities, which encourages not only residents, but non-residents as well.

The Land and Water Conservation Fund program (LWCF) provides federal funding for the development and acquisition of public recreational areas in West Virginia. The state also has access to the West Virginia State Parks and Recreation Endowment Fund; a revenue account used for special projects. This includes funds received from state-owned natural resources beneath the Ohio River and its tributaries along with gifts, grants, and contributions specifically allotted for the fund.

The West Virginia Rails-to-Trails program, converting old unused railroad lines to trails, is funded largely by the federal Recreational Trails Fund Program. Additional financing measures include fundraising events, membership dues, county property tax levies, grants to local and regional foundations, municipality budget requisitions, savings through volunteer engagement, and partnerships for in-kind resources.

Figure 4: WVDNR Disbursements FY23-24



Source: WVDNR

Despite not charging entry fees, West Virginia's state park system is one of the most operationally self-sufficient in the nation. Instead, the system generates revenue through state park activities such as lodging, camping, and concessions. These revenue sources are then reinvested into the parks. In July 2021, state lawmakers approved a $42 million investment of budget surplus funds on state park expansion and renovations. Part of this investment included twenty new cabins at Coopers Rock State Park, where the first five stargazing cabins were opened in September 2025.

To revise current asset management plans, two bills were passed during the 2017 and 2018 legislative sessions. The first bill authorized the Parks and Recreation Section to receive an exemption from oversight by the purchasing division which would allow the agency to purchase necessary materials sooner than typical. The second bill passed during the 2018 session; Senate Bill 438, allowed the WVDNR to sell up to $80 million in excess lottery revenue bonds for deferred maintenance and capital improvement projects.

The primary weakness of the park system is deferred maintenance and a backlog of capital improvement projects, which has resulted in aging and non-viable buildings, safety concerns, and the deterioration of infrastructure. Despite bills being passed in efforts to acquire more assets, West Virginia state parks still have a large amount of deferred maintenance and backlog of capital improvement projects. These concerns have resulted in severe issues that pose a risk to public safety. Some examples include faulty playground equipment, dilapidated buildings at Cass Scenic Railroad State Park, and extreme issues with wastewater and drinking water treatment in State Parks.

Another major concern is that all 10 tunnels at the North Bend Rail Trail are 150+ years old and are prone to flooding with 300-400 failing culverts along this trail. As of 2018, no engineering study has been completed, and the WVDNR has no plan to prevent a collapse or contingency plan in response to a collapse.

Figure 5: Coopers Rock State Park Stargazing Cabins

Source: WV State Parks

RESILIENCE

West Virginia is well known for vast amounts of land comprising several state and national parks. According to the Green Initiative, the parks system upholds their mission by adopting policies that better the environment.

Methods in which the parks system upholds their mission statement include installing more efficient LED lights at all park facilities, providing recycling programs, and discontinuing the use of polystyrene foam products, which are commonly used in disposable products. Due to the increasing number of electric powered vehicles being driven, 9 of 35 state parks have added charging stations.

In the meantime, generators have been installed at several parks to sustain functions when there are power outages in the event of extreme weather.

Figure 6: Cass Old Mill Building

Source: MidAtlantic Daytrips

PUBLIC SAFETY

Physical access controls at West Virginia's state and local parks are generally limited, as most sites do not utilize manned entry booths or vehicle barriers. Parking areas are typically located at a distance from park structures, except for designated accessible spaces, and visitors reach facilities via sidewalks or trails, many of which have been updated to meet ADA accessibility standards.

At this time, there is no centralized or statewide reporting available on park closures related to environmental threats such as algal blooms or bacterial contamination. These typically rely on organization official social media outlets in lieu of a formal reporting system. The absence of consolidated reporting makes it challenging to fully assess safety conditions across local, state, and national parks, but it also highlights an opportunity for future data collection efforts that could support long-term planning and visitor safety.

Figure 7: Canaan Valley State Park

Source: West Virginia Public Broadcasting

INNOVATION

The WVDNR manages many innovative programs within the state. The organization utilizes Geographic Information System (GIS), and GPS, in combination with spatial data analysis to produce interactive maps. They offer maps on web browsers and mobile devices for hunting, fishing, trapping, wildlife management areas, and watershed resources. Hunting, trapping, and fishing maps can be downloaded for access while offline.

The WVDNR is active in schools across the state and has partnered with the West Virginia Department of Education to provide the Simulated Workplace program. This program exposes students to careers in science, mathematics, engineering, and technology. It is beneficial for both students and the state, as it provides needed maintenance in parks while teaching students technical skills. Apart from the Simulated Workplace program, the WVDNR provides resources for schools and instructors to participate in the National Archery in the Schools Program, which has been operational in West Virginia since 2004.

West Virginia recently completed construction of its first wildlife education center, the Claudia L. Workman Wildlife Education Center at Forks of Coal State Natural Area. The center will be home to exhibits that educate visitors about West Virginia's native wildlife including conservation, game management, forestry, stream restoration and how to identify native plants and animals.

The WVDNR also sponsors the annual Hunters Helping the Hungry (HHH) program. The Governor's One-Shot Hunt event is the largest contributor to this program. Hunters can take their deer to a participating meat processor who will process, package, and freeze the venison so that it can be donated to local food pantries and other organizations. In addition to this program, the West Virginia Council of Churches also runs an event called "Share the Harvest Sunday" which encourages congregations to donate toward the HHH program. Since 1991, this program has provided over 1 million pounds of venison to families and individuals across the state.

Figure 8: Chief Logan State Park upgraded, ADA accessible playground equipment

Source: West Virginia State Parks

West Virginia parks also provide opportunities for prison inmates convicted of non-violent crimes to work as maintenance crews on the Rails-to-Trails program. Inmates can gain technical work experience through the West Virginia Correctional Industries, which includes manufacturing picnic tables, grills, and benches that can be purchased by government entities and non-profit organizations. These programs are beneficial to the individual and the state alike.

West Virginia's Almost Heaven Swing initiative has become a creative and highly visible effort to enhance outdoor recreation and promote tourism across the state. Installed at scenic overlooks in state and local parks, the handcrafted wooden swings encourage visitors to explore lesser-known sites, stay longer in outdoor spaces, and share their experiences on social media. While the initiative is not a capital improvement in the traditional sense, it has successfully increased public engagement, strengthened the state's outdoor brand identity, and highlighted the value of preserving natural and recreational assets. The swings also serve as an accessible, low-cost amenity that brings attention to the broader need for continued investment in park infrastructure and visitor facilities.

Table 1: HUNTERS HELPING THE HUNGRY 5-YEAR ANNUAL REPORT						
	2020	2021	2022	2023	2024	SINCE 1992
Processors	17	16	12	11	14	-
Deer Donated	500	579	681	433	591	29,850
Pounds of Venison	20,104	23,807	24,580	17,187	20,954	1,133,225
Meals Provided	-	-	-	-	27,938	1,523,016
Total Cost*	**$38,197**	**$45,233**	**$46,703**	**$60,156**	**$73,342**	**$1,737,737**

Source: WVDNR
**Processing and distribution costs vary year-to-year due to the annual harvest and number of deer donated to the Hunters Helping the Hungry Program.*

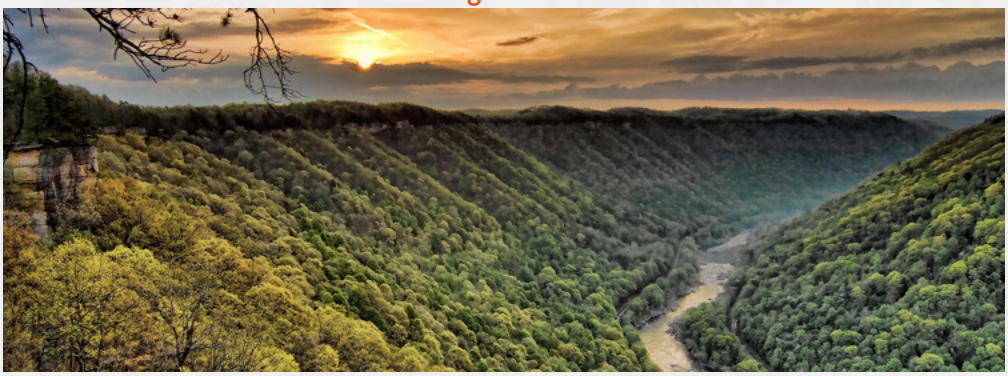
Figure 9

Source: WVDNR

RECOMMENDATIONS TO RAISE THE GRADE

- Promote the benefits of multiple-use parks that increase the community's resilience, such as rain gardens, which reduce stormwater pollution and protect drinking water sources.
- Secure further revenue for park maintenance, condition, and related costs through increased licensing fees.
- Explore revenue options such as user fees to address priority needs, including park operations and maintenance.
- Include optional fee to go to State Parks with Motor Vehicle Registration Fee.
- Prioritize funds towards improving and modernizing park accommodations to promote visitation.
- Advocate for technical educations programs statewide that involve parks and recreation.
- Direct additional funding for marketing West Virginia parks to out-of-state residents

Photo: New River Gorge National Park & Preserve



Source: US National Park Service

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Photo: Cass Scenic Railroad (Mountain Rail WV)

RAIL

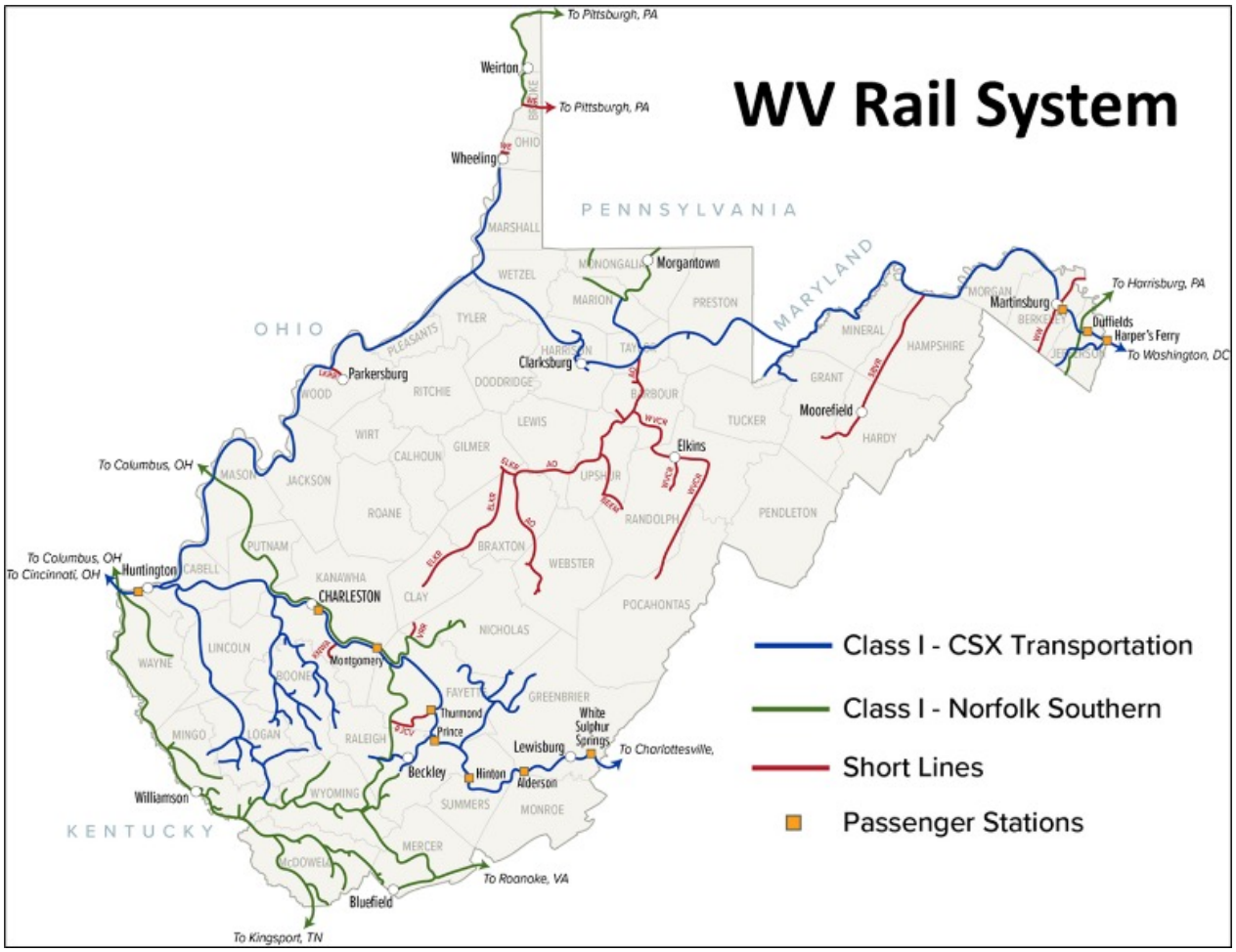
EXECUTIVE SUMMARY

West Virginia's rail infrastructure plays a vital role in the economy by serving as a connector for Midwest markets to the Atlantic Coast and lower Southeast. This infrastructure consists of 2,401 miles of rail that facilitated the movement of 52.7 million tons of freight in 2019, valued at $5.7 billion. This is projected to decline to 29.2 million tons by 2050 but increase in value overall. The decline of demand for terminating and originating services proves to be a major challenge for West Virginia's rail system serving under capacity. However, investing in train technology has reduced under-capacity issues and strengthened preventive maintenance. While passenger rail service in West Virginia serves over 143,000 people annually, service revenue has not been sufficient to meet their operating costs. Nevertheless, ridership has steadily increased for years, in turn furthering demand. Continued Class I rail investment and attention to service challenges are key to the state's future rail system.

CONDITION & CAPACITY

The national freight rail network in West Virginia is over 150 years old, and, over time, industry standards have increased railcar size and weight allowances. The 2,383 route miles of rail tracks across the state of West Virginia are comprised of two Class I railroads and nine short lines or regional lines. CSXT is the state's largest carrier, with 1,253 route miles of track, and NS is the second largest carrier, with 618 route miles of track. The remaining 512 route miles of track consist of the short lines and regional lines. Approximately 326 miles of the mainline track is designated as part of the Strategic Rail Corridor Network (STRACNET), which is an interconnected network that serves defense installations for the National Defense Program and carry at least 10 million gross tons per year. CSXT, Norfolk Southern, and Winchester & Western Railroad own all the tracks designated as STRACNET in West Virginia. The state also contains one intermodal terminal in Wayne County, the Central Appalachia Inland Port at Prichard, formerly known as the Heartland Intermodal Gateway. The gateway began operation in 2015 and is currently developing a strategy for the facility to support current supply chain needs under an Economic Development Administration Grant.

Figure 1: WV Rail System



Source: WVDOH

With respect to passenger rail, West Virginia has two Amtrak lines, with 10 stations serving nearly 32,000 passengers in 2023. These include the Cardinal Line in the southern part of the state, which provides trips three times a week to New York, Washington, Charlottesville, Charleston, Cincinnati, Indianapolis, and Chicago, and the Floridian line, predecessor to the Capitol Limited and Silver Star lines, in the eastern panhandle; this line provides trips daily to Chicago, Pittsburgh, Washington DC, Savannah, and Miami. It should be known that the Capitol Limited line was discontinued in November of 2024 and, similarly, ran daily trips from Chicago to Washington DC, passing through the Eastern Panhandle. Because of this recent change and financial references to the predecessor, Capitol Limited will be referenced for the majority of this report. Additionally, the West Virginia Department of Transportation, Division of Multimodal Transportation Facilities (DMTF) houses the Cass Scenic Railroad, Durbin & Greenbrier Valley Railroad (West Virginia Central), and Potomac Eagle Railroad, which reported over 111,000 passenger trips in 2024.

Figure 2: Greenbrier Express Rail

Source: WV Tourism

Most of West Virginia's rail systems are maintained at Federal Railroad Administration (FRA) Track Class 3 and 2 designations. The FRA standards set minimum requirements for freight train operations at specific speeds, where the maximum allowable operation speed for Class 3 is 40 mph and 25 mph for Class 2. Passenger rail speeds for Class 3 and Class 2 are 60 and 30 mph, respectively. Amtrak's Capitol and Cardinal lines are maintained at Class 4, which permits an operation speed of 80 mph for passenger rail. The largest challenge this system faces is the general aging of tracks in place.

West Virginia's rail system is currently operating under capacity. The state rail system was originally constructed to support the timber industry before the coal mining industry became its primary user. In general, West Virginia has historically been dependent on mining, forestry, agricultural, and heavy industries. Other commodities, including oil, gas, metals, and chemicals, offset a fraction of this reduced activity in rail transportation. It is anticipated by the WVDOT that West Virginia's rail freight tonnage will decline 45% by 2050 but will increase in value by 39%. The tonnage decrease is largely due to the decline in coal, while the increase in value is anticipated to be driven by the rise in higher per-unit-price commodities such as pharmaceuticals, precision instruments, and electronics.

Between 2001 to 2018, the state's originating tonnage declined from 106 million tons to 62 million tons, while the state's terminating tonnage declined from 11.4 million tons to 6.6 million tons. Conversely, the state's through tonnage increased from 87 million tons to 91 million tons. Freight tonnage through 2020 can be seen in Figure 3. This trend is due to the decline in coal freight in addition to the declining population of the state.

OPERATION & MAINTENANCE, FUNDING, & FUTURE NEED

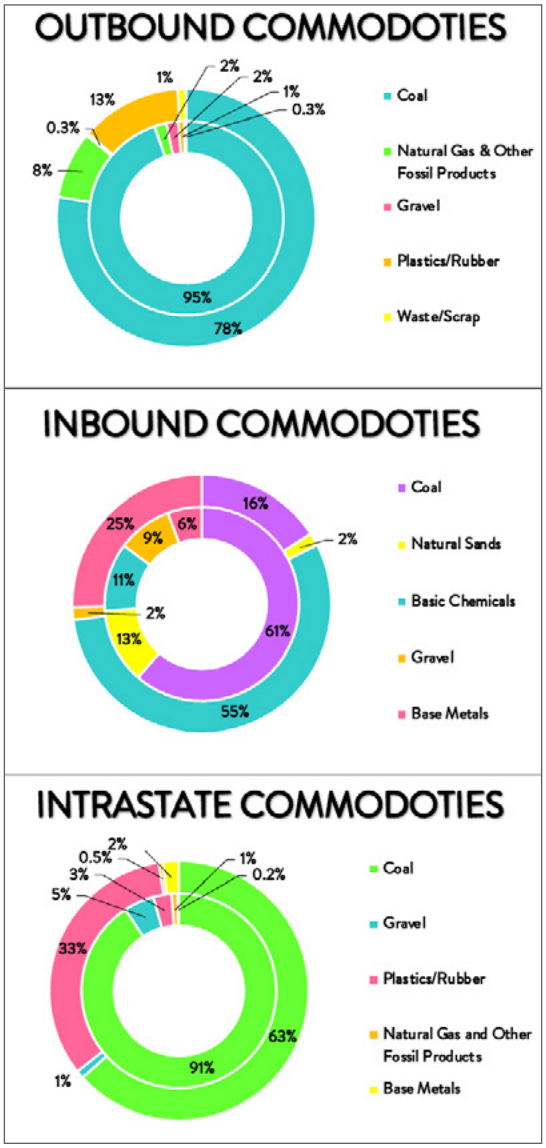
Passenger rail remains limited to the eastern panhandle and southern West Virginia. Amtrak is the largest generator of passenger rail traffic, where all routes within West Virginia are operated on privately owned Class I railroads. Therefore, neither the WVSRA nor Amtrak is responsible for operational, maintenance, or other capital expenditures. However, the WVSRA and Amtrak have collaborated in improving Americans with Disabilities Act (ADA) compliance at stations across West Virginia, as well as evaluating the feasibility of constructing a new station near Hurricane.

One of the more significant projects to increase interstate rail connection includes the Heartland Corridor. The Heartland Corridor is a major, multistate project that has been envisioned primarily by NS with support from the former West Virginia Public Port Authority, along with the WVDOT and FHWA. This $354 million project is intended to connect the Port of Virginia in Norfolk, VA, to the Chicago rail hub and beyond. Within West Virginia, the $32 million Central Appalachia Inland Port at Prichard project, formerly known as the Heartland Intermodal Gateway, was constructed in 2015, but never fully aligned with the promised scope or expectations. The facility allows double-stacked international and domestic shipping containers to pass through West Virginia without vertical clearance issues. Ownership was transferred to Wayne County in 2022 and then leased to a private railroad group in 2024 to revive the site and expand operations.

Amtrak's Cardinal and Capitol Limited train lines offer commuter and scenic route services to the surrounding metropolitan areas. The Cardinal line runs from New York to Chicago and makes eight stops throughout southern WV, whereas the Capitol Limited line runs from Chicago to Washington DC, passing through Martinsburg and Harpers Ferry. While ridership has steadily increased for these two lines within the last 3 years, including a nearly 30% jump in ridership on the Capitol Limited line for Fiscal Year (FY) 24, both of these services continue to operate at a loss.

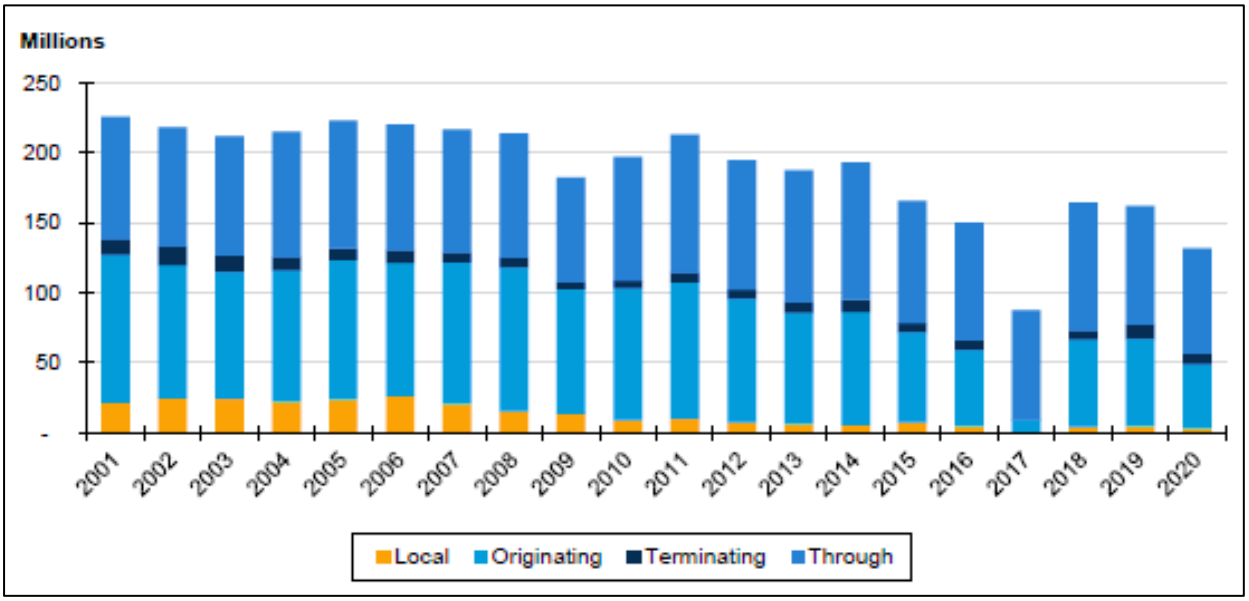
In the pre-pandemic FY 2019, the Cardinal generated $8.4 million with an operating cost of $20.3 million. Despite serving 108,900 passengers, the Cardinal operated at a loss of $16 million. In comparison, Capitol Limited generated $20.3 million in revenues while operating at a cost of $44.6 million, resulting in an operating loss of more than $24.3 million while serving approximately 209,000 passengers. Commuter rails are still recovering from the historic dips in 2020 due to the work from home initiatives and shifting traffic patterns. To offset these losses in the future, Amtrak plans to identify and implement operational efficiencies, evaluate service models to improve revenue performance, and evaluate and implement customer service improvements.

Figure 3: 2019 WV Rail Commodity Information for Value (exterior) and Tonnage (interior)



Source: WVDOT

Figure 4: Historic Freight Tonnage



Source: WVDOH Note: 2017 data is incomplete

Funding for both passenger and freight rail is provided by the State General Fund, WVDOT and FHWA funds, transit funds, local grants, and private funds. During FY 2021, the WVSRA received $4.9 million from the General Fund through the state budget appropriations process. The funds received assist in paying for staffing, insurance, commuter station upkeep, and capital projects. More recently, the state's rail system has received funding from the Infrastructure and Jobs Act and the US Department of Transportation's Consolidated Rail Infrastructure and Safety Improvements (CRISI) program. West Virginia was awarded $22.8 million through these funds for design and construction activities for the Winchester & Western Railroad mainline. Additionally, another $6.9 million was awarded to Cathcart Rail, LLC, to complete final design and construction surrounding repairs to address structural deficiencies of the historic B&O Sixth Street Railroad Bridge in Parkersburg, WV.

Figure 5: Heartland Intermodal Gateway and Central Appalachia Inland Port at Prichard

Source: Railway Age

Figure 6: Amtrak Station in Prince, WV

Source: Charleston Gazette

Moving forward in West Virginia, focus is being directed toward the improvement of passenger rail services. The WVSRA is looking to take a regional approach to tackle passenger service issues. The WVSRA and WV Department of Tourism are in development phases to expand rail-related tourism while supporting economic development through local business expansions and sustainable tourism. Amtrak has committed to the completion of ADA upgrades for passenger rail services. This investment totals $49.0 million in West Virginia and is targeted for completion by the end of FY 2029. Looking at future projects for freight rail, the WVDOT and WVSRA will be working with short-lines to apply for Federal grants to bring the state's short-line rail system to a state of good repair. CSXT is also preparing to increase the rail capacity along the Ohio River. This will alleviate congestion and improve the on-time performance of both passenger and freight rail. States such as Virginia, Pennsylvania, and Ohio could potentially benefit from these intended upgrades.

Table 1: Amtrak FY2019 revenue and Operating Costs

Amtrak Line	Passenger Count	Revenue (millions)	Operating Cost (millions)	Operating Loss (millions)
Cardinal	108,090	$8.4	$24.4	$16.0
Capitol Limited	209,000	$20.3	$44.6	$24.3

Source: Amtrak

Figure 7: Durbin & Greenbrier Valley RR

Source: Mountain Rail WV

Additionally, West Virginia is concerned with the lack of public awareness in regard to passenger rail service. In 2022, the WVSRA was integrated into the newly established Division of Multimodal Transportation Facilities (DMTF). This streamlined the execution and implementation of the state's multimodal transportation goals by consolidating existing multimodal authorities related to public ports, railroads, aeronautics, airports, and air navigation facilities. The state anticipates this will enhance the efficiency and reduce related costs of the movement of goods and services to and from markets in West Virginia while encouraging the construction and completion of local infrastructure projects for all types of transportation systems. Overall, the goal is consistent maintenance and utilizing the state rail development funds as a match for potential federal loans and discretionary grant applications.

PUBLIC SAFETY, RESILIENCE & INNOVATION

West Virginia's Public Service Commission (PSC) currently operates one of the largest state rail inspection programs in the country. Established in 1975, the PSC conducts inspections of tracks, equipment, signals and train controls, hazardous material sites, and the safety of operating practices. Across the state of West Virginia, there is an average of 68 rail-related accidents/incidents annually, with an average of 9% resulting in fatality. In 2024, there were 70 accidents/incidents- seven of these being fatal.

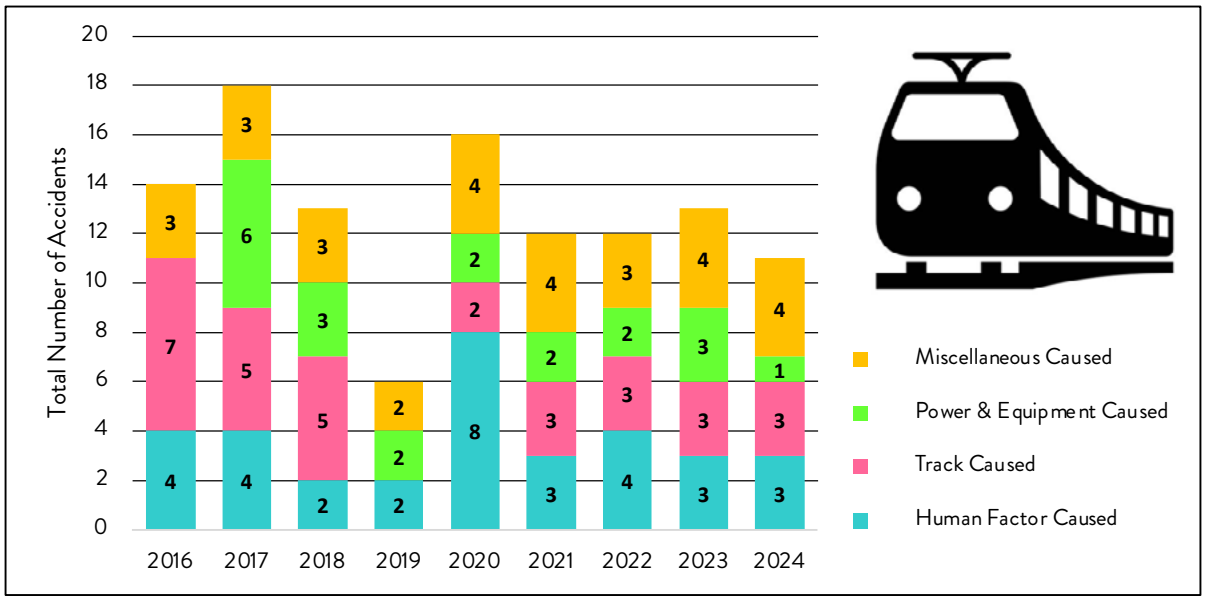
Figure 8: 2024 WV Rail Safety Data

Source: FHWA

Since 2013, the state has completed 65 projects on the rail system totaling $10.9 million (an average cost of $170,000 per project) to improve safety and resolve rail issues. In January 2025, West Virginia was awarded $3.2 million in grants from the FRA to fund three rail safety projects. These projects include the Keyser Safety and Mobility Project, the WV-2 At-Grade Crossing Assessment Project, and the WV 45 Apple Harvest Drive Grade Separation Study. All three projects address issues with grade crossings throughout the state, and the WV DOT will provide a 20% non-federal funding match for the projects.

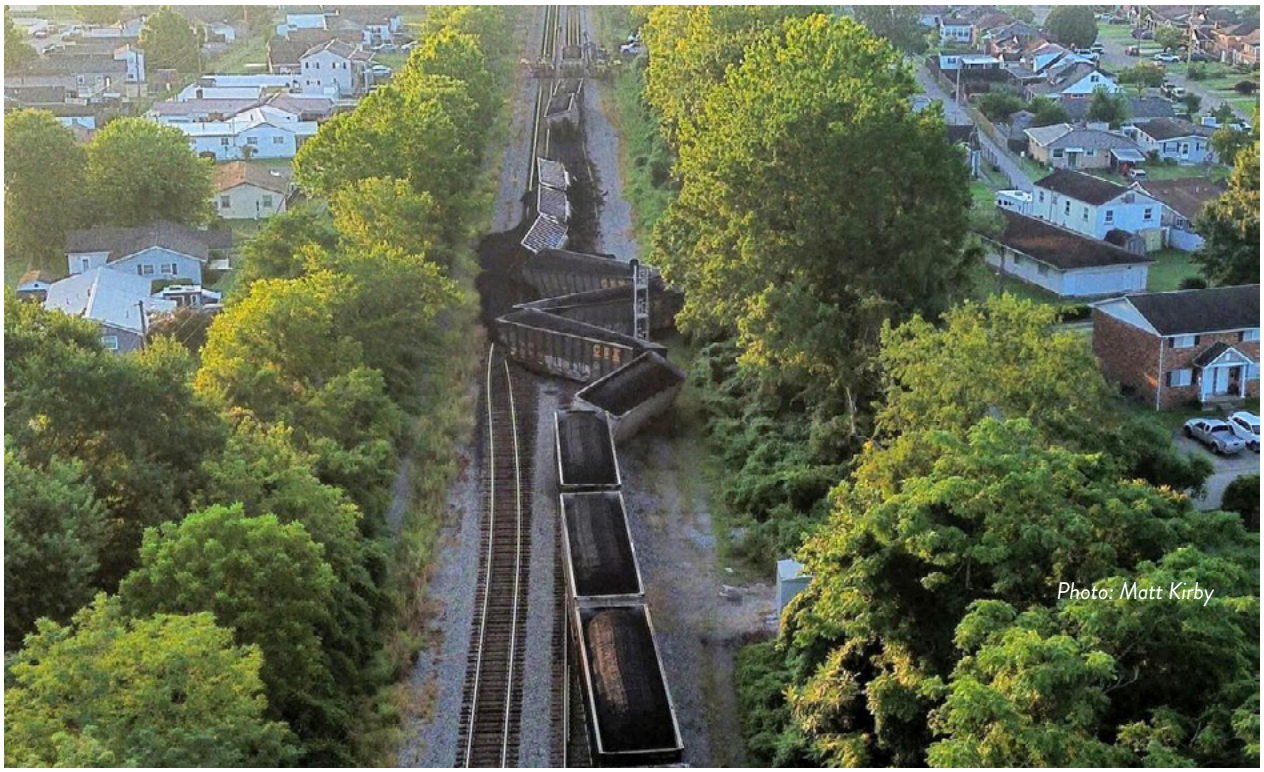
Both Class I operators, CSXT and NS, have heavily focused on preventative maintenance and upgrading signaling to combat rail incidents. With the FRA mandate of positive train control, both Class I operators worked diligently to bring the Class I lines into Positive Train Control (PTC) compliance before the December 31, 2020, deadline. PTC refers to the technologies used to prevent train accidents by coordinating speeds and communicating locations of trains within the rail system. The mandate was met by all 41 freight and passenger railroads that were mandated, including the seven main lines in West Virginia. For the short and regional rail lines, the WVSRA has established working agreements with other agencies to assist with maintenance.

Figure 9: History of WV Train Accidents Not at Highway-Rail Crossings



Source: FHWA

Figure 10: Train derailment in St. Albans, WV, August 2025



Source: Charleston Gazette

Flood events that devastated much of the Mid Atlantic in early 2025 created challenges for rail in southern West Virginia, including the closures across the Heartland Corridor. While route services were quickly reestablished, residual washouts created further closures and delayed reopening. An uncertain future of climate-related weather events creates development of technologies such as PTC to quickly communicate track emergencies before they become catastrophic. Fascinatingly, older advancements, such as the "submarine bridge" used by Beech Mountain railroad have been used to combat frequent flooding, in which a series of culverts are surrounded by concrete and tracks are placed within the concrete. This allows floodwater to flow over the tracks without damaging them.

The WVSRP indicates a need of $9.3 million for safety upgrades, with 35 of the 38 projects designated as "Immediate", or requiring completion within the next 5 years. All of these projects are owned by the WVDOH, with a majority of funding provided by the Highway Safety Improvement Program. At-grade highway-rail crossings are a primary focus of the WVSRP. In total, the state has 3,753 at-grade crossings; of these, 1,882 involve public roadways. Trains have priority at these crossings, which include a range of safety systems depending upon the crossing volume. Crossings with high volumes of traffic are often equipped with active warning devices such as flashing lights and gates. Lower volume crossings must, at minimum, be equipped with passive warning devices such as crossbuck, stop, or yield signs. In 2024, West Virginia reported 15 highway-rail incidents. Twelve of these incidents occurred at a public crossing and one resulted in fatality. Prior to 2024, the state had not had a highway-rail related fatality since 2019.

Upon its creation, the DMTF conducted a detailed analysis of the state's freight transportation, including its strengths, weaknesses, opportunities, and challenges. The 2023 State Freight Plan was released in January 2024, providing a blueprint for addressing West Virginia's current and future freight transportation needs. This document provides strategies to address aging infrastructure, safety concerns, truck parking, rural

and multimodal connectivity challenges, system capacity constraints, bottlenecks, system resiliency, and funding challenges experienced by the freight transportation systems in the state. The WVSRA works with the WV State Resiliency Office to improve preparedness and develop strategies to mitigate hazards like floods.

Furthermore, as noted, the state's rail network is over 150 years old. Over time, industry standards have increased railcar size and weight allowances on rail systems that were built to the safety standards of their time. Additionally, West Virginia railroad bridges are designed, built, and maintained by private railroad companies. Class 1 carriers, which interchange with the local short lines in West Virginia, are pushing a national standard weight of around 286,000-pound railcars. When the tracks' weight capacity cannot accommodate standard railcars, shippers and receivers are required to lighten the load of each train car. To improve the performance and productivity of railroads, the state would benefit from making certain tracks and bridges meet this minimum requirement.

Recent technological advancements have helped keep up with national standard weights by using distributed power units (DPUs), which both CSXT and NS have increased the use of. DPUs allow trains to have powering locomotives distributed at strategic locations throughout a single train, which can be remotely controlled to increase power for climbing steep grades, which help traverse the state's mountainous terrain. This maximizes the train handling and allows railroads to increase train size. Continuous investment in track improvements, upgrades to facilities, and technology will be necessary to keep up with growing standards across US rail.

Figure 11: Rail Crossing on Fayette Station Road

Source: Creative Commons

RECOMMENDATIONS TO RAISE THE GRADE

- Increase investment in consistent inspection programs and prompt attention to wear or defects that help lower the risk of track, signal, or crossing failures to preserve rail network integrity.
- Place an emphasis on grade crossing closures and upgrades at crossings with the highest risk profiles and prioritize engineering solutions that separate rail traffic from motorists and pedestrians.
- Improve public safety measures by encouraging collaborative investment and technical support in PTC coverage for short-line and regional railroads to reduce speed-related derailments and train-to-train collisions beyond the required Class I operators.
- Increase in technological investments, such as distributed power units (DPUs), to maximize train handling. Investments in locomotive and communication technologies position railroads to handle higher volumes with fewer delays and improved safety rates.
- Develop relationships with Atlantic coastal ports to maximize the export connection of West Virginia railroads. Coordinated planning can streamline freight movements, expand market opportunities for coal, chemicals, timber, and manufactured goods, and increase the competitiveness of the state's supply chain.
- Establish a public awareness campaign showcasing the steady increase in ridership as a means to expand passenger rail systems both within WV and to neighboring major cities. Highlighting ridership trends and success stories can build public support for improved passenger rail frequency, reliability, and connectivity.

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ROADS

EXECUTIVE SUMMARY

West Virginia maintains approximately 38,879 miles of public roads, 91% of which are rural, with most facilities built between the 1960s and 1980s and now operating beyond their intended service life. Urban congestion—measured as the share of urban Vehicle Miles Travels (VMT) occurring under congested conditions—has grown from 33% in 1982 to 67% in 2021, and VMT has largely rebounded to pre-pandemic levels. Deferred maintenance costs drive an estimated $1.6 billion annually, underscoring the need for sustained investment. Funding comes from IIJA allocations, state fuel taxes, registration fees, and toll revenue, yet a $600 million shortfall is projected by 2030. Maintenance is challenged by severe weather, aging infrastructure, and more than 400 vacant positions statewide. Safety remains a concern: 264 people were killed on West Virginia roads in 2022, with roadway departures and impaired driving contributing significantly. Looking ahead, the state is prioritizing preservation, drainage upgrades, flood-resilient culverts, and sustainable paving methods to improve long-term system performance.

Figure 1: Welcome to West Virginia sign on US Route 48 and WV Route 55

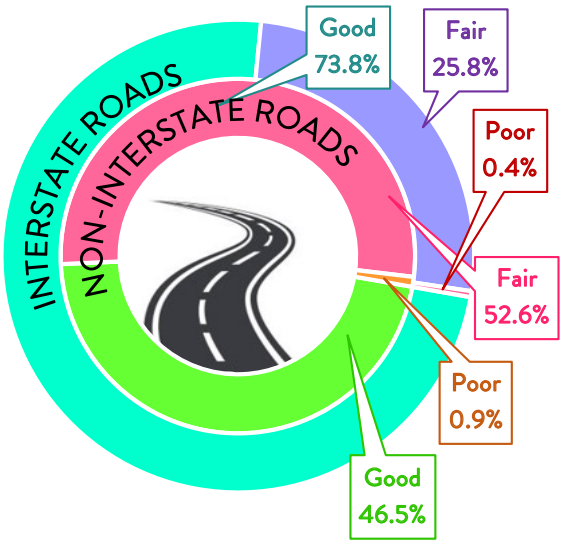
Source: Creative Commons

CONDITION & CAPACITY

The West Virginia Division of Highways (WVDOH) owns the majority – some 34,421 miles – of the state's public roads. In comparison, Local municipalities own 3,539 miles, and the federal government owns 919 miles. West Virginia's unique terrain and topography make metropolitan areas few and far between, with 91% of roadways being considered rural and only 9% considered urban.

Much of West Virginia's highway network was constructed between the 1960s and 1980s, which means many pavements, bridges, and drainage structures are now operating beyond their intended design service life. This increases long-term rehabilitation needs and contributes to higher maintenance costs statewide.

Figure 2: Interstate and non-interstate road conditions



Source: WVDOH TAMP

Congestion pressures are concentrated in these limited urban centers. As measured by the share of urban vehicle-miles traveled occurring under congested conditions, congestion increased from 33% in 1982 to 67% in 2021. Although VMT dropped sharply during the COVID-19 pandemic, statewide volumes have since rebounded to near pre-pandemic levels, and congestion is expected to continue along West Virginia's growing travel corridors.

Unaddressed repairs on roadways cost $1,280 annually per motorist, totaling $1.6 billion statewide. These roadway-related costs represent about 2.3% of the average household income, a high burden in a state with one of the lowest income levels nationally. These deficiencies also elevate freight and business operating costs. According to TRIP, deteriorated pavement, congestion-related delays, and reduced travel reliability increase fuel consumption, tire wear, vehicle operating costs, and maintenance requirements for trucking and supply-chain operators, thereby diminishing the competitiveness of freight-dependent industries across West Virginia's predominantly rural highway network. Roadway pavement conditions according to WVDOH's 2022 Transportation Asset Management Plan (TAMP) are shown in the figure below. The pavement conditions show that most Interstate and non-Interstate mileage is in Good or Fair condition, comparing favorably to national figures, where a significantly higher share of urban roadways is rated Poor. However, roadway deterioration remains more severe on rural secondary routes and on urban arterials affected by freeze-thaw cycles, drainage issues, and landslides.

Figure 3: Plow truck on WV secondary road

Source: WVDOH

Figure 4: Potomac Highlands

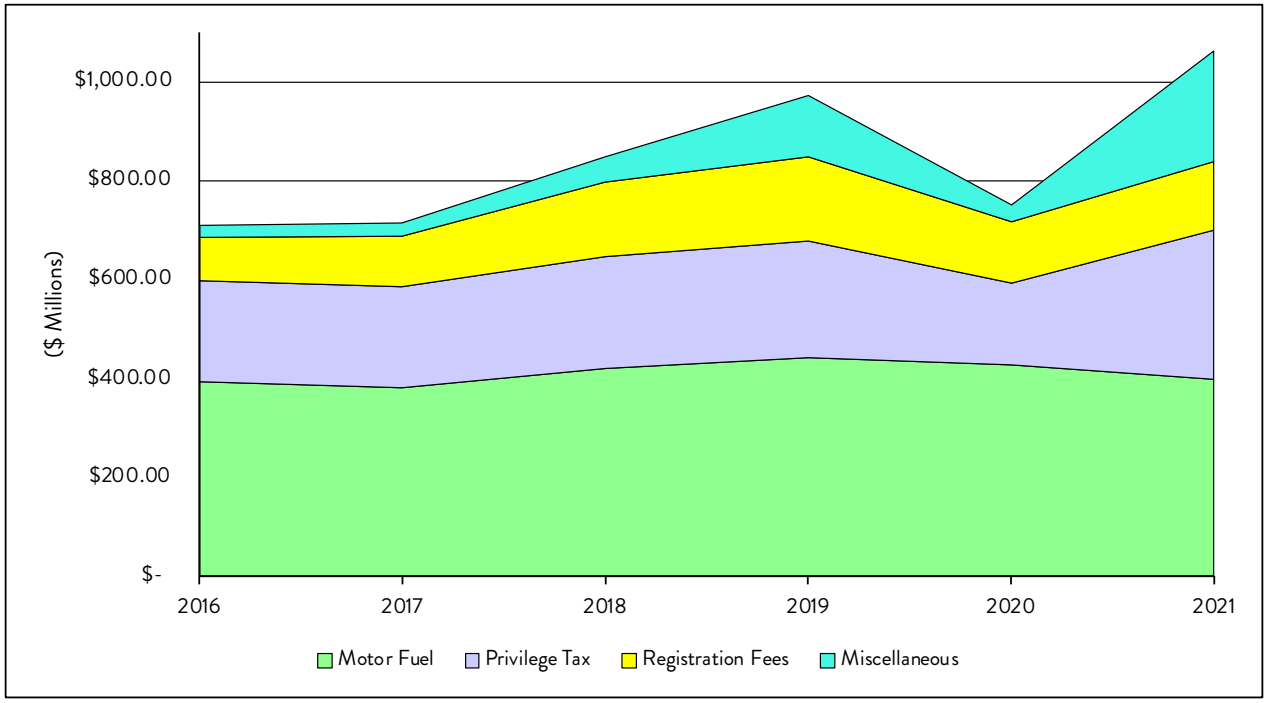
Source: WV Tourism

FUNDING

West Virginia's road infrastructure is funded through a combination of federal, state, and local sources. Federal funding includes programs supported through the Infrastructure Investment and Jobs Act of 2021, for which West Virginia is expected to receive approximately $3.8 billion in funding for road and bridge improvements. The state has dedicated more than $200 million of that funding to the completion of Corridor H, a portion of U.S. Route 48 that is the final section of the Appalachian Development Highway System in West Virginia. Recent modifications to the 2023–2028 STIP have increased WVDOH's ability to reallocate federal funds within grouped project categories, allowing faster response to maintenance and safety needs. This shift reflects a broader statewide strategy of prioritizing system preservation and traffic system modernization over new corridor expansion.

State-generated revenue is primarily supported through the State Road Fund, which draws from West Virginia's 35.7-cent-per-gallon gasoline tax and 38.4-cent diesel tax, one of the highest combined rates in the nation. By comparison, the federal gas tax of 18.4 cents per gallon has not been increased since 1993, increasing pressure on state and local revenues to keep pace with system needs. Additional funding comes from registration fees, including $100–$200 surcharges on electric and hybrid vehicles, and a 6% motor vehicle sales privilege tax.

Figure 5: WV State Road Fund Revenues



Source: STIP 2023-2028

The state also benefits from toll revenue generated by the 88-mile West Virginia Turnpike along Interstate 77, which produces approximately $90 million annually to support operations, maintenance, and capital improvements. Additionally, statewide bond programs funded through the State Road Fund have delivered more than 1,300 roadway and bridge projects in recent years.

Despite these investments, funding remains insufficient to meet the needs of a large, aging, and rural statewide roadway network. With the rise in the use of electric and hybrid vehicles, the heavy reliance on fuel taxes will continue to strain the viability of the State Road Fund.

FUTURE NEED

West Virginia's transportation plan is guided by the 2050 Multimodal Long-Range Transportation Plan, which identifies and addresses the future needs of the state's roadway, safety, and freight systems. The WVDOH 2022 TAMP highlights that to better serve the future needs of West Virginia, more assets should be allocated for signage to enhance safety and roadway drainage to better preserve the base of roadways from washing out. The statewide Roads to Prosperity program focused on short-term road enhancements, while the West Virginia Freight Plan targets reducing freight bottlenecks and improving highway mobility.

In 2025, the U.S. Department of Transportation awarded a $24.8 million BUILD grant to expand truck-parking capacity along major freight corridors on I-81, I-64, and I-79—addressing longstanding safety issues and improving freight reliability. As VMT rebounds near pre-pandemic levels, West Virginia faces growing pressure to manage congestion in its limited urban areas while maintaining mobility in freight-intensive regions.

Figure 6: New River Gorge National Park's Fayette Station Road

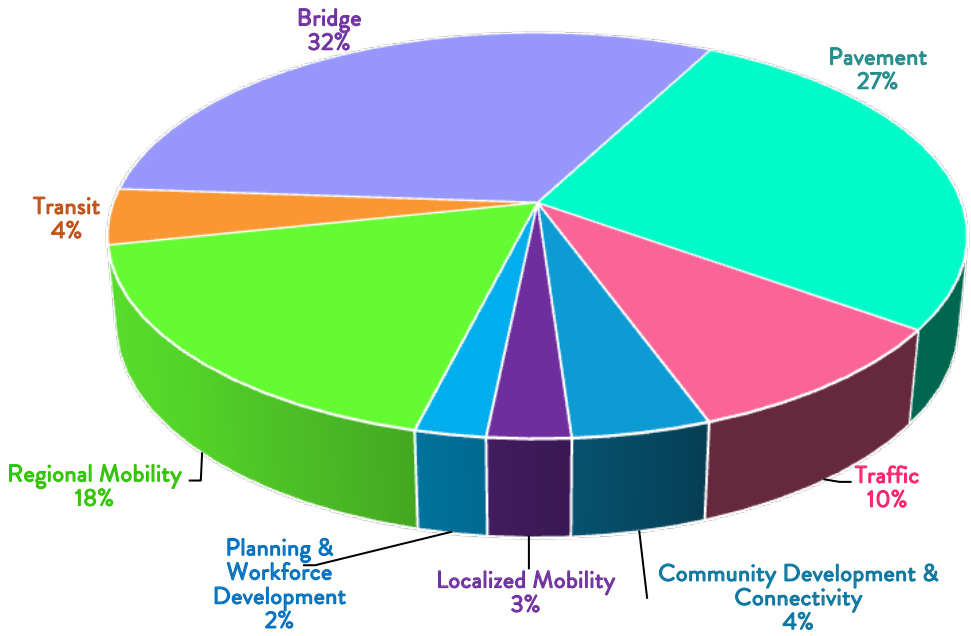
Source The Researched Traveler

Despite these efforts, the state confronts a substantial funding gap, with a projected $600 million shortfall by 2030 and more than $4 billion by 2050 for roadway construction, preservation, and modernization. The pavement maintenance backlog totals $242 million, and $36 million has been allocated through the Highway Safety Improvement Program (HSIP) for long-needed safety improvements. Sustained and predictable funding will be essential to keep pace with future travel demand and preserve system performance across West Virginia's predominantly rural network.

Figure 7: WVDOH Maintenance

Source: WVDOH

Figure 8: WV's average year federal funding need FY23-28



Source: STIP

OPERATION & MAINTENANCE

West Virginia maintains over 34,000 lane miles of roadway and more than 6,900 bridges, one of the largest state-maintained highway networks in the country. Operation and Maintenance (O&M) responsibilities include pavement preservation, drainage and ditching, vegetation control, slide and slip repairs, culvert maintenance, traffic operations, bridge maintenance, and extensive winter weather treatment. The state's mountainous topography, aging rural networks, and harsh winter weather create ongoing maintenance demands.

Recent administrative modifications to the 2023-2028 Statewide Transportation Improvement Program (STIP) have expanded WVDOH's ability to move federal funds within grouped O&M categories, allowing more responsive allocation during weather events, emergencies, and preservation needs. Since funding for O&M is separate from new projects, resources for maintenance are not diverted to create new projects. Winter operations require a statewide fleet of roughly 1,100 snowplows and salt trucks, and 4,800 maintenance workers, who apply more than 193,000 tons of salt and 2.2 million gallons of brine during a typical winter season. However, persistent workforce shortages (for example, more than 400 vacant maintenance positions in 2023) and rising material costs continue to challenge WVDOH's ability to meet statewide maintenance expectations. Sustained and predictable funding will be essential to maintain service levels and support long-term system performance.

Figure 9: West Virginia Roads

Source: WV Tourism

PUBLIC SAFETY

West Virginia continues to experience one of the highest roadway fatality rates in the nation. In 2022, the state recorded 264 traffic deaths and a fatality rate of 16.6 per 100,000 residents, compared to a national average of 12.9 per 100,000. Rural roads remain especially hazardous with roadway departure crashes. In recent years, WVDOH has worked to reduce these departures by implementing high-friction surfaces and safety edges. This helped to see an improvement in roadway departure crash fatalities falling from 70% in 2017 to 65% in 2020.

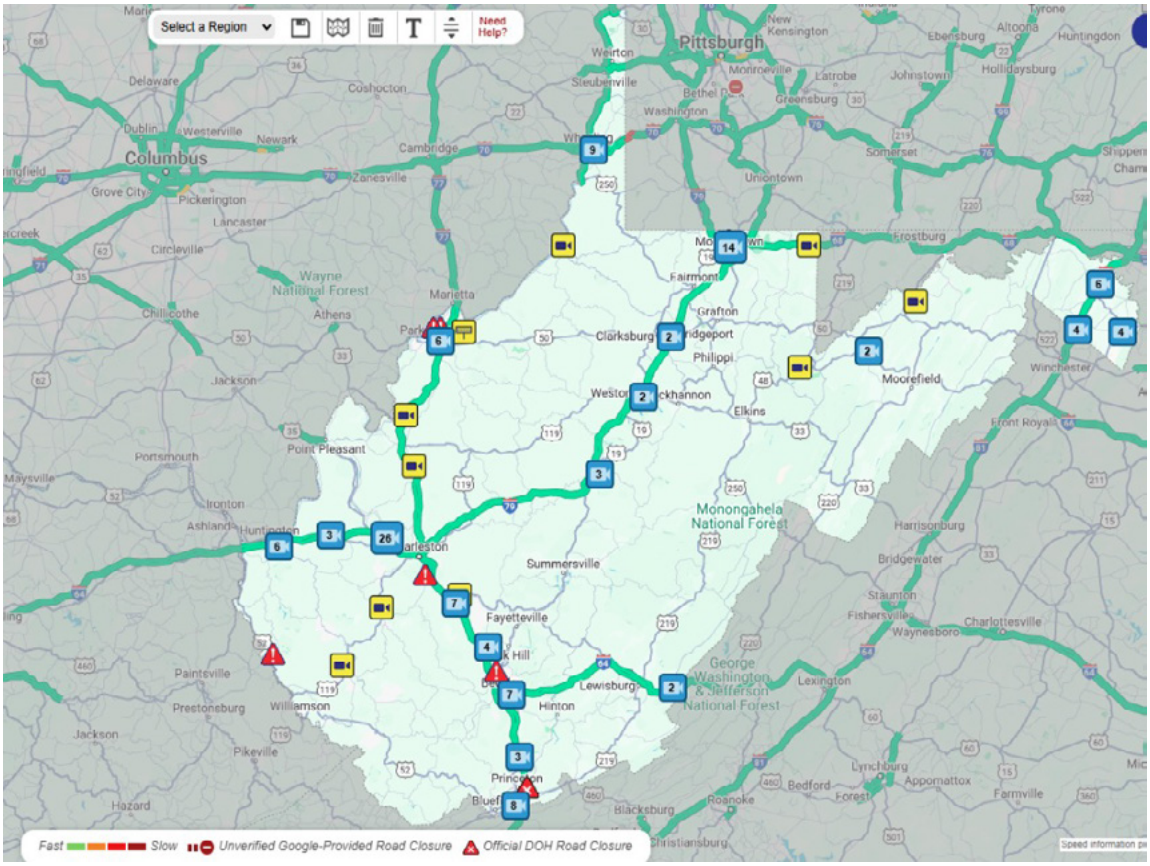
Impaired driving also remains a major contributor to severe crashes. In 2022, 60 fatalities involved alcohol-impaired drivers. To address impaired and distracted driving, Governor's Highway Safety Program (GHSP), National Highway Traffic Safety Administration (NHTSA), and law enforcement agencies implement high-visibility enforcement programs including "Drive Sober or Get Pulled Over" and "Put the Phone Away or Pay," supplemented by three statewide DUI mobilizations each year. WVDOT reinforces these campaigns through public outreach such as "Buckle Up and Phones Down" and "Click It or Ticket."

Vulnerable road users and workers also face elevated risks. In 2022, West Virginia experienced 26 pedestrian fatalities, 2 cyclist fatalities, and 12 work zone fatalities. This highlights the need for enhanced user

separation, access management, and multimodal safety improvements. These efforts align with the 2022–2026 West Virginia Strategic Highway Safety Plan, which sets a long-term goal of zero fatalities by 2050 and prioritizes corridor safety improvements and roadway departure countermeasures. While annual fatalities have declined from 304 in 2017 to 264 in 2022, the state's fatality rate remains well above national averages, underscoring the need for continued investment.

Another valuable tool for improving overall safety is the West Virginia 511 Traveler Information System. This system offers real-time updates on road conditions, traffic alerts, and weather-related hazards, helping drivers make informed decisions before and during their trips. By providing up-to-date information on road closures, accidents, and weather patterns, the 511 system helps reduce the likelihood of road departures and crashes. Furthermore, the system promotes safe driving practices by alerting drivers to potential risks, such as slippery roads or visibility issues, which are common in the mountainous regions of the state.

Figure 10: 511 Travel Conditions Interactive Map



Source: WV511

Figure 11: WV State Highway 4 along the Elk River after 2016 flood

Source: WVDOT

RESILIENCE AND INNOVATION

West Virginia is strengthening roadway resilience by shifting from reactive to proactive maintenance, emphasizing pavement preservation treatments such as chip seals and micro surfacing to extend pavement life and reduce long-term costs. In response to more frequent extreme-weather events, WVDOT has updated culvert sizing standards and is prioritizing proactive design as increasing precipitation, freeze–thaw cycles, and landslide-prone terrain continue to threaten roadway durability.

WVDOT has begun early evaluation of digital project delivery tools, including Building Information Modeling (BIM) and emerging asset data platforms. These tools have the potential to improve design coordination, reduce construction errors, and strengthen long-term asset management tracking.

Sustainability is also an emerging priority. Transportation contributes roughly 27% of statewide greenhouse gas emissions, and WVDOT is beginning to coordinate with FHWA on carbon-reduction strategies, EV charging deployment through the NEVI program, and efforts to improve long-term roadway and bridge resilience. WVDOT is also exploring lower-energy asphalt mixes, recycled materials, and other construction approaches that can reduce lifecycle emissions and enhance pavement durability. WVDOT research continues to highlight adapting infrastructure to natural disasters and improving system durability, forming the foundation for future sustainable practices.

West Virginia continues to participate in the Federal Highway Administration's Every Day Counts (EDC) initiative, which supports the adoption of innovative construction techniques and accelerated project

delivery. Through EDC and funding flexibility provided by grouped projects, the state has advanced the use of tools such as Public-Private Partnerships (P3) and Indefinite Delivery/Indefinite Quantity (ID/IQ) contracting. According to the 2022 TAMP and FHWA bridge data, these innovation and preservation strategies are beginning to show measurable outcomes: Poor-condition Interstate pavement has decreased, and the share of structurally deficient bridges has fallen over the past decade, demonstrating progress in system performance and asset condition.

Figure 12: Corridor H Construction

Source: WV Office of the Governor

RECOMMENDATIONS TO RAISE THE GRADE

- Allocate additional funding for preventive maintenance and rehabilitation of existing infrastructure to extend the lifespan of the road network and prevent expensive repairs later. Regular inspections and timely maintenance can reduce the occurrence of infrastructure failures and improve the reliability of the roads.
- Enhance focus on upgrading the state's transportation systems, particularly its aging highway system. West Virginia should adopt modern design standards and enhance roadways to accommodate growth.
- Implement Building Information Modeling (BIM) and other advanced technologies to enhance infrastructure planning, construction, and maintenance. Opportunities include expanding the use of data analytics, sensor technologies, and digital assistant platforms to support earlier detection of infrastructure problems and improve decision-making regarding repairs and upgrades.
- Further incorporate sustainability and resiliency into road infrastructure planning, design, and construction with consideration for environmental impacts, climate change, and long-term adaptability. This could include green infrastructure solutions such as road stormwater management and energy-efficient road construction.
- Ensure timely completion of Corridor H of the Appalachian Development Highway System. This will connect northwestern Virginia to central West Virginia and is anticipated to greatly enhance the economic development of West Virginia by creating jobs for residents while saving significant travel time for passenger vehicles and freight.

DEFINITIONS

VEHICLE MILES TRAVELED (VMT): The total number of miles traveled by all vehicles in a geographic area over a specific period of time. Used as a measure of travel demand and congestion.

PAVEMENT STRUCTURAL SECTION: The layers of materials (e.g., asphalt, concrete, gravel) that make up the surface of a roadway, designed to support traffic loads.

EROSION: The gradual wear of soil or rock, often caused by wind, water, or human activity, which can affect infrastructure like roads or bridges.

SUSTAINABILITY: The ability of infrastructure to endure and perform over the long term without causing undue harm to the environment, society, or economy.

CONSTRUCTABILITY: The ease and efficiency with which a design can be built, considering factors like materials, site conditions, and available technology.

ROADWAY DEPARTURE CRASH: A crash in which a vehicle crosses an edge line, centerline, leaves the roadway, or otherwise departs from the travel lane, often resulting in collisions with fixed objects, embankments, or drops.

PUBLIC-PRIVATE PARTNERSHIP (P3): Structured in multiple forms, P3s involve partnerships between the public and private sectors to share the risks and rewards of designing, constructing, financing, operating, and/or maintaining publicly-owned assets in order for projects to be completed earlier, on budget, and at an enhanced value-for-money to the public owner.

INDEFINITE DELIVERY/INDEFINITE QUANTITY (ID/IQ): The contract is awarded for an undetermined quantity of work over a specified period of time for smaller and maintenance projects.

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Schools

D-

GRADE COMPARISON

WV: D-

Nat'l: D+

Photo: Parkersburg High School, built in 1917 (Wood County Schools)

SCHOOLS

EXECUTIVE SUMMARY

The school infrastructure in West Virginia is underfunded and not improving, as nearly 85% of school infrastructure and outdoor facilities in West Virginia fall below modern building standards, and about 543 school facilities out of 637 are rated as poor or fair. The average funding that is received by the School Building Authority of West Virginia (SBA) is about $50 million per year, but the estimated statewide funding gap is about $300 million per year. Reported needs of $2.5 billion in the 2010-2020 Comprehensive Facilities Educational Plan (CEFP) have increased to $3.2 billion per the 2020-2030 CEFP. This amount has further increased due to a nearly 40% increase in construction costs. Overall, West Virginia's schools are in poor condition and do not have the necessary funding for infrastructure to become adequate.

Figure 1: Ridgeview Elementary in Raleigh County, WV

Source: ZMM

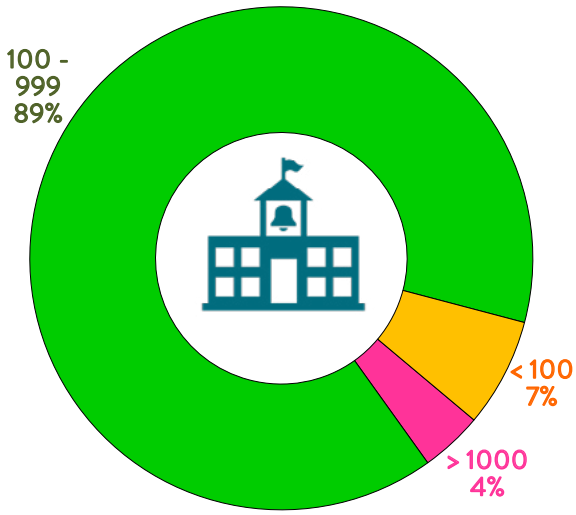
CONDITION & CAPACITY

The state's education landscape is comprised of 637 public school facilities accommodating 241,013 students during the 2024-2025 academic year, averaging approximately 378 students per school. There are a substantial number of rural schools in West Virginia that do not have nearly this many students, many with just over 100 students at each location. However, the average is distorted since only 25 of the larger schools in the state individually total over 1,000 students, bringing the average higher.

The land area for school facilities and infrastructure in West Virginia totals approximately 10,250 acres; only about 865 acres (37,645,420 square feet) though is used for school infrastructure, meaning that only 8.4% of the land area of schools in West Virginia is usable/maintained. On average, each school in West Virginia sits on roughly 16 acres of land, while the average school infrastructure area is only approximately 1.36 acres.

The average class size in West Virginia's public schools is 18.7 students per classroom. High schools in West Virginia have a slightly higher average class size of 24 students per classroom. About 85% of school infrastructure and outdoor facilities in West Virginia (543 out of 637 school facilities) are rated as either fair or poor. This is based on each school's Facility Condition Index (FCI), as reported by the School Building Authority. If the school has less than 10% FCI, that means it is in good condition. If it is greater than 10%, that means it is in fair or poor condition.

Figure 2: Number of students per WV Schools



Source: SBA

Figure 3: Mannington Middle School, the oldest school building in WV

Source: WBOY

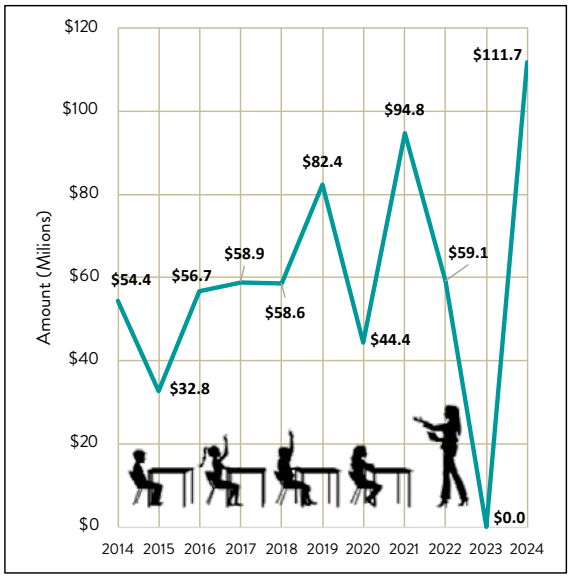
Figure 4: Fairmont Senior High School

Source: Creative Commons

To fight the continuing trend of declining enrollment, as well as aging buildings to poor conditions, West Virginia public school systems are turning to consolidations and closures. While Logan County is currently considering the closure of Verdunville Elementary, other counties also considering consolidation or having consolidations include Clay, Harrison, Kanawha, Lincoln, Marion, Randolph, Roane, Wayne, and Wetzel. Starting with the 2025-2026 school year, East Bank Middle School was closed and consolidated with DuPont Middle School in Kanawha County. In 2024, the Harrison County Board of Education merged Liberty High School into Robert C. Byrd High School, consolidated Washington Irving Middle School and Mountaineer Middle School into a new Liberty Middle School and relocated North View Elementary to the Mountaineer Middle School building.

About 80% of school buildings in West Virginia have promoted energy efficiency, reducing the amount of energy to heat, cool, and run appliances and electronics. Additionally, 35 schools in the state have been awarded an Energy Star certification for their energy-efficient operation.

Figure 5: WV SBA Funding 2014-2024



Source: SBA

Berkeley County Schools remains a state leader in energy efficiency. Since 2016 with their partnership with CMTA Energy Solutions, they have achieved a 47% reduction in electrical consumption and a 55% reduction

in natural gas use. According to the U.S. Department of Energy's ENERGY STAR® Certification Program, the district represents the largest percentage of K–12 facilities in West Virginia to earn a perfect ENERGY STAR score—with six of the seven top-performing schools statewide.

OPERATION AND MAINTENANCE, FUNDING AND FUTURE NEED

Each of West Virginia's 55-counties individual Board of Education faces the task of maintaining and operating schools in the state while keeping the students and staff safe. Some schools in each county need repairs to the existing buildings, while other schools need entirely new buildings. In addition to the need for school buildings, technology updates will also prove to be critical. For example, Wheeling Park High School's recent $22 million renovation transformed its original 1975 structure by creating a 13,000-square-foot Innovative Learning Center complete with a Maker Space, STEM lab, 3D printers, VR capabilities, green-room multimedia space, and flexible "huddle" break-out areas to support immersive, technology-rich learning.

Funding for school construction, renovations, and repair projects are allocated by the School Building Authority of West Virginia (SBA) from the West Virginia Legislature using general state revenue, lottery funds, and excess lottery funds. The SBA uses a comprehensive scoring system to evaluate and prioritize project proposals. Funding was awarded for the construction of 10 new schools and 13 school buildings to be renovated across 19 different counties in 2024. At a rate of 10 new schools and 13 building renovations a year, it would take 28 years to replace or renovate each school in the state. At this point, infrastructure such as roofing and HVAC systems would be functionally obsolete. The number of schools funded in 2024 was higher than average as there was no funding awarded in 2023 as a result of inflationary issues on previously funded projects.

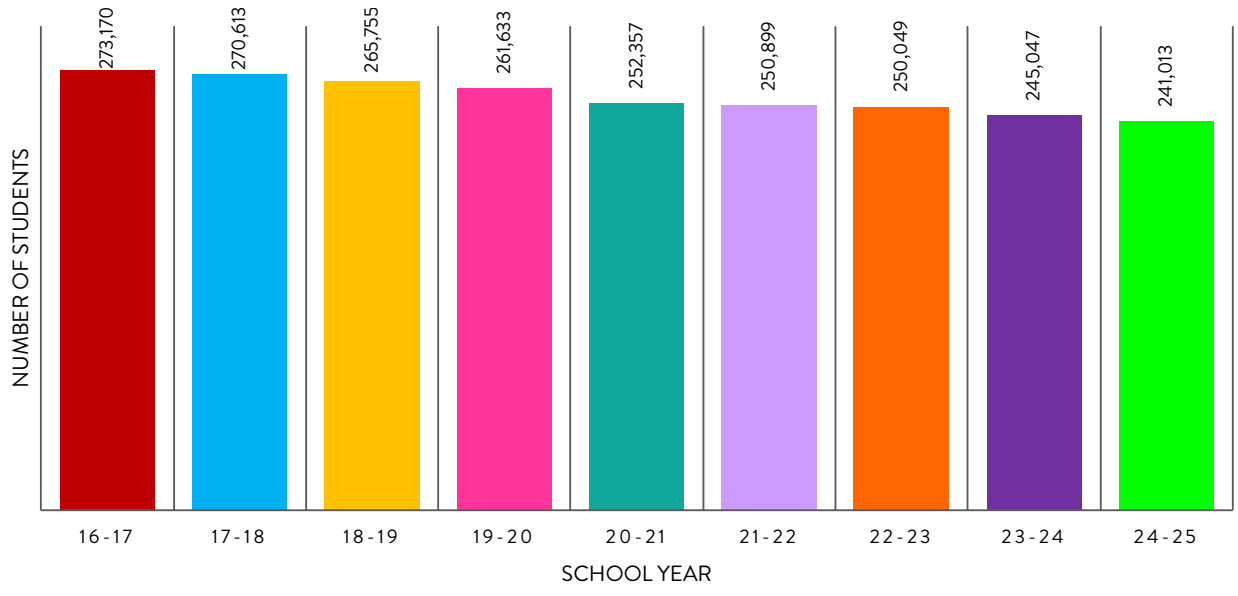
Figure 6: Wheeling-Park High School Interior

Source: McKinley Architects & Engineering

Counties in West Virginia completed a long-term facility plan for 2020 to 2030 (CEFP – Comprehensive Facilities Educational Plan). A long-term facility plan gives an estimate and a basis of the costs needed for the required educational facility improvements of schools in each county. The estimated cost to operate and maintain schools from 2020 to 2030 is just over $3.2 billion. The cost identified was prior to the increase in construction costs, which are now about 40% higher. The need now is predicted to be closer to $4.5 billion. The needed funding is increasing as this estimate for the 2010-2020 CEFP was $2.5 billion. The SBA awarded $234,339,086 for the year 2024 (awards were in December 2023 and April 2024), but this was due to minimal funding being awarded in 2023. In December 2024, $65 million was awarded. The average that is typically received for needs projects has been about $50 million per year. There is no indication that this number will increase significantly in the near future.

Based on the estimate to operate schools from the long-term facility plans, this would leave a funding gap of about $300 million per year without accounting for local funds. The school systems in the state are funded on a per-student basis, and the number of enrolled students is decreasing, and fluctuations in enrollment are more common. These fluctuations could be attributed to the Hope Scholarship, which has enabled alternative methods of education, along with new athletic transfer rules, in which students can now transfer to other schools one time to play sports without a penalty. Although this gives the opportunity for students to transfer and play for the best sports teams in the area, the transfer undermines funding for the schools with less successful athletic programs. The number of students in the state has decreased by nearly 33,000 students in the last ten years, from 273,170 students in 2016 to 241,013 students in 2025. With the number of students declining, schools receive less funding but still have the same number of facilities to maintain as before. Due to ongoing population loss, enrollment is expected to decline in the future.

Figure 7: WV School Enrollment 2016-2024



Source: SBA

Figure 8: Timberwood Elementary School

Source: Mercer County Schools

PUBLIC SAFETY, RESILIENCE, & INNOVATION

A State of Emergency is not something anyone wants to experience but for which everyone should prepare. Due to this, in the Emergency Operation Plan West Virginia plans to use the school facilities as shelters during emergency events. According to West Virginia's Emergency operation plan, the board of education is to coordinate with local school governments, school boards, and the West Virginia Voluntary Organization Active in Disaster (WVVOAD). This helps establish which school facilities will be used as a shelter site. With the facilities being used as a shelter, there must be a system established to ensure they have the necessary resources and an emergency generator ready. It is also up to each county to design their own emergency operations plan for what suits their needs, and this can determine whether to use the school as a shelter.

The use of school facilities in the emergency plan also allows for the use of school buses to transport people out of the area in an emergency evacuation, where the buildings themselves are planned as shelters.

According to the School Building Authority of West Virginia, since 2013 all new schools with fixed interior frames should use tempered safety glass, and all main entrance doors and frames should use 1/4" security glass infill. There is currently no plan for making these updates to the older schools in the state. For natural disasters, there is a crisis prevention and response plan. This plan states what action needs to be taken for all types of storms such as severe weather, tornados, winter storms, floods, and earthquakes.

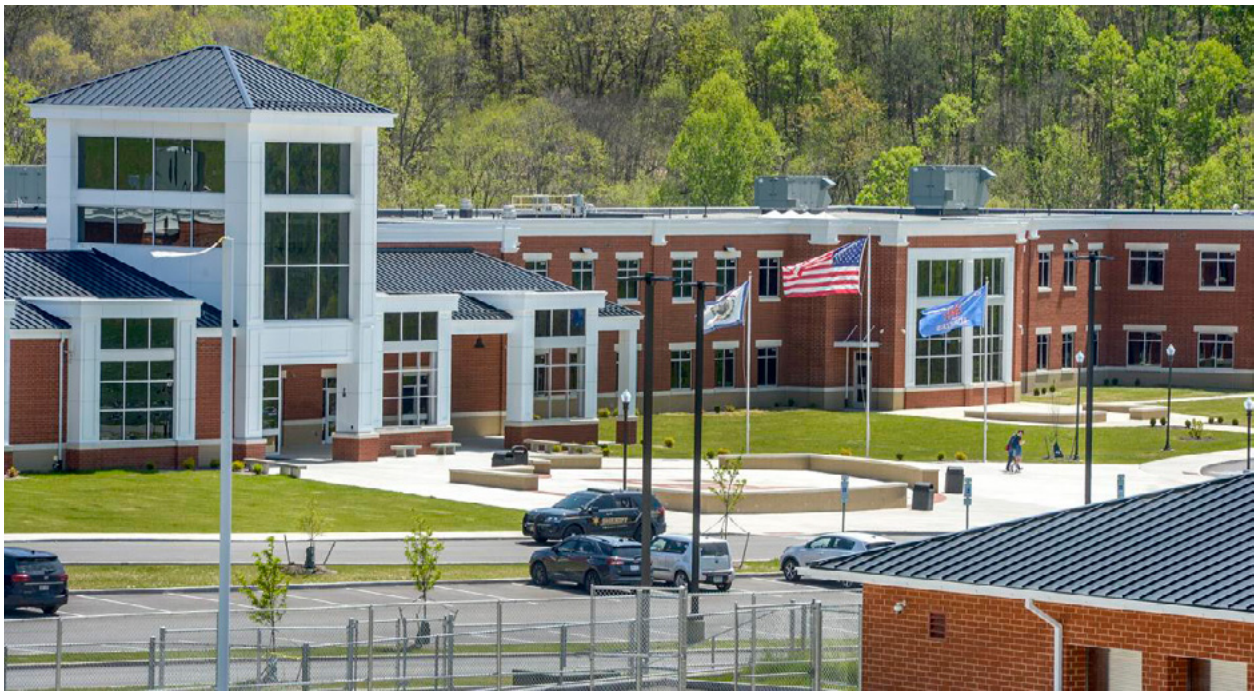
Flooding is the most impactful hazard in West Virginia, with each county on average experiencing 31 major floods in the past 15 years. Even though flooding proves immensely consequential, there is no resilience plan in place to prevent or protect schools from this type of event.

In West Virginia, there are no sustainability requirements for bids in design or construction of schools; however, there are stated policies on sustainability for schools in West Virginia. One of these policies is the West Virginia Sustainable Schools (WVSS) award program, which is a recognition program for schools that exemplify a commitment to sustainable practices in the facilities as well as integrating those practices into the curriculum and community. This is awarded via an application and council review process. In 2019, Junior Elementary School in Barbour County was named the winner of the West Virginia Sustainable Schools Award by the West Virginia Department of Education for its green and healthy biking program and received a $5,000 grant to launch a biking initiative for students and families.

Figure 9: Former Herbert Hoover High School flood damage from 2016.

Source: Charleston Gazette

Figure 10: Herbert Hoover High School, opened in August 2023. The school was reconstructed after flood damage in 2016.



Source: Charleston Gazette

Figure 11: Meadows Elementary School interior

Source: ZMM

West Virginia has also implemented a sustainability design process used for existing assets/infrastructure, such as planning for changing needs through flexible and sustainable facilities. For example, considering future infrastructure needs such as fiber optic wiring or additional water/wastewater requirements can simplify add-ons as enrollment grows. Utilizing energy-efficient systems like geothermal heating and cooling and building airtight spaces with the use of insulated concrete forms can help reduce the overall lifecycle cost of a building.

Management plans for sustainability have also been implemented in West Virginia schools. The Office of School Facilities guides county school systems in their effort to continually improve all aspects of educational programming, including physical facilities. The office is responsible for conducting annual facility reviews for all schools constructed or renovated with School Building Authority (SBA) funds, providing training on installed heating, ventilation, and air-conditioning systems. The office reviews and approves all ten-year Comprehensive Education Facilities Plans (CEFP) submitted by each county board. The office also annually reviews all updates to their CEFPs submitted by each county.

Starting in 2009 with the Spring Mills Primary School, the SBA funded a LEED (Leadership in Energy and Environmental Design) school for each cycle, creating an incentive for schools to prioritize innovation, sustainability, and resilience. Since funding for LEED projects has ended, schools are no longer incentivized to be designed with resiliency or sustainability in mind. As a result, schools must increasingly rely on emergency backup generators or the ability to localize HVAC systems.

Figure 12: Milton Elementary School in Cabell County, WV

Source: McKinley Architecture and Engineering

RECOMMENDATIONS TO RAISE THE GRADE

- Direct additional SBA funding to maintain school operations and safety. Schools throughout the state are in desperate need of repairs, and further resources are needed to facilitate both maintenance of existing facilities and new construction.
- Enhance resiliency by protecting existing schools at risk of flooding and ensuring new schools are not constructed within flood plains.
- Incorporate sustainability requirements into the bid process for construction and design of schools.
- Establish capital improvement programs for each school district and conduct regular inspections of the building structures to identify and address priority issues. As a result, this will allow schools to identify both current and future needs by accommodating necessary repairs and upgrades.
- Upgrade HVAC and electrical systems within existing schools to improve energy efficiency and reduce operating costs.
- Promote consolidation of schools that are not operating near capacity for improved efficiency. In turn, this would lower the number of buildings in operation and decrease costs to operate and maintain schools. Several schools have enrollment of under 200 students. Consolidation should be balanced with considerations including updated transportation times for students.

Photo: Parkersburg High School, built in 1917

Source: Wood County Schools

DEFINITIONS

SCHOOL BUILDING AUTHORITY OF WEST VIRGINIA (SBA) - created in 1989 by the West Virginia Legislature to address the educational planning and school construction needs of the state in an efficient and economical manner.

COMPREHENSIVE EDUCATIONAL FACILITIES PLAN (CEFP) – Plan created by every county in the state to show the condition of the schools within the county and the costs to bring the schools up to standard.

HVAC – heating, ventilation, and air conditioning

ENERGY EFFICIENCY - This means they have reduced the amount of energy to heat, cool, and run appliances and electronics.

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)- a program that sets standards used intentionally for the design, construction, and maintenance of environmentally sustainable buildings and infrastructure.

WEST VIRGINIA VOLUNTARY ORGANIZATIONS ACTIVE IN DISASTER (WVVOAD)- The VOAD's role is to bring organizations together and enable them to understand each other and work together during times of disaster preparedness, response, relief, and recovery.

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Solid Waste

C+

GRADE COMPARISON

WV: C+

Nat'l: C+

Photo: Recycling location in Morgantown Industrial Park (The Dominion Post)

SOLID WASTE

EXECUTIVE SUMMARY

In 2023, West Virginia's 16 operational landfills managed over two million tons of municipal solid waste (MSW). Residents generated around 5.7 pounds per person per day of waste, exceeding the 2018 national average of 4.9 pounds. Landfills are operating at nearly 54% of permitted monthly capacity, but the system faces recycling challenges due to a lack of asset management. Robust regulations and landfill expansions show progress, but infrastructure gaps in rural areas and flood risks persist. West Virginia's solid waste system needs enhanced recycling, asset management, and resilience to meet future demands. Access to recycling remains limited, particularly in rural wastesheds without drop-off sites or curbside service. Several counties rely on transfer stations for safe consolidation and collection, but the absence of Material Recovery Facilities constrains sorting and market access, keeping recycling tonnage low.

BACKGROUND

West Virginia's solid waste system includes 16 landfills, 19 transfer stations, and county/regional Solid Waste Authorities organized across eight wastesheds. The Solid Waste Management Board develops the state plan and supports Solid Waste Authorities. Since the 1980s, state rules aligned with Resource Conservation and Recovery Act have required liners, leachate collection, and groundwater monitoring; unlined facilities closed or were upgraded in the 1990s. The public–private mix provides statewide disposal capacity, but a declining population and rural access gaps shape current challenges and priorities.

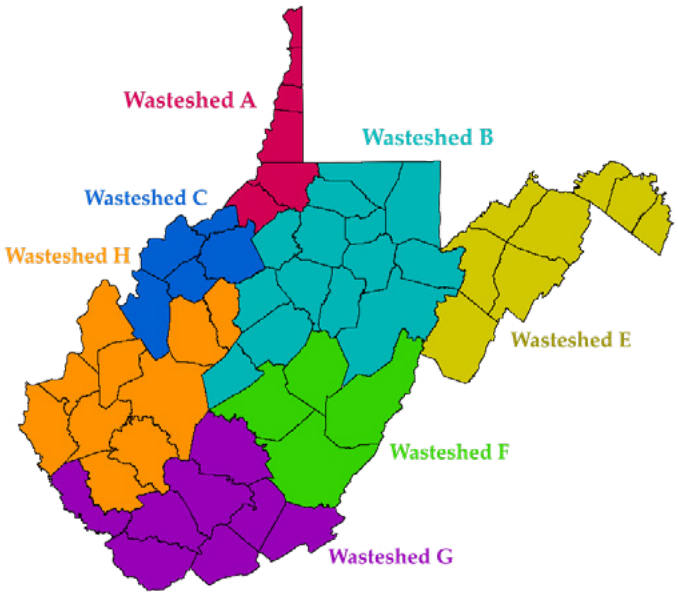
CONDITION & CAPACITY

West Virginia's solid waste infrastructure handles significant waste volumes while maintaining good physical condition, though ongoing challenges exist for recycling and rural facilities. Landfills in West Virginia are classified based on the amount of waste they handle:

Class A Facilities: These facilities handle between 10,000 and 30,000 tons of solid waste per month. If two or more Class B landfills are owned or operated by the same entity in the same county, and they collectively handle over 9,999 tons per month, they are considered a Class A facility.

Class B Facilities: These facilities handle less than 10,000 tons of waste per month. They tend to serve smaller areas or handle specialized types of waste, such as construction and demolition debris.

Figure 1: WV Wasteshed Map



Source: WV Solid Waste Board

Table 1: WV Solid Waste Location and Classification

Wasteshed	No.	Classification	Facility Name	County
A	1	A	Brooke/Valero	Brooke
	2	A	Short Creek	Ohio
	3	B	Wetzel	Wetzel
B	4	A	Meadowfill	Harrison
	5	B	S & S	Harrison
	6	B	Tucker County	Tucker
C	7	A	Northwestern	Wood
E	8	B	LCS	Berkeley
F	9	B	Greenbrier County	Greenbrier
	10	B	Pocahontas County	Pocahontas
G	12	A	Copper Ridge	McDowell
	13	B	HAM	Monroe
	14	B	Mercer County	Mercer
	15	A	Raleigh County	Raleigh
H	16	A	Charleston	Kanawha
	17	A	Disposal Services	Putnam
	18	A	Sycamore	Putnam

Source: WV Solid Waste Board

In 2023, the state's 16 landfills (8 Class A, 8 Class B) managed over 2 million tons of MSW, up from previous years. Approximately 10% of waste was from out-of-state, yielding an in-state total of around 1.84 million tons, or 5.7 pounds per person per day. This exceeds the 2018 national average of 4.9 pounds. Landfills operate at around 54% of monthly permitted capacity, with Wetzel County exceeding capacity due to mining waste (e.g., drilling mud).

The physical condition of West Virginia's solid waste facilities generally supports current capacity but reveals notable gaps. Class A and Class B landfills utilize composite liners and leachate collection systems. Additionally, they have mandatory treatment systems and groundwater monitoring to prevent groundwater contamination. The Landfill Closure Assistance Program (LCAP) is also in place and monitors 34 non-operational landfills for leachate and methane emissions. This cost approximately $8.5 million in FY 2020 and ensures long-term environmental protection.

Rural transfer stations and recycling facilities, particularly in Wastesheds F and G, show signs of deterioration due to limited maintenance budgets and staffing shortages. More than half of the state's landfills are undergoing or planning expansions, including major projects in Wastesheds A and C, to meet increasing demand. Despite these efforts, the absence of material recovery facilities (MRFs) and the ongoing challenges faced by local Solid Waste Authorities, such as Berkeley County's recycling drop-off sites, underscore persistent issues of low participation and outdated equipment.

Figure 2: WV Operational Landfills

Number	Facility Name
1	Brooke/Valero
2	Short Creek
3	Wetzel
4	Meadowfill
6	Tucker County
7	Northwestern
8	LCS
9	Greenbrier County
11	Pocahontas County
12	Copper Ridge
13	HAM
14	Mercer County
15	Raleigh County
16	Charleston
17	Disposal Services
18	Sycamore

Source: WV Solid Waste Board

Figure 3: Waste Management trucks exiting the former Charleston landfill

Source: Charleston Gazette

OPERATION & MAINTENANCE, FUNDING & FUTURE NEED

West Virginia's solid waste system is well-regulated and financially stable, but operational challenges, maintenance gaps, and future needs all require attention. The Solid Waste Management Board (SWMB), coordinating with the Department of Environmental Protection (DEP), oversees landfill operations to ensure compliance with state and federal standards, while local SWAs implement waste management plans, including source reduction and recycling initiatives. The LCAP supports 30-year post-closure monitoring, managing leachate and methane to prevent environmental hazards. However, operational reliability is sometimes uneven, particularly in rural areas.

Key operational and maintenance challenges exist for the state. Facilities like Wetzel County are upgrading to handle overcapacity, incorporating new liners and leachate systems, but such efforts are not widespread. Only 25% of utilities employ asset management practices, leading to inconsistent maintenance schedules and equipment downtime in rural transfer stations (e.g., Wastesheds F and G). Rural SWAs, such as those in Webster County, rely on inconsistent inmate labor for operations, reducing efficiency and delaying repairs.

While operational challenges are present, the system is financially supported by multiple revenue streams. Tipping fees average $47.27/ton, below the 2023 national average of $56.80. While there is no reliable way to track statewide recycling , in 2021, local SWAs reported a total of 1.2 million in revenue from selling recyclables. This is nearly double what was reported in 2019. There is also a mandatory assessment fee of $8.25 per ton of disposed waste. This fee generated over 17 million dollars in 2022 and funds support environmental agencies, LCAP, and SWAs. Waste management employee wages average $978 per week, outpacing state retail jobs at $614 per week, supporting a skilled workforce. However, a declining population limits the workforce and tax base.

West Virginia faces several pressing needs to address emerging challenges in solid waste management. Rising waste generation and contaminants such as PFAS are creating demand for landfill expansions and advanced treatment systems capable of managing chemical leachate. The continued absence of MRFs highlights the need for expanded drop-off infrastructure in rural Wastesheds F, G, and H. With the lack of reporting systems for recycling, it is difficult to address possible areas of improvement. Public engagement remains limited, underscoring the need for broader educational efforts to improve recycling participation and reduce landfill dependency. A comprehensive statewide asset management plan is also needed to guide maintenance and infrastructure upgrades. Additionally, waste-to-energy initiatives have not yet been evaluated or implemented within the state, leaving a gap in potential long-term waste diversion strategies. IIJA grant programs help modernize solid waste infrastructure to address long-term capacity needs through supporting landfill upgrades, transfer station improvements, recycling expansion and resilience measure that many local systems cannot afford on their own. Leveraging IIJA funding now will reduce future costs and strengthen West Virginia's ability to meet growing solid waste management demands.

PUBLIC SAFETY, INNOVATION & RESILIENCE

West Virginia's solid waste system prioritizes safety through stringent regulations, albeit with room for growth, and faces resilience challenges from flooding. The DEP and SWMB enforce liners, leachate systems, and groundwater monitoring, minimizing contamination risks. The LCAP ensures 30-year monitoring of closed landfills, addressing methane and leachate leaks. Cleanup programs, supported by SWAs in areas like Webster County, reduce illegal open dumping, particularly in rural regions. Landfills are strategically sited to avoid flood-prone areas, and state laws aid in enhancing public safety.

West Virginia's innovation and resilience efforts in solid waste management reflect both progress and ongoing challenges. Methane gas collection for energy has been implemented at select facilities, such as Meadowfill, generating small-scale power, and demonstrating potential for waste-to-energy conversion. Composting programs, such as Monongalia County's, help divert organic waste but remain limited in reach and capacity. Recent House legislation supports the development of advanced recycling technologies, such as chemical recycling for plastics, though widespread adoption remains slow due to high costs and insufficient infrastructure. Similarly, the A. James Manchin Rehabilitation Environmental Action Plan promotes community-based waste reduction initiatives, yet the absence of material recovery facilities and a statewide recycling tracking system continues to impede measurable progress.

Figure 4: Recycling center in Parkersburg, WV

Source: wtap

Sustainability planning remains inconsistent, with no formal frameworks like Envision adopted at the state level. However, some local Solid Waste Authorities, particularly in Wasteshed A, are beginning to develop sustainability goals. Environmental resilience remains a key concern, as periodic flooding in Wastesheds C and H frequently disrupt transfer station operations. Debris from construction materials and household waste often clogs systems, causing multi-day collection delays. Although inter-agency partnerships with the West Virginia Department of Transportation's Division of Highways provide vital equipment and manpower for debris removal, comprehensive contingency plans for rapid recovery remain underdeveloped, leaving rural facilities particularly vulnerable to recurring flood impacts.

Figure 5: New Charleston landfill transfer station, 2025

Source: Charleston Gazette

RECOMMENDATIONS TO RAISE THE GRADE

- Expand Recycling Infrastructure: Develop Material Recovery Facilities (MRFs) and increase drop-off sites in rural wastesheds like F, G, and H, and implement a reliable reporting system to begin tracking recycling rates.
- Enhance Funding Mechanisms: Infrastructure Investment and Jobs Act (IIJA) grants expire in 2026; therefore, it is essential to secure federal funding for recycling and infrastructure upgrades, while exploring public-private partnerships to diversify revenue streams and offset the impacts of a declining population.
- Implement Comprehensive Asset Management: Adopt statewide asset management plans to track and maintain landfills, transfer stations, and recycling facilities, addressing the current low adoption rate of 25% among utilities and prioritizing rural areas with deterioration issues.
- Strengthen Resilience Planning: Create detailed disaster debris management plans, focusing on flood-prone wastesheds C and H, including inter-agency protocols with the WV Department of Transportation Division of Highways to minimize operational disruptions and improve rapid recovery.
- Promote Innovation and Technology Adoption: Expand methane capture for energy production, composting initiatives, and waste-to-energy programs while establishing a statewide recycling tracking system and advancing chemical recycling to foster sustainability.

Photo: Recycling location in Morgantown Industrial Park

Source: The Dominion Post

DEFINITIONS

- IIJA (INFRASTRUCTURE INVESTMENT AND JOBS ACT): Federal legislation providing grants for infrastructure improvements, including solid waste and recycling projects, to enhance capacity and sustainability.
- LANDFILL: A landfill is a well-engineered and managed facility for the disposal of solid waste, located, designed, operated, and monitored to ensure compliance with regulations. Specifically, a municipal solid waste landfill (MSWLF) is a discrete area of land or excavation that receives household waste and other non-hazardous materials for burial.
- LCAP (LANDFILL CLOSURE ASSISTANCE PROGRAM): A state program that funds monitoring and maintenance of closed landfills for 30 years, including leachate and methane management, to prevent environmental hazards.
- LEACHATE SYSTEM: A leachate system, or leachate collection system, is designed to collect and remove leachate—a liquid formed when rainwater filters through waste in a landfill, extracting chemicals or constituents from the buried materials. It typically includes pipes, liners, and treatment mechanisms to prevent groundwater contamination by managing this contaminated liquid.
- PFAS (PER- AND POLYFLUOROALKYL SUBSTANCES): Persistent chemicals in consumer products that can contaminate leachate and groundwater, requiring specialized treatment in waste management systems.
- REAP (A. JAMES MANCHIN REHABILITATION ENVIRONMENTAL ACTION PLAN): A West Virginia initiative promoting waste reduction, reuse, recycling, and environmental cleanup, including grants for local programs.
- SWA (SOLID WASTE AUTHORITY): Local county or regional public agencies responsible for implementing waste management plans, including recycling and litter control, under state oversight.
- SWMB (SOLID WASTE MANAGEMENT BOARD): The state-level board that develops West Virginia's solid waste plan, designates wastesheds, and supports local SWAs with resources and regulations.
- TRANSFER STATION: An intermediate point where waste from smaller trucks is consolidated into larger loads to optimize transportation and reduce costs.
- WASTESHED: A wasteshed is an area of the state that shares a common solid waste disposal system or is designated as an appropriate area for developing a common recycling system. It functions similarly to a watershed but for waste management, grouping regions (e.g., counties) for efficient planning and resource allocation in solid waste handling.

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Photo: WV Division of Highways Culvert Maintenance (WVDOH)

STORMWATER

EXECUTIVE SUMMARY

West Virginia's outdated stormwater infrastructure continuously handles increasing amounts of precipitation. A substantial amount of the infrastructure is approximately 80 years old, and the state is experiencing a decreasing vegetation problem; these issues are putting excessive strain on already neglected systems. Compounding the problem, these systems have little to no record of installation or maintenance, making the condition virtually unknown. While funding for the development and improvement of these systems has slowly increased, with approximately $49 million in federal funds being directed to the state in 2025, there are few reliable funding sources for stormwater. These funds are divided amongst other water-related infrastructure, so this oftentimes leaves stormwater projects underfunded. While some larger areas within the state are beginning to institute more updated and effective technologies, most rural areas continue to operate with either obsolete or non-existent infrastructure. As a result, there are dangerous amounts of flooding each year with thousands being impacted by costly amounts of damage.

Figure 1: June 2025 flooding in Fairmont, WV

Source: WV News

CAPACITY

West Virginia is divided into 55 stormwater districts with 53 recorded Municipal Separate Storm Sewer Systems (MS4) with registration numbers located in various areas throughout said districts. The MS4s within the state are all classified as "small," compared to the rest of the country which has approximately 500 "large" MS4s. Large MS4 systems are designed for areas with a population greater than 250,000 people; therefore, this explains why West Virginia's MS4s are limited to the "small" classification. For those 53 MS4s, the West Virginia Department of Environmental Protection (WVDEP) says that the level of managerial and financial commitment that is required to operate and maintain these is often not met. This results in the demand not being kept up, and flooding has more devastating impacts.

The state has seen an increase in annual precipitation since the first half of the 20th century, with experts predicting this trend to continue during the coming centuries. The state is also seeing a reduction in its natural vegetation, which helps to absorb approximately 90% of fallen precipitation. The remaining 10% is handled by stormwater infrastructure. It is believed that during this century, precipitation runoff can intensify to a level that the current stormwater infrastructure cannot accommodate.

Figure 2: Wheeling, WV 2024

Source: WV Public Broadcasting

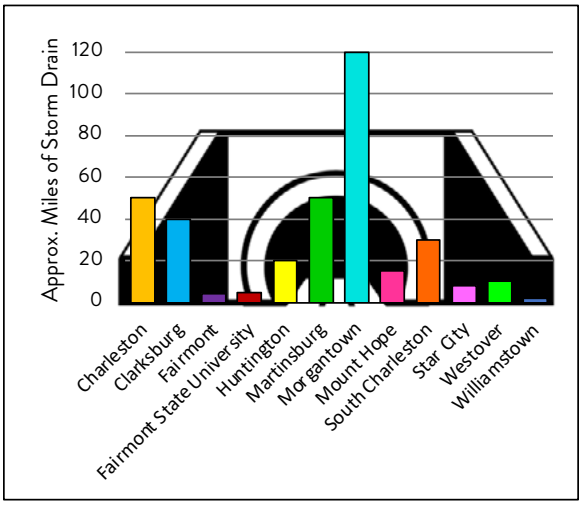
CONDITION

Stormwater infrastructure in West Virginia consists of ponds, wetlands, swales, storm drains, pipes, and ditches. Some of the combined sewer systems that collect storm and wastewater were placed in the mid-1800s, and some are still being utilized today. Separate storm drainage systems began to be implemented around the 1950s when the existing sewer systems needed to be repaired. Separate storm drain systems were employed throughout the various districts when sewer restoration was needed; however, record of the condition of systems across the state is unavailable. For areas that utilize them, MS4 permitting has mitigated some of this issue by requiring records of new construction that impact more than an acre of disturbance, allowing for best practice standards.

Figure 3: WV DOH maintenance

Source: WVDOH

Figure 4: Miles of known storm drain in WV



Source: MS4 Permits

Stormwater infrastructure within the state is comprised of clay, PVC, corrugated metal, and wood. On average, the estimated age of this infrastructure is 80 years old. Older infrastructure focused on peak discharge rates when stormwater management standards were less developed. These older methods create challenges today with overloaded downstream stormwater management. Newer developments tend to utilize technology that focuses on treating stormwater and improving the health of the nearby waterways. For the most recent assessment of stormwater runoff in West Virginia, of the 63% of rivers and streams evaluated, approximately 20,515 miles were impaired. Of the 68% of lakes/reservoirs/ponds evaluated, approximately 15,241 acres of those were also compromised. To help combat this, and many other stormwater issues, capital improvement plans have been put in place for several MS4s while several studies and surveys are ongoing. An example of the mitigation process to reduce impairment to existing waterways is the use of pretreatment basins to reduce sediment and contaminants that discharge into the existing waterways.

FUNDING

Funding for state stormwater infrastructure comes from multiple sources; these include the Clean Water State Revolving Fund (CWSRF) program, which receives and distributes money from both the Environmental Protection Agency (EPA) and the State of West Virginia. The funds from the state are comprised of property taxes imposed on citizens, system development charges, special assessment districts, similar to Tax Increment Financing (TIF), and environmental tax funding, also known as green taxes. User fees are also utilized and considered one of the most reliable forms of income, with the average monthly user fee in West Virginia being $5.14. Emergency funding is occasionally utilized within the state. For example, when major flooding occurred in central West Virginia in the summer of 2016, relief aid was brought in from organizations such as the Community Development Block Grant Mitigation Program (CDBG-MIT), which is funded by the U.S. Department of Housing and Urban Developments (HUD). Another critical funding source is the Water Resources Development Act (WRDA), which authorizes U.S. Army Corps of Engineers water resources projects. Since 2016, the law has emphasized nature-based solutions in the development of water resources projects, including those fighting against storm damage, and flood-risk management.

Funding is needed for the advancement of both gray infrastructure (pipes, culverts, ditches, retention ponds, and swales) and Green Infrastructure (GI), which is intended to mimic more naturalized and undeveloped conditions. In October 2024, the EPA announced that the state will receive approximately $49 million in 2025 for water/stormwater infrastructure improvements from the Infrastructure Investment and Jobs Act (IIJA). Funding was strategically directed toward communities identified as underserved or facing substantial infrastructure deficiencies. However, at the state level, it is challenging and somewhat complicated for projects to receive the funding they require. State funds are being distributed to the 55 stormwater districts for fiscal year 2022 based on financial assistance need, project readiness, contact with loan recipients, allocation of funds among projects, development of payment schedules, activity, and the estimate of expenditures that will occur with each project.

Figure 5: Fairmont, WV rain garden

Source: City of Fairmont

Figure 6: Brooke County ditch repair

Source: WVDOH

FUTURE NEED

West Virginia's population has been declining at a rate of about 1.3% between April 1, 2020, and July 1, 2023. As a result, fewer people are contributing to the stormwater revenue fund via service fees and property taxes. Given the reliance on general funds for stormwater revenue, continued population decline could result in dangerously inadequate infrastructure funding in the future. In March 2025, the WV State Legislature introduced a bill to fund $250 million for a flood resilience initiative, however this bill died soon after. Later, in July 2025, a $6 million federal and state funded study was commissioned for two major river basins in WV: Guyandotte and Kanawha River. Both studies are expected to take at least three years, with no guarantee for funding available for any potential projects identified.

Figure 7: Rain gardens in Berkeley Springs, WV

Source: Female Solo Trek Blog

As of 2025, there are millions of dollars of stormwater projects that require funding; prioritization at the state level is therefore key to bridging the funding gap. The Clean Water State Revolving Fund (CWSRF) has approximately $159 Million in funding money available for projects in West Virginia based on their Intended Use Plan FY 2026. However, although they are one of the systems in need of the most help, historically, stormwater systems are one of the last ones to receive funding, with other systems such as wastewater treatment and conveyance systems typically receiving funding first.

Figure 8: June 2025 flooding in Marion County

Source: WBOY

OPERATION & MAINTENANCE

Stormwater infrastructure within the state is primarily under municipal jurisdiction and control. However, ownership responsibility can also be seen falling on the Department of Transportation (DOT), large businesses/organizations and campuses. Information regarding the miles of storm drains within the state is publicly available on only 12 of the state's 53 MS4 permittees. Those 12 permittees have a total of 356 miles of known existing storm drains.

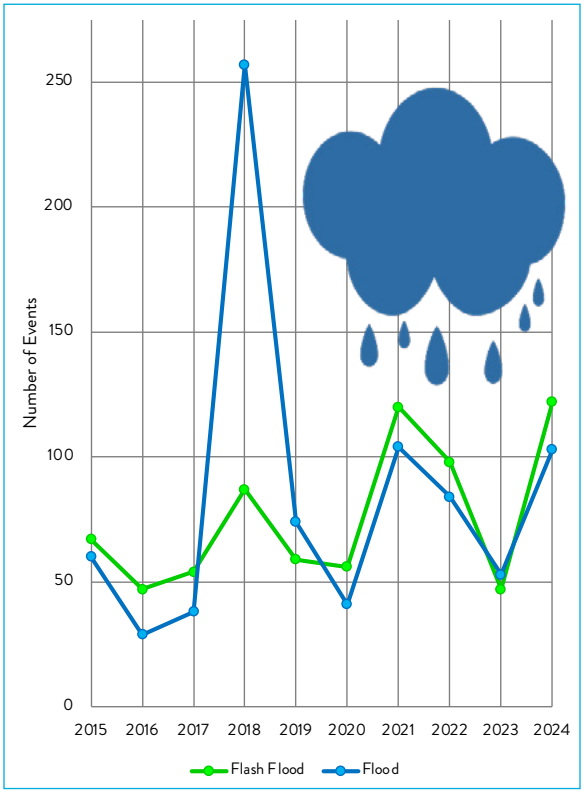
Responsibility for stormwater system maintenance lies with local municipalities, which must provide and procure the resources required for ongoing operations and maintenance. Larger cities within the state are normally able to perform their own routine maintenance. However, smaller towns typically do not have access to the labor force and equipment resources that infrastructure maintenance can require. As a result, local governments oftentimes hire contractors to perform these jobs, adding to the total costs associated with the infrastructure.

Private-sector owners play a significant role in state stormwater. They are often tasked with several responsibilities such as providing flexibility, providing access to advanced technology, addressing dynamic community development trends and goals, and encouraging long-term financial and regulatory commitments for integrating green infrastructure into stormwater management programs. An example of Green Infrastructure is the use of rain gardens, used throughout the state in cities such as Fairmont and Berkeley Springs and bio retention swales, used in Martinsburg and Morgantown.

PUBLIC SAFETY & RESILIENCE

Improper or lack of maintenance and replacement of infrastructure can greatly impact public safety. Sinkholes, flash floods, and collapsed roadways can occur from undersized and failing infrastructure, which can cause significant property damage, dangerous situations for the public, and in some cases, loss of life. Within the last few years, West Virginia has seen substantial flooding, including several 100-year floods located in the northern portion of the state. Most notably, a 1,000-year flood occurred in 2016 that ravaged the central portion of the state, causing over $1 billion in damage and 23 deaths. In 2025, there were multiple major flooding events. The first one occurred on February 15th and 16th in southern West Virginia affecting McDowell, Mercer, Mingo and Wyoming counties, leading to three confirmed deaths. Again, on June 14th and 15th, 2025, heavy flooding occurred in Ohio and Marion Counties which resulted in 9 deaths. State and federal funding was allocated to assist those affected from these flooding events.

Figure 8: WV Flood Events 2015-2024



Source: NOAA

Figure 9: Sissonville, WV sinkhole under the road. The WVDOH was able to repair and reopen the road in just over 6 hours.

Source: WVDOH

Improper or neglected infrastructure maintenance can lead to roadway collapses, the most notable of which have been seen in Morgantown, as well as Parkersburg. In response to these recent natural disasters and to improve resiliency, many MS4s, the Division of Natural Resources (DNR), and the Environmental Protection Agency (EPA) have been conducting regional studies, advancing Geographic Information System (GIS) and online mapping, (which helps find areas that are ideal for stream mitigation and wetlands), making improvement plans to better harvest runoff, and even advocating for increased funding towards stormwater improvements

Not only can failing infrastructure exacerbate flash flooding issues, but it can also produce sinkholes. Some of the more significant sinkholes occurred in Beckley and Parkersburg, as recently as December 2020. These result in expensive reactive costs and the potential shutdown of roads and utilities.

Figure 10: Tree boxes and bioretention cells in downtown Berkeley Springs, WV

Source: Chesapeake Bay Program

INNOVATION

Most stormwater systems in West Virginia are reaching, or have surpassed their life expectancies, and as a result, flooding has become all too common. To combat this flooding, a network of decentralized stormwater management practices, called Green Infrastructure (GI), are slowly beginning to be implemented throughout the state. For example, in 2012, the Town of Berkley Springs experienced a storm that produced six inches of rain in about three hours. Based on the National Oceanic and Atmosphere Administration (NOAA) prediction models, a storm in this area of West Virginia producing 6" of rainfall over a short 3-hour period is classified as a 1,000-Year return frequency; in other words, there is a 0.1% chance of a storm of this magnitude to occur in any given year. As a result, the city's stormwater infrastructure was overwhelmed, causing severe flooding downtown that forced the closure of many businesses. From there, the city began to look for cost-effective

Figure 11: Duckbill check-valves in Huntington, WV

Source: Red Valve

solutions to prevent this from happening again. By 2018, the city was able to implement some GI technology to solve this issue. The GI that was installed implemented pervious concrete, which allows water to pass through the road into the ground, tree boxes and bioretention cells, which utilized highly porous soil to absorb more water at a faster rate, and a rain garden at the historic Greenway Cemetery, which utilized native trees and plants to absorb stormwater.

Projects are being introduced by using advanced technology that improves traditional infrastructure. For example, in 2018 the Huntington Sanitary Board introduced the use of "duckbill check valves." These special valves are designed to allow stormwater to flow through the outfall pipe valve while also preventing water from the Guyandotte and Ohio rivers from backing up into the system. The use of these valves not only saved the city approximately $500,000 but also turned out to be a more effective solution to the initial problem. This is a good example of how infrastructure investments provide a good return on investment.

Figure 12: Sinkhole in Hinton, WV

Source: WV Public Broadcasting

RECOMMENDATIONS TO RAISE THE GRADE

- Offer resources and financial incentives to localities assisting them with establishing their own MS4s.
- Encourage all current MS4 permittees to complete the Stormwater Management Program Site Registration Form for the state to accurately track stormwater infrastructure.
- Develop a comprehensive education campaign on the true costs, savings opportunities, risks-reduction benefits associated with stormwater infrastructure improvements.
- Implement green infrastructure measures, such rain gardens and bioretention swales, as a cost-effective strategy to manage stormwater runoff and reduce pollution.
- Develop and utilize GIS programs to monitor and perform detailed inspections of stormwater systems to better determine the current condition and capacity of the infrastructure maximizing the effectiveness of dollars invested.
- State regulators, in coordination with state and local partners, should work to identify and dedicate funding sources specifically targeted to stormwater system improvements and projects.

Photo: June 2025 flooding in Fairmont, WV

Source: WV News

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GRADE COMPARISON

WV: D

Nat'l: D

Photo: Potomac Valley Transit Authority

TRANSIT

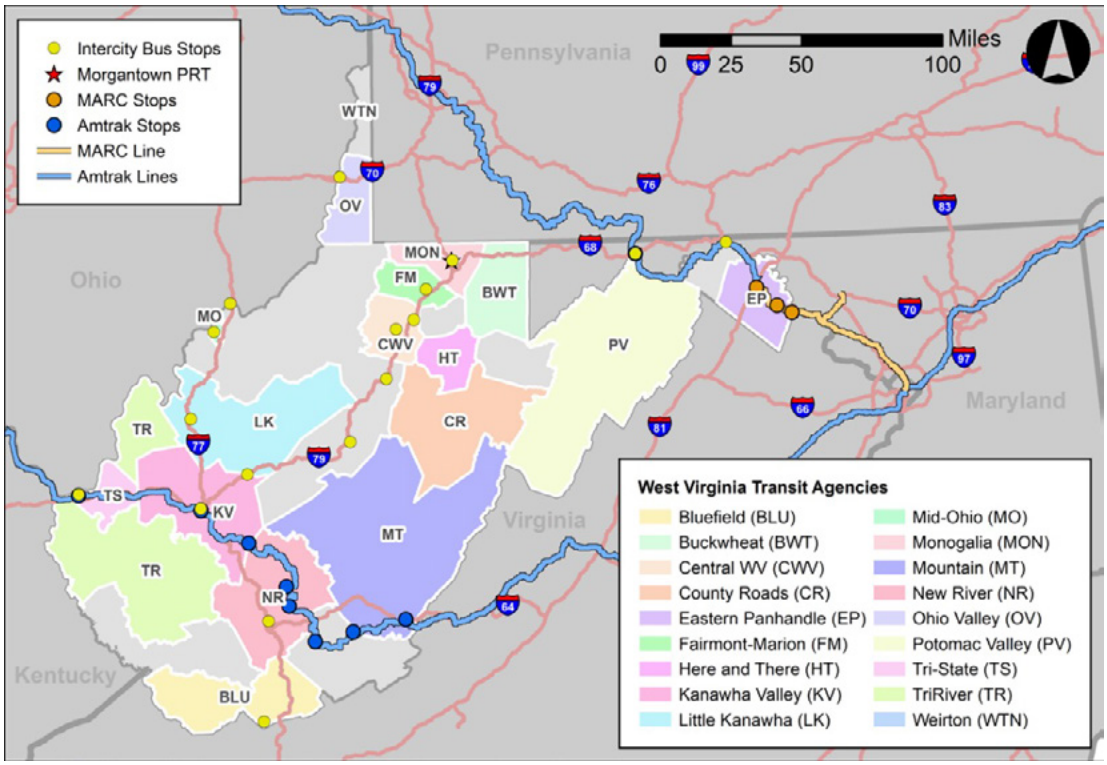
EXECUTIVE SUMMARY

West Virginia residents and visitors rely on public transportation to access work, education, medical facilities, shopping, and recreational activities. The state's system consists of 18 transit providers (eight urban and ten rural), most of which operate as privately owned authorities. The system faces significant challenges in funding and coverage. While federal grants provide the majority of funds, state-level financial support is exceptionally low. According to 2022 data, West Virginia's state funding for transit was $1.28 per capita, ranking 37th in the nation. This creates a critical structural problem: the inability to provide the required non-federal match for federal grants. This shortfall jeopardizes the state's ability to fully leverage the $195 million in federal transit funds allocated by the Infrastructure Investment and Jobs Act (IIJA). Overall, West Virginia's transit system is defined by a critical funding gap that prevents it from meeting state-of-good-repair needs, expanding coverage, and maximizing a historic influx of federal investment.

Figure 1: Kanawha Valley Regional Transit Authority

Source: KVRTA

Figure 2: Summary of the statewide public transportation system



Source: WVDOT

CONDITION & CAPACITY

West Virginia offers bus, rail, and demand-response modes of transportation. The state has eight urban and ten rural transit providers, most of which operate as privately owned authorities. The most recent addition has been service to Clay county by the Mountain Transit Authority. Only 58% of the state's 55 counties had access to public transit opportunities in 2019. As of 2025, about 38 counties have bus service with many routes only operating a few days per week.

In 2019, 404 vehicles were operated at enabling roughly 7.2 million passenger trips during peak service hours. During COVID-19 the passenger trips decreased by approximately 50%. Since COVID-19, the passenger trips have steadily increased, however, the passenger trips still lag behing the pre-COVID-19 passenger trips by almost 20%.A unique guided-rail Personal Rapid Transit (PRT) system serves West Virginia University and Morgantown. Since its debut in 1975, the PRT has carried over 100 million passenger trips and now averages about 12,000 riders per day during the school year.

In 2023, the fleet of buses, mini-buses, vans, and support vehicles was approximately 614 with one vehicle being in service for 30 years, 199 of these were buses. Most of the fleet is less than ten years old and is in adequate to good condition. The condition of the fleet changes daily as the vehicle miles continue to increase. West Virginia maintains a Transit Asset Management Plan (TAMP), which is a document that guides the state's transit organizations in operating, maintaining, upgrading, and replacing transit capital assets throughout their lifecycles. This document directs West Virginia transit providers on how to efficiently spend funding.

One of the persistent challenges for transit agencies is identifying and meeting the highly specific mobility needs of all residents, particularly seniors, individuals with disabilities, and those requiring transport to healthcare. The most detailed knowledge about these "last mile" service gaps oftentimes resides with local stakeholders.

Figure 3: WVU PRT

Source: WVU eNews

For example, West Virginia's own Section 5310 Program (Enhanced Mobility of Seniors and Individuals with Disabilities) already requires applicants to seek letters of support from "doctor's offices, government agencies, and members of the community." This highlights a formal recognition that community groups, healthcare providers, and senior centers possess on-the-ground insight that is not always captured in conventional transit ridership data. This information gap presents a clear and critical opportunity for greater, more proactive collaboration between transit agencies and these local organizations.

As the state's urban and suburban areas continue to grow, there is another critical need to align transportation infrastructure with new development. While West Virginia State Code (§8A-3-4) mandates that a community's Comprehensive Plan must include a transportation component that is "consistent with the land use component." The integration of this remains a significant practical challenge.

Land-use planning, which is controlled at the local level, and regional transit planning have historically operated in separate silos. This can result in new residential or commercial developments that are auto centric by design, lacking the density or pedestrian connectivity to support efficient bus service. This disconnect makes it difficult and costly to retrofit transit services later-locking in patterns of congestion. Strengthening the practical application of the state's existing land-use mandate is therefore essential for sustainable growth.

Figure 4: CENTRA Buses

Source: WV News

OPERATION & MAINTENANCE, FUNDING & FUTURE NEED

Operation and maintenance (O&M) are crucial for ensuring that West Virginia's transit systems run safely and efficiently. These responsibilities, managed by the state's individual transit agencies, include maintaining facilities, vehicles, and supporting systems.

Similar to transit agencies across the country, West Virginia depends on a mix of federal, state, local, and farebox revenues. The funding model itself presents a significant structural challenge. While the U.S. Department of Transportation (DOT) provides most of the funding, state-level financial support is exceptionally low. According to 2022 data from AASHTO, West Virginia's state funding for transit was $2.26 million, or just $1.28 per capita, ranking 37th out of 50 states.

Figure 5: Mountain Line Transit Authority

Source: Mountain Line Transit Authority

This low level of state contribution, which the WVDOT notes is approximately $3 million annually from General Revenue funds, creates a critical problem- the inability to provide the required non-federal match for federal grants. With the influx of new federal money from the Infrastructure Investment and Jobs Act (IIJA) - which is expected to provide more than $195 million to WV transit over five years - this shortfall becomes even more acute. Many West Virginia agencies, particularly in rural areas, struggle to secure the local or state match needed to draw down these federal dollars. As a result, millions of potential aids go unclaimed and jeopardize the long-term sustainability and state of good repair for the system.

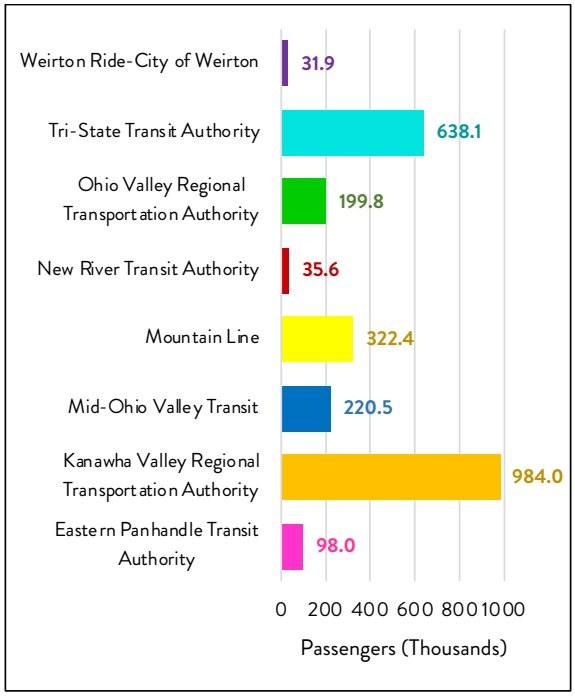
In February of 2022, a $13.8 million investment was announced from the IIJA for public transit programs in WV. Later in spring 2022, an additional $24.8 million in federal funds were awarded for public transportation throughout the state. This money will improve the current transit conditions and develop sustainable transit across the state. To date, approximately $38.2 million has been allocated for public transit in 2022

To manage these funds, West Virginia utilizes federal programs that are programmed through the Statewide Transportation Improvement Process (STIP), including:

- Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310)
- The Formula Grants for Rural Areas Program (Section 5311)
- The Bus and Bus Facilities Program (Section 5339)

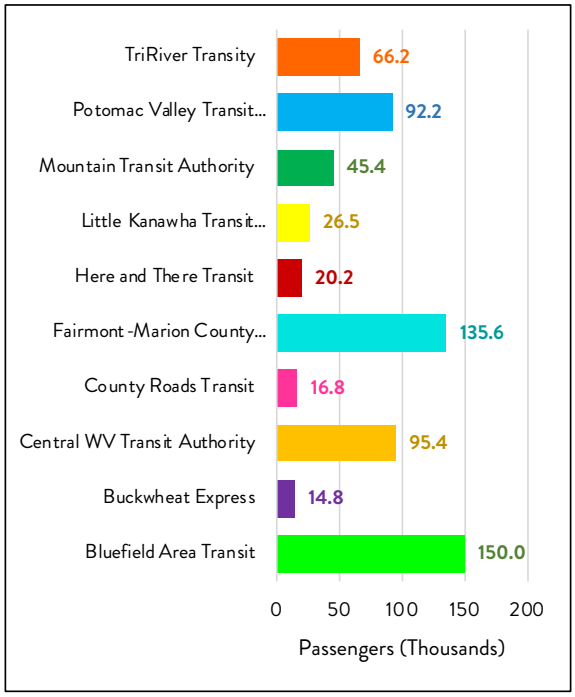
Looking forward, the WVDOT's statewide 2050 Multimodal Long-Range Transportation Plan (LRTP) aims to develop a 30-year blueprint to fund and preserve the system. A key goal is to work with transit agencies to find new ways to leverage local funding in hopes of reducing the state's contribution—a goal that will be difficult to achieve without first addressing the existing structural funding gap.

Figure 6: FY 2021 Small Urban Agency Passengers



Source: WVDOT

Figure 7: FY 2021 Rural Agency Passengers



Source: WVDOT

PUBLIC SAFETY

Transit is one of the safest modes of transportation. Less than 7% of accidents involve buses and off-road vehicles, while 70% of accidents involve passenger vehicles. The Bureau of Transportation Statistics has not recorded a transit fatality in West Virginia since 2013 when one occurred.

WVDOT's Division of Public Transit developed the Safety and Security Planning Information Directed to Effective Response (SPIDER) manual in 2006 to assist transit systems with ensuring the safety and security of their operations. This emphasizes preparation for emergencies that include major accidents, natural disasters, and terrorist attacks. The manual is not mandated but suggested as a guide for transit systems to utilize in developing their Safety and Security manual. The transit system manual evaluates their community's needs and coordinates with the surrounding communities to develop and implement a safety, security, and emergency response plan.

Figure 8: Kanawha Valley Regional Transportation Authority

Source: KVRTA

Figure 9: Mountain Line Transit Authority

Source: Mountain Line Transit Authority

RESILIENCE & INNOVATION

For West Virginia, transit resilience is the ability to prepare for, withstand, and recover from significant disruptions. The state's geography and climate make its transit networks, particularly in rural areas, vulnerable to acute challenges like severe flooding, winter storms, and landslides. These events can damage infrastructure, make routes impassable, and cut off critical lifeline services for residents who rely on transit.

The IIJA provides a significant opportunity to enhance this resilience. While the law allocated $47 million to West Virginia for general infrastructure resilience (primarily for highway projects), public transit is benefitting from other IIJA-backed FTA programs. Federal funds from State of Good Repair (SGR), and Buses and Bus Facilities programs are being used to replace aging vehicles and harden critical infrastructure like maintenance depots, making the system more robust against physical disruptions such as flooding.

Operational and environmental resilience is also a key focus. Funds from the Volkswagen Environmental Mitigation Trust, established around 2018 as part of a national settlement, continue to be used to replace or upgrade high-emission, older diesel transit vehicles across the state. This effort aligns with the West Virginia Public Transit Association (WVPTA)'s broader goal of making the state's transit system more economical and sustainable. This implementation is not based on a single statewide timeline, but rather is already in progress on a decentralized, agency-by-agency basis. For example, the Kanawha Valley Regional Transportation Authority (KRT) in Charleston already operates ten hybrid buses in its fleet. The timeline for this modernization is driven by support from federal grants. In 2023, both KRT and the Tri-State Transit Authority (TTA) secured federal funding from the FTA's Low-No Emission program to purchase additional low-emission vehicles, demonstrating the gradual but steady replacement of older fleets with more resilient technology.

Innovation in West Virginia's public transit system is not limited to new vehicles but also includes new service models, passenger-facing technology, and legacy automated systems. Perhaps the state's most unique, long-standing example of transit innovation is the Morgantown PRT system. Operational since 1975, this automated guideway network connects the West Virginia University campuses and downtown area, demonstrating a long history of technological adoption.

Figure 10: Bluefield Area Transit

Source: Bluefield Area Transit Authority

Figure 11: WVU PRT

Source: C3M Power Systems

More recently, innovation has focused on passenger information systems. Rather than a single statewide map, several of the state's larger transit authorities have implemented their own real-time GPS bus tracking. Agencies like the Tri-State Transit Authority (TTA) in Huntington and Mountain Line in Morgantown provide web-based maps and Google Trip Planners, allowing passengers to see approximate bus locations and plan trips, which is a significant improvement from static schedules.

In addition to technology, agencies are innovating service models to serve rural and low-density areas. The Fairmont-Marion County Transit Authority (FMCTA), for example, offers a "Flex Service." This model functions as a form of micro-transit, allowing buses to deviate up to 3/4 of a mile from their fixed routes for on-demand pickups and drop-offs.

While these public-facing innovations are promising, a 2023 legislative performance review of the Division of Public Transit highlighted significant challenges in backend data innovation. The review noted that the state's "Automated Vehicle Information System" (AVIS) lacks adequate data controls, making it difficult to manage assets. This identifies a critical need for new, more sophisticated data systems to effectively plan and select future projects in underserved areas.

In fleet modernization, agencies are beginning to adopt electric vehicles. In the fall of 2022, the Fairmont-Marion County Transit Authority released what was reportedly one of the first all-electric vans for public transportation in the state, signaling a move toward zero-emission options.

Figure 12: Fairmont-Marion County Transit Authority

Source FMCTA

RECOMMENDATIONS TO RAISE THE GRADE

- Increase state and federal funding to improve transit services. In turn, this could allow for more frequent and reliable services for the public, as well as the expansion of transit routes to areas in need. Furthermore, public-private partnerships could also bring private investment and expertise to improve public transit services.

- Continue to encourage the adoption of sustainable technology to reduce emissions and operating costs through hybrid or electric buses and other alternative fuel options.

- Expand rural transit options by developing flexible routes that can be adjusted to meet the needs of residents. Meaningful proposals include on demand or micro-transit services that are responsive to changing demands.

- Partner with local organizations, such as senior centers, community groups, and healthcare providers, to help identify transportation needs and provide targeted solutions. One example is establishing and expanding shuttle services to healthcare appointments or shopping centers.

- Integrate transit with land-use planning in growing urban areas throughout the state to ensure new developments are designed with consideration for transit. Zoning changes that allow for mixed-use development can reduce the need for car travel and increase transit ridership.

- Publish updated ridership and asset-condition data. Collect and release statewide data for 2022–2025 so that progress toward state-of-good-repair and post-pandemic ridership recovery can be measured.

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Wastewater

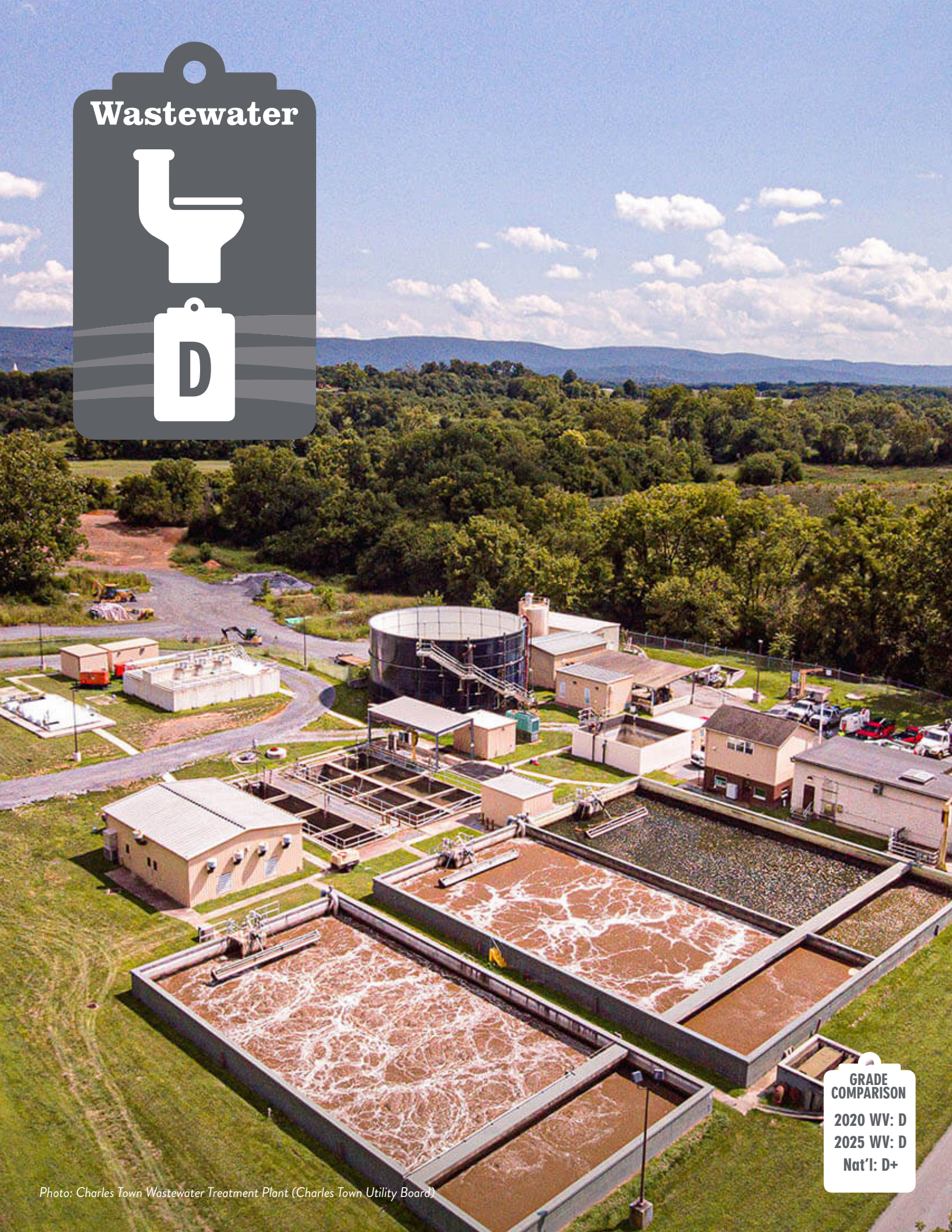


Photo: Charles Town Wastewater Treatment Plant (Charles Town Utility Board)

GRADE COMPARISON

2020 WV: D
2025 WV: D
Nat'l: D+

WASTEWATER

EXECUTIVE SUMMARY

West Virginia's wastewater infrastructure plays a vital role in protecting public health, maintaining environmental quality, and supporting future economic development. The state faces growing challenges, with approximately 500,000 customers, over half the population, lacking access to public sewer systems. Many of the 336 regulated sewer utilities are aging or operating beyond capacity, contributing to inflow and infiltration issues, overflows, and mounting maintenance costs. Combined Sewer Overflow (CSO) correction needs have risen from $1.7 billion in 2022 to $1.9 billion in 2023. Despite these concerns, progress is being made. Several municipalities have adopted new technologies such as automated sampling systems, and decentralized systems may offer promising solutions. Continued investment, education, and smart policy decisions will be essential to modernize infrastructure, protect water quality, and support long-term community and economic growth and resilience in West Virginia.

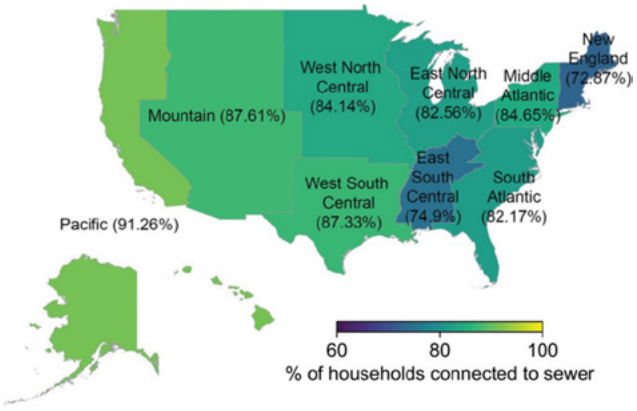
Figure 1: Malden PSD Wastewater Treatment Plant

Source: The Thrasher Group

CONDITION & CAPACITY

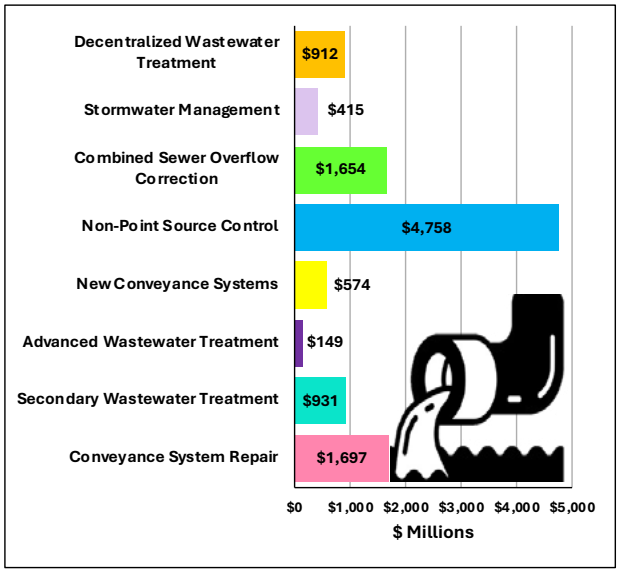
West Virginia's wastewater infrastructure currently serves nearly 500,000 customers through a network of 336 sewer utilities regulated by the Public Service Commission, which represents approximately half of the state's population. These include 302,000 customers on municipal systems, 155,000 served by Public Service Districts, and roughly 5,000 homes using private systems. While this represents about 47% of the state's population, it also means approximately 53%, or more than half of all West Virginians, are not connected to public sewer utilities. This equates to a vast number of private systems, including septic tanks, alternative on-site solutions, and straight pipes to adjacent waterways, most of which operate without consistent oversight. Compared to the recent NIH assessment of sewer connectivity in the U.S., West Virginia is significantly behind the regional percentage of approximately 83%. The widespread reliance on these decentralized systems raises growing concerns about maintenance practices, groundwater protection, and the cumulative environmental and public health risks posed by potential system failures, especially in rural and flood-prone areas.

Figure 2: Percentage of households connected to sewers in each census division.



Source: NIH

Figure 3: WV Wastewater Needs



Source: CWNS

Many of the wastewater systems in place were built decades ago and have exceeded, or are reaching, the limits of their design life. Many collection facilities across the state are considered past their functional lifespan due to broken, clogged, or disconnected pipes. These conditions lead to reduced reliability, increased maintenance needs, and higher costs. A total of 196 collection facilities requested funding for the 2024 fiscal year from the Clean Water State Revolving Fund, which provided full or partial funding for various projects and upgrades to these systems. This highlights how many facilities are outdated and in need of upgrade or replacement. In some areas, performance has been significantly affected.

Figure 4: Huntington Water Quality Board wastewater treatment plant

Source: WV Press

In the city of Salem, the 2023 annual report for Salem's sewage system reported that nearly 85% of the gallons of wastewater treated were from inflow and filtration instead of gallons of wastewater billed. Inflow and infiltration refer to the groundwater and stormwater that enter the sewer system outside of official connections. This makes it more costly to treat wastewater and can contribute significantly to overflows in the system.

While the state has made progress, most notably through a $109.88 million water infrastructure investment in 2023, primarily through the Infrastructure Investment and Jobs Development Act (IIJA), the overall need remains high. According to the USEPA 2022 Clean Watersheds Needs Survey Report to Congress, West Virginia was ranked first in the continuous 48 states for clean water infrastructure needs at $6,182 per capita, or $11 billion total needs requirement.

Wastewater infrastructure is defined as treatment of plant improvements, conveyance system repairs, new conveyance systems, and CSO correction. West Virginia ranked fifth in the nation for conveyance system repair needs ($1,266 per capita), first in the nation for combined sewer overflow correction needs ($922 per capita), and fifth in the nation for nonpoint source control needs ($4.8 billion). Defined as land runoff, precipitation, drainage, and seepage. Furthermore, West Virginia ranked second for states with the highest small community wastewater needs. This suggests a significant infrastructure burden relative to the state's population and financial capacity.

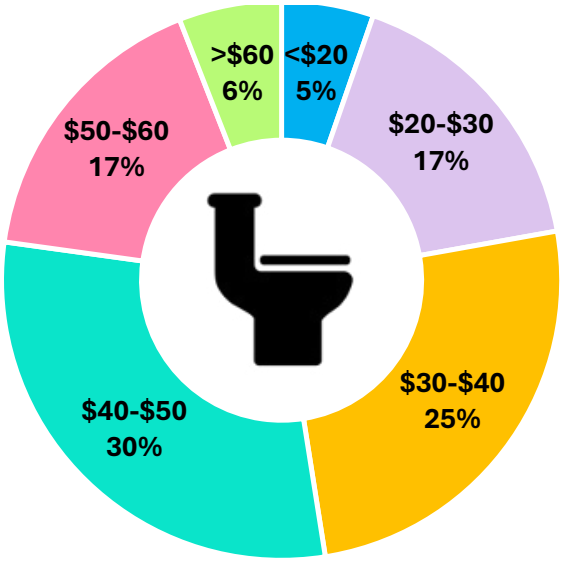
The West Virginia Infrastructure and Jobs Development Council (WVIJDC) states that $106.8 million was committed to various wastewater projects in 2023, but more funding is needed to address all issues. According to the WVIJDC's "2023 Needs Assessment," the estimated cost for sanitary sewer projects is roughly $1.17 billion, as well as $1.9 billion, for combined sewer overflows (CSO) alone. In total, a combined $3.6 billion is needed to repair sanitary sewers and connected CSOs. This is an increase of $1.6 billion when compared to the "2017 Needs Assessment." Infrastructure Council grants and loan funds cannot be used for stormwater system construction; however, West Virginia Water Development Authority funds can be used for stormwater construction. This highlights how critical adequate financial support is for addressing wastewater challenges. Similarly, approximately $11.8 billion is needed to upgrade existing sewage systems and construct new sewage systems for every household in West Virginia to meet regulations-an increase of $1.1 billion when compared to 2017. These numbers show that the state is trending in the wrong direction when attempting to meet wastewater standards.

Figure 5: Welch WV Wastewater Treatment Plant

Source: Thompson & Litton

According to the 2022 Clean Water Needs Survey, the estimated cost for Combined Sewer Overflow (CSO) correction in West Virginia was approximately $1.7 billion, closely aligning with the 2023 Needs Assessment, which raised that figure to $1.9 billion, reflecting a continued upward trend in infrastructure demands.

Figure 6: PSD Sewer Utility Rates, per 4500 gallons



Source: PSC of WV

Funding for West Virginia's wastewater infrastructure comes from a combination of grants, loans, and local revenue sources. Grants and loans are received through the West Virginia Water Development Authority (WDA), the Clean Water State Revolving Fund at the West Virginia Department of Environmental Protection, and the West Virginia Infrastructure and Jobs Development Council. Other sources of funding include the Appalachian Regional Commission (ARC) and the United States Economic Development Administration (EDA). EDA can provide funding for wastewater projects that promote economic development. The United States Department of Agriculture Rural Development also provides both loans and grants through the Water and Waste Disposal Loan and Grant Program to households and businesses in towns with 10,000 people or less. Other funding sources include the WVDEP Abandoned Mine Lands and Reclamation, which is funded through a 28-cent per ton fee on surface mined coal and 12 cents per ton on coal that is mined underground. Certain municipalities also utilize watershed restoration fees, which are based on the total area of impervious materials (such as concrete, shingles, metal roofing, and other water-resistant materials) on each lot. Watershed restoration fees are heavily utilized to cover operation and maintenance costs in a community, as federal funding cannot be used for such things.

Figure 7 & 8: Star City Wastewater Treatment Plant Improvements

Source: Ulliman Schutte

OPERATION AND MAINTENANCE, FUNDING AND FUTURE NEED

In 2022, The West Virginia Legislature created the Economic Enhancement Grant Fund (EEGF) to provide grants to governmental agencies to cover all or a portion of the costs of infrastructure projects that enhance economic development and/or tourism. The fund is administered by the West Virginia Water Development Authority (WDA). Eligible projects include wastewater/sewer system upgrades and expansions, and stormwater system development.

Since its creation, the EEGF has been instrumental in funding numerous projects across West Virginia, impacting hundreds of thousands of residents. Projects include extending sewer services to underserved areas, upgrading aging infrastructure, and supporting economic development initiatives. In December 2024, the WDA approved funding for 24 EEGF projects totaling over $67 million. In short, the EEGF is a significant program in West Virginia aimed at boosting the economy and improving infrastructure through strategic grant funding and represents the state's continued commitment to improving its infrastructure.

The Water Resources Development Act (WRDA) was recently passed by legislation at the federal level. This encourages the conservation and development of water-related resources, which aims to improve rivers and harbors across the country. This legislation also increases the funding for water and wastewater projects through the United States Army Corps of Engineers' (USACE) section 340 and section 571 environmental infrastructure programs.

Sewer rates in West Virginia vary greatly from one municipality to another. Sewer bills continue to increase, which reflects the rising costs of compliance and operation and maintenance in West Virginia. West Virginia's Public Service Commission plays an essential role in reviewing and approving utility rate adjustments to ensure they remain fair and reasonable for customers. The structure of this approval process, however, can make it difficult for some utilities to adopt full-cost pricing approaches that include long-term capital planning and reserve generation. As a result, many systems rely primarily on rates that cover current operations and existing debt rather than future replacement needs, which can limit their ability to address aging infrastructure over time.

Annual rate expenditure typically goes to paying operation and maintenance costs, along with any debt and reserve payments rather than the construction of new systems. This is due to the large amount of required maintenance across the state, which precludes significant utility generated funding for new infrastructure development. This trend will likely continue unless more state and federal grant funding is given to local governments for the purpose of extending service. Higher rates can prove to be a disincentive for seeking to extend service to utility officials. Current customers are often unwilling to increase their existing rates for extensions to new services.

Figure 9: Malden PSD WWTP

Source: The Thrasher Group

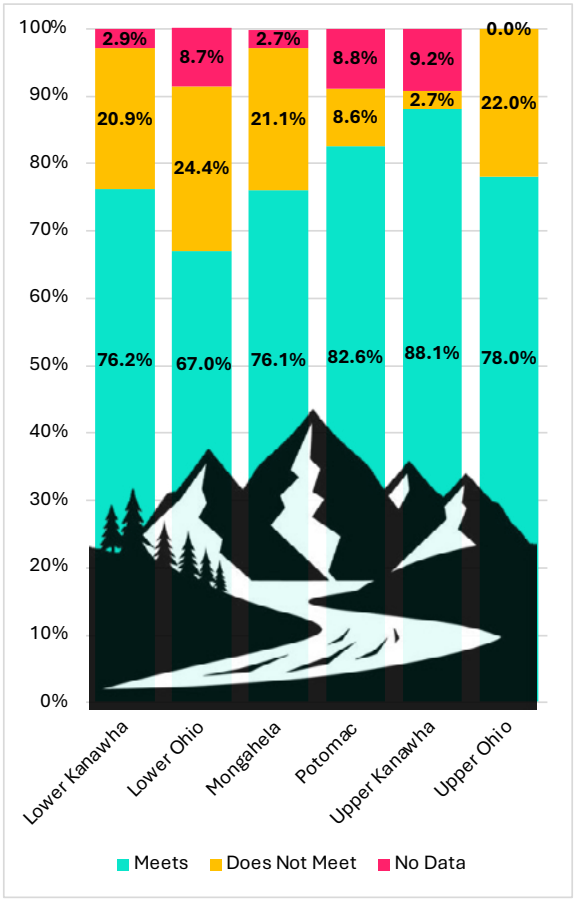
PUBLIC SAFETY

Aging infrastructure has created vulnerabilities that can severely affect public health. As systems deteriorate, infiltration and overflow events become more common, particularly during heavy rainfall. These events increase the risk of untreated sewage reaching waterways, thus expose residents to pathogens and harm aquatic ecosystems.

Fecal contamination remains one of the most widespread water-quality problems in West Virginia, and the data make clear that wastewater infrastructure plays a major role. Statewide monitoring shows that only about one in five assessed stream miles meet the state standard for fecal coliform bacteria, with higher levels often linked to leaking or overflowing sewer lines, failing septic systems, straight-pipe discharges, and runoff from homes and farms. While some basins, such as the Upper Kanawha, show better conditions; other basins, including the Lower Ohio, experience far more severe impairments. According to the state's impairment assessment, fecal coliform is the leading cause of stream impairment, affecting 11,475 miles out of 14,452 assessed miles. Because monitoring occurs during calm, base-flow conditions, these numbers likely underestimate the true extent of contamination during storms, when sewer overflows and runoff increase sharply. Altogether, the findings highlight the urgent need for investment in aging and failing wastewater systems to reduce bacterial pollution and protect public health.

In November 2021, the Berkeley County Public Service Sewer District (BCPSSD) in West Virginia reached a federal-state settlement under the Clean Water Act after being cited for exceeding pollution limits more than 1,300 times, allowing over 500 sanitary sewer overflows, and failing to properly maintain its sewage and stormwater systems. The BCPSSD was required to implement a supplemental environmental project, valued at $1.1 million. Additionally, the district also agreed to carry out roughly $50 million in infrastructure and program improvements. These include a broad assessment of its collection system, actions to prevent stormwater and groundwater infiltration, a pump-station inspection program, training, and public outreach.

Figure 10: Streams meeting fecal coliform standards



Source: Data from WVDEP

Overall, the state's problems are not isolated from a single municipality, public service district, or privately owned utility. Many wastewater systems across West Virginia face similar challenges due to outdated infrastructure, leading to frequent pipe failures and pollution events. Addressing these issues and ensuring sustainable water management for the future of the state is critical to protect not only the environment, but the safety, health, and welfare of the public.

Figure 11: Cheat Lake WWTP Upgrades

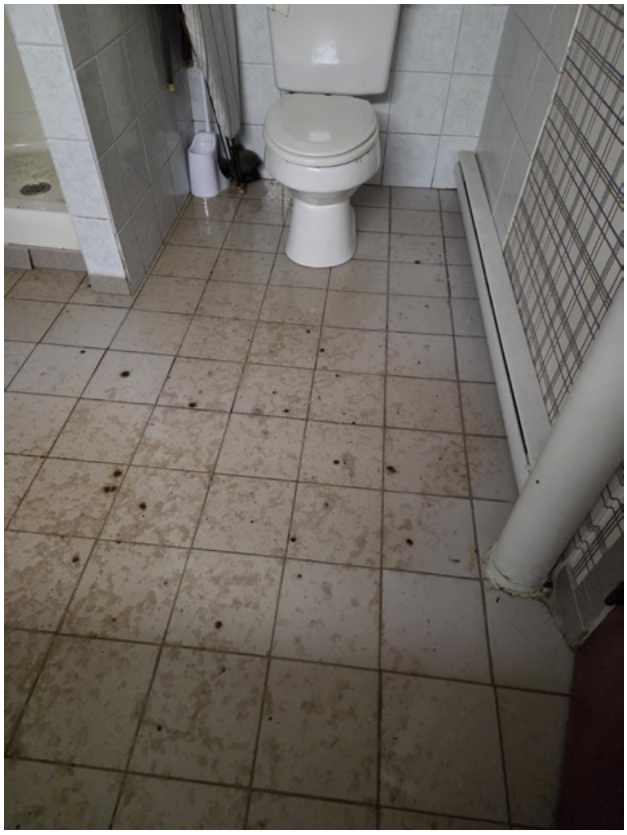
Source: Morgantown Utility Board

RESILIENCE AND INNOVATION

The flash flooding event on June 15, 2025 in Fairmont flooded dozens of homes and businesses in a matter of minutes, underscoring how vulnerable our communities are to extreme weather. In the wastewater context, such a sudden surge of stormwater and runoff can overwhelm sewer lines, inundate septic systems, and cause untreated or poorly treated waste, to enter waterways. Flooding led to sewage on floors, clogged basement drains, and general unsanitary conditions, requiring extensive cleanup and repair. In an event like this, not only must the system serve normal flows; it must withstand and recover from extreme events. Investing in resilient wastewater systems means not waiting for the next flash event to expose failures. Instead, we should be currently building our capacity, redundancy, and rapid-response capability to prevent future disasters. This will ensure that public health and water quality are protected rather than threatened.

The ongoing wastewater failures in the town of Worthington offer a clear example of what a lack of system resilience is like on the ground. In recent months, repeated breakdowns of the town's aging vacuum sewer system have caused sewage backups into homes and forced emergency responses from state and local officials. These incidents illustrate how a system without redundancy, adequate maintenance capacity, or reliable backup equipment can quickly fail when a single component malfunctions. A resilient wastewater system should be able to absorb mechanical failures, power disruptions, or surges in flow without creating immediate public-health hazards. In Worthington, each disruption led directly to service collapse. The situation underscores the vulnerability of small, under-resourced wastewater systems across the state and highlights how limited operational capacity can translate into major resilience challenges when infrastructure is pushed beyond its breaking point. In response to repeated wastewater failures, Worthington, along with local state agencies, has begun repairing pumps and vacuum lines, increasing inspections, and securing grant and ARPA funding to rehabilitate its aging system and restore reliable service.

Figure 12: Sewage backup in a resident's home in Worthington, WV



Source: Worthington Sewage Crisis

In recent years, several municipalities have adopted forward-looking practices aimed at improving sustainability and system resilience. Technologies, such as real-time flow monitoring and smart system controls, are becoming more available, though cost remains a limiting factor for many smaller or rural utilities. In addition, interest is growing in decentralized strategies, such as the separation of black and grey water at the household level. Greywater reuse systems may offer a supplementary way to reduce pressure on centralized treatment systems, particularly in areas with seasonal water availability challenges.

Research institutions in West Virginia are playing a vital role in driving innovation within the system. A wastewater surveillance project led by West Virginia University, supported by a $2.9 million CDC grant, implemented automated sampling at 50 treatment plants to monitor COVID-19. The system reduced lab turnaround time and successfully tracked emerging variants. This research underscores the evolving role of wastewater infrastructure as a tool for public health monitoring and response.

RECOMMENDATIONS TO RAISE THE GRADE

- Establish a statewide inspection frequency standard, such as once every 10 years for sewer lines, with compliance tied to funding eligibility. Additionally, encourage utilities to develop and implement asset management plans that address aging and high-risk infrastructure, schedule replacements and upgrades, and cybersecurity through the use of a variety of planning horizons. These plans are required by the DWTRF program and are an eligible cost. This will assist in the prioritization of critical maintenance needs and infrastructure.

- Incentivize utilities to incorporate innovative wastewater related technology and systems in design and upgrades. This includes the installation of real-time flow meters, smart manhole covers, or SCADA systems to track overflows and system performance.

- Accommodate the ability of water and wastewater systems to institute small, periodic rate increases over time without regulatory oversight in order to cover the full cost of service. This will lessen the rate shock to customers and will improve the utility's ability to generate revenue to keep up with operation and maintenance along with capital costs.

- Encourage the restructuring of wastewater systems into more viable regional systems to improve the capacity, financial sustainability, and efficiency using all available means including the distressed utilities statute.

- Promote educational campaigns to raise awareness about water conservation programs and the importance of supporting water and wastewater infrastructure.

DEFINITIONS

ADVANCED WASTEWATER TREATMENT: A more advanced process used to clean wastewater, remove harmful pollutants and contaminants to meet stricter environmental standards, often using specialized techniques like filtration and chemical treatments.

AMMONIA (AS N): A form of nitrogen commonly found in wastewater. High concentrations of ammonia can be toxic to aquatic life and typically indicate that organic material has not been fully broken-down during treatment.

ANAEROBIC DIGESTERS: Treatment systems that use microorganisms to break down organic waste in the absence of oxygen. These systems produce biosolids and can reduce the volume of waste sent to landfills.

BOD (BIOCHEMICAL OXYGEN DEMAND): A measure of the amount of oxygen required by bacteria to break down organic matter in water over five days. High BOD levels in treated wastewater suggest that organic pollution remains and can reduce oxygen levels in receiving streams.

COLIFORM, FECAL GENERAL: A type of bacteria found in the intestines of warm-blooded animals. Their presence in treated wastewater indicates potential contamination by fecal matter and the possible presence of harmful pathogens.

COMBINED SEWER OVERFLOW (CSO): Occurs when stormwater and wastewater flow into the same pipes and exceed the capacity of a treatment system, resulting in untreated or partially treated water being discharged into nearby rivers or streams.

CWSRF (CLEAN WATER STATE REVOLVING FUND): A federal-state partnership program that provides low-interest loans and grants to communities for water quality improvement projects, including wastewater treatment upgrades and extensions.

DISSOLVED OXYGEN (DO): The amount of oxygen available in water. It is essential for fish and other aquatic organisms. Low DO levels in treated water can lead to harmful environmental conditions downstream.

DWTRF (DRINKING WATER TREATMENT REVOLVING FUND): The DWTRF program was authorized by federal and state governments to assist public water systems in financing the cost of the infrastructure needed to achieve or maintain compliance with Safe Drinking Water Act requirements and protect public health.

EPA (ENVIRONMENTAL PROTECTION AGENCY): A federal agency responsible for setting environmental standards and overseeing regulations, including those related to wastewater discharge and pollution control.

IMPERVIOUS SURFACES: Surfaces like concrete, asphalt, or roofing materials that do not allow water to soak into the ground. These contribute to runoff and can strain stormwater systems.

INFILTRATION AND INFLOW (I&I): Refers to excess water entering sewer systems from groundwater (infiltration) or stormwater (inflow), which can overload treatment plants and lead to overflows.

NEW COLLECTOR SEWERS AND APPURTENANCES: New pipes that collect wastewater from homes and buildings and send it to larger sewer systems, along with additional parts like manholes and valves that help control and maintain the system. Also known as a conveyance system.

NEW INTERCEPTOR SEWERS AND APPURTENANCES: Large sewer pipes that carry wastewater from smaller pipes to treatment facilities, along with additional components like pumps and valves that help manage and maintain the system.

DEFINITIONS (cont.)

NPDES (NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM): A permitting program under the Clean Water Act that regulates the discharge of pollutants from point sources into U.S. waters.

SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION): Technology used by utilities to monitor and control water and wastewater treatment systems remotely, helping detect issues like overflows in real-time.

SECONDARY WASTEWATER TREATMENT: A stage in wastewater treatment where bacteria are used to break down organic materials in the water, further cleaning it after the first stage, before it is disinfected or released.

SEWER REPLACEMENT/REHABILITATION: The process of repairing or replacing old, damaged sewer pipes to ensure they continue to work properly, preventing leaks, blockages, and other issues.

SUSPENDED SOLIDS (TOTAL OR PERCENT REMOVAL): Particles floating in wastewater that must be removed during treatment. Percent removal refers to how effectively the system is capturing these solids.

USACE (UNITED STATES ARMY CORPS OF ENGINEERS): Federal agency involved in civil works projects, including environmental infrastructure programs that support wastewater improvements.

USDA (UNITED STATES DEPARTMENT OF AGRICULTURE): Provides financial support through loan and grant programs for rural development projects, including water and wastewater infrastructure.

WRDA (WATER RESOURCES DEVELOPMENT ACT): Federal legislation that supports the conservation and improvement of water infrastructure, including funding for wastewater and stormwater projects.

WVDEP (WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION): The state agency responsible for enforcing environmental laws and issuing permits for wastewater discharge and infrastructure projects.

WVIJDC (WEST VIRGINIA INFRASTRUCTURE AND JOBS DEVELOPMENT COUNCIL): A state-level entity that funds and oversees public infrastructure projects, including water and wastewater upgrades.

WEST VIRGINIA WATER DEVELOPMENT AUTHORITY (WDA): The WDA administers a variety of programs to provide long-term, short-term and private-activity financing at favorable interest rates for design, construction, improvement and acquisition of wastewater and water systems.

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