2026 REPORT CARD FOR NEW YORK'S INFRASTRUCTURE



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Cover photo: Aerial view of Hell Gate Bridge approaches over Randall's Island sports fields, East River area, and distant Manhattan skyline; Felix Lipov

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LEADERSHIP COMMITTEE:

Andrea Hunt
Shahin Ariaey-Nejad
Tony Cioffi
Craig Ruyle
Sreenivas Alampalli
Beth Ann Smith

RELEASE COMMITTEE:

Andrea Hunt
Shahin Ariaey-Nejad
Christopher Carter
Modeste Muhire
Rebecca Kohlman
Timothy D'Agostino
John Folts
Kevin Hill
Joseph Corio
Craig Ruyle
Anthony Cioffi
Sreenivas Alampalli

AUTHORS/CONTRIBUTORS:

Aviation:
Jonathan Schneider
Brenna Henry
Charles Renner
Richard Haight
Patrick Kim
Robert Shaw
Brendan Smith

Bridges:
Maqbool Mohammed
Kevin Hill
Prateek Srivastava
Soumabrata Dutta
Isaiah Wood
Shahin Ariaey-Nejad
Sreenivas Alampalli

Dams:
Caitlin O'Leary
Thomas Saldutti
Brian Sanders
Beth Ann Smith

Drinking Water
Timothy D'Agostino
Daniel Loscalzo
Katelyn Reepmeyer
Anne Dudek Ronan
Tony Cioffi

Parks and Trails
Sarah Johnson
Suzette Lopane
Nita Gonita
Craig Ryen

Ports & Terminals
Radhi Majmudar
Charlotte Broadbent
Michael Willis

Rail
Sanket Patel
Craig Covil
Craig Ruyle

Roads
Bill Finch
Megan Buchanan
Daniel D'Angelo
Becca Kohlman
Bill Merwarth
Dan Crnkovich
Sreenivas Alampalli

Solid Waste
Jim Sacco
Joshua Cardamone
Charles Corio
Ruwen Qin
Robert Phaneuf
Beth Ann Smith

Stormwater
Modeste Muhire
Dennis Roote
Kossivi Maglo
Jaideep Rao
Anne Dudek Ronan
Craig Ruyle

Transit
Michael V Martello
Craig Covil
Daniel Crnkovich
Pablo Heras Mateo
Otto Xu
Tony Cioffi

Wastewater
Matthew I. Thogersen
Joseph A. Corio, Jr.
Matthew J. Czora
Matthew R. Oster
Robert Lannon

2026 REPORT CARD FOR NEW YORK'S INFRASTRUCTURE

Executive Summary

New York's infrastructure supports one of the largest and most complex economies in the world. The State is home to more than 19 million residents, serves as a major gateway for domestic and international commerce, and operates extensive transportation, water, and waste management systems that are critical to public health, economic competitiveness, and quality of life. Continued investment over the past several years has helped maintain system performance, but has not produced measurable improvements, and substantial challenges remain. New York State's infrastructure received an overall grade of C-, down from the C earned in 2022. Significant investment will be required to address aging assets, growing demand, climate resilience challenges, and long-term funding needs.

Although a majority of the State's maintained highways are rated in good or excellent condition, many roadway assets require rehabilitation or reconstruction. The combination of rough roads and congestion costs every driver on average an additional $718 annually. Of the state's more than 17,600 highway bridges, roughly 10% are in poor condition, and recent trends show an increase in poor condition bridges alongside declines in good condition structures. Public transportation has experienced a strong recovery following the COVID-19 pandemic, but transit systems remain highly dependent on federal assistance, creating uncertainty regarding long-term capital planning and project delivery.

New York maintains one of the Northeast's most extensive freight transportation networks. More than 3,700 miles of active freight rail track supports interstate commerce, industrial development, and port operations. Maritime systems continue to support critical state industries as well as national and international trade. Despite recent investments, aging infrastructure, climate-related risks, and growing capital needs continue to challenge safe and reliable operations.

Water, waste, and recreational infrastructure directly affect public health and community well-being but often receive less public attention than transportation systems. The State maintains more than 9,000 public drinking water systems and more than 35,000 miles of sewer infrastructure, with many wastewater systems operating beyond their intended design life and require significant rehabilitation or replacement. These aging systems must manage stricter regulatory requirements, emerging contaminants, and climate-related risks. Similarly, many of the state's dams were constructed before modern engineering standards were established and now must address age-related deficiencies and changing risk conditions.

Solid waste systems remain functional, but currently, 48 lined solid waste landfills are operating with an estimated remaining permitted capacity of 16 years as of 2024. Expanding waste reduction, recycling, organics diversion, and sustainable materials management practices will be critical to extending facility life and reducing future disposal demands. New York's parks visitation has increased by approximately 5% year-over-year, demonstrating the increasing importance of recreational assets to residents and visitors alike. Despite this growth, aging facilities, workforce shortages, and uneven funding continue to strain the system.

Since the 2022 Report Card, several infrastructure sectors have experienced stagnant or declining conditions or increased risks despite ongoing investment. The State faces a critical period marked by aging infrastructure, workforce constraints, inflationary pressures, and funding uncertainty. Strategic investment, effective asset management, research and innovation, public education and outreach, and long-term planning will be essential to maintaining public safety, supporting economic growth, enhancing resilience and sustainability, and meeting the infrastructure needs of future generations.

Recommendations to Raise the Grade

Six shared priorities emerged from the individual chapters to help improve New York's infrastructure grades.

1. **Establish sustainable, long-term funding.** Provide predictable funding for capital improvements, operations, and maintenance. Align investments with full lifecycle costs and address funding gaps through dedicated revenues, grants, and appropriate public-private financing partnerships.

2. **Prioritize maintenance and rehabilitation.** Use comprehensive asset inventories, data-driven condition assessments, and lifecycle-based management plans to guide and encourage preventive maintenance, reduce repair backlogs, timely rehabilitation, whenever possible prioritize preservation and adaptive reuse over premature replacement.

3. **Strengthen the infrastructure workforce.** Expand recruitment, internships, technical education, and certification programs for engineers, technical staff, operators and maintenance staff to stay current and be aware of new technologies. Support retention and succession planning to preserve the expertise needed to operate, maintain, and oversee infrastructure.

4. **Build safer, more resilient, and sustainable systems.** Incorporate climate risks, emergency preparedness, and safety improvements into planning and design. Integrate new technology into the systems where appropriate and provide value.

5. **Improve coordination, accountability, and innovation.** Strengthen collaboration among agencies, utilities, and communities; improve data collection, sharing, and transparent reporting; and adopt proven technologies and efficient project delivery methods. Educate the public about infrastructure needs, costs, and benefits to reduce potential consequences in the event of failure.

6. **Plan for adequate capacity and reliable service.** Assess current and projected demand, identify capacity constraints and service gaps, and prioritize improvements that maintain reliable infrastructure. Coordinate expansion with rehabilitation, resource efficiency, and connections between systems to meet long-term community needs.

About The Report Card for America's Infrastructure

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

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

Methodology

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

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

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

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

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

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

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

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

In addition to this national Report Card, ASCE's sections and branches prepare state reports on a rolling basis. Visit **InfrastructureReportCard.org** to learn about your state's infrastructure.

About the Grades

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



Exceptional, Fit for the Future



Good, Adequate for Now



Mediocre, Requires Attention



Poor, At Risk



Failing/Critical, Unfit for Purpose

The 2026 Report Card on New York's Infrastructure



Aviation
C+



Bridges
C-



Dams
C-



Drinking Water
C-



Ports
C+



Public Parks
C+



Rail
C



Roads
D+



Solid Waste
C+



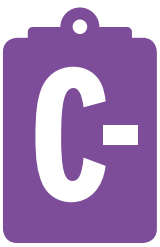
Stormwater
D



Transit
D+



Wastewater
D+



OVERALL GPA

Aviation

C+



GRADE COMPARISON

NY: C+

Nat'l: D+

Photo: Plane flies low over the New York City Manhattan Skyline; ungvar

AVIATION

EXECUTIVE SUMMARY

New York State has 510 aviation facilities, of which 118 are public-use airports. These facilities contribute to the state's economy as job centers, critical infrastructure for emergency response, and international gateways to the U.S. Of these public-use facilities, LaGuardia Airport (LGA), John F. Kennedy International Airport (JFK), and New York Stewart International Airport (SWF) are owned and operated by the Port Authority of New York and New Jersey (PANYNJ) and play a large role in the state's aviation activity. However, since 2022, smaller airports in the state have made newsworthy improvements to their terminals and hangar capacity.

New York is a leader in innovation with respect to electric and vertical take-off and landing aircraft. Consistent funding must be available to maintain New York's place on the cutting edge of technology.

New York State's general aviation activity has increased, largely due to favorable aircraft ownership tax treatment from the New York Aviation Jobs Act (NYAJA). New airfield, terminal, and hangar improvements across the state have shown that funding and grants are exercised to keep up with projected passenger and air cargo growth.

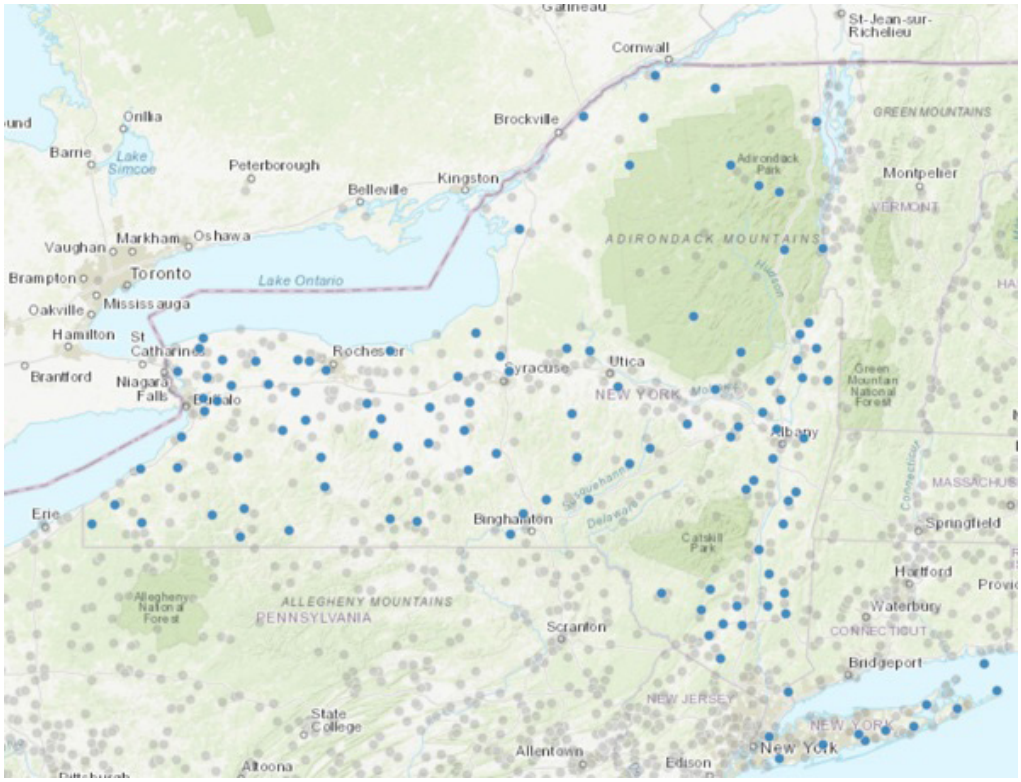
CAPACITY

This section discusses four components of aviation capacity: (1) airfield capacity, (2) landside capacity, (3) airspace capacity, and (4) based aircraft capacity (aircraft storage capacity).

Airfield Capacity

Airfield capacity is expected to grow in New York State as airport master plans and redevelopment programs take shape. At the time of publication of the 2018 SASP, the future airfield capacity was projected to be sufficient for the demand for aviation activity, provided airfield pavement was to be sufficiently maintained. Gate capacity at existing commercial airports will continue to constrain commercial passenger activity, while hangar capacity will constrain general aviation growth.

Figure 1: Public-Use Airports in New York State (blue).



Source: FAA (Jan 22, 2026). Aviation Facilities. National transportation atlas database. (https://geodata.bts.gov/datasets/usdot::aviation-facilities/about)

Figure 2: Airplanes parked in "remain overnight" positions at LGA



Source: Schneider, 2025

Landside Capacity.

Landside capacity improved through airport-wide projects. JFK Redevelopment includes improvements to the airport's terminal roadways (by PANYNJ) and the Van Wyck Expressway (by NYSDOT) which is a main artery for terminal and cargo transportation. Islip MacArthur Airport (ISP) is receiving $150 million for improvements, including connecting the terminal to the Long Island Rail Road at Ronkonkoma. There are 48 acres surrounding Ronkonkoma, which are prime for transit-oriented development having ancillary effects of increasing housing stock while generating jobs. In late 2022, Frederick Douglass Greater Rochester International Airport constructed a roundabout to replace the intersection of Airport Road (terminal frontage access) and Airport Way (cargo area access), thereby improving traffic flows.

LaGuardia (LGA) was expected to begin construction on an AirTrain project that would connect Willets Point with Terminals B and C. The project had a successful environmental review process but was shelved in 2023. A free bus service is now offered from New York City Subway and Long Island Rail Road connections at Jackson Heights and Woodside stations.[9]

Figure 3: Bus service at LGA Terminal C during LGA Redevelopment (2020)



Airspace Capacity.

The shortage of on-duty FAA air traffic controllers continues to affect New York State. Several news stories in the past few years have featured the complexity of the national airspace and its toll on controllers. Improvements to airspace systems must increase safety simultaneously with capacity.

Based Aircraft Capacity.

The 2018 SASP indicated that aircraft hangars were the capacity constraint on general aviation. Since then, demand for hangars has increased, partially as a result of the New York Aviation Jobs Act (NYAJA). This legislation exempts aircraft buyers from paying sales and use tax in New York. This legislation's purpose is to reduce attrition of New York State-based aircraft to neighboring states

with appealing aviation tax rules. In the 2023-2024 legislative session, Assembly Bill A01523 (SB 2556) sought to reinstate private aircraft taxes. The bill expired at the end of the legislative session, therefore New York is still a favorable state for based aircraft.

NYAJA has noticeably increased demand for general aviation investments across the state. This is demonstrated by hangar construction at Long Island MacArthur Airport, Stewart International Airport, and Plattsburgh International Airport. Orange County Airport has increased annual fuel sales since NYAJA, and Schenectady County Airport was selected by an aero-medical company to establish direct jobs and facilities for northeast flight operations.

CONDITION

Several airports across the state are undergoing modernization to addresses condition and capacity. Together, these projects reflect a broader statewide push to replace aging airport facilities with more resilient, higher-capacity, and increasingly energy-efficient facilities designed to better manage passenger growth and experience.

John F. Kennedy International Airport has ongoing construction of its roadways, including NYSDOT's Van Wyck Expressway, and several terminals. Airports in Upstate and Western New York have undergone modernization efforts as well.

- Frederick Douglass Greater Rochester International Airport - full terminal modernization including redesigned ticketing and baggage areas, new jet bridges, improved security and concessions space, upgraded HVAC and lighting systems, and improved roadway circulation.
- Syracuse Hancock International Airport - major expansion of the North Concourse, improving passenger capacity, circulation, and amenities while also upgrading surrounding access infrastructure.
- Ogdensburg International Airport - terminal overhaul with expanded check-in and baggage areas, upgraded passenger systems, weather-protected curbside improvements, and added EV charging, all aimed at improving reliability in harsh winter conditions.
- Saratoga County Airport have also seen full rebuilds, including a new energy-efficient terminal with solar panels, geothermal heating and cooling, and EV infrastructure.
- Meanwhile, larger ongoing projects include Albany International Airport - multi-phase terminal expansion and modernization including new security processing areas, expanded concourses, and HVAC upgrades
- Greater Binghamton Airport – terminal reconstruction
- Sullivan County International Airport – New terminal with energy efficient design.

Airfield pavement deteriorates over time and must be rehabilitated. In 2024, PANYNJ released an invitation to bid for the rehabilitation of Taxiway A and B East and South. This work has been largely completed. PANYNJ has followed in 2026 by an invitation to bid for the re-habilitation of Taxiway A and B North and Taxiway C.[xvi] BUF recently completed rehabilitation of Runway 5-23 and its parallel Taxiway A.

Figure 4: Rendering of Possible FBO Terminal Building at Saratoga County Airport



Source: https://www.governor.ny.gov/sites/default/files/2024-05/Saratoga-County-Airport-Renderings.pdf, Jun 2026

Figure 5: Runway at Buffalo Niagara International Airport (BUF)



Source: https://www.nfta.com/about/capital-improvement/runway-5-23-rehabilitation

OPERATION AND MAINTENANCE

Airports must meet minimum operational standards prescribed by federal agencies. Large airports, especially the states' commercial hub airports, often have their own maintenance teams, while smaller airports more often rely on their local department of public works or contracted companies.

Maintenance of existing infrastructure is essential to the functions and must be considered in budgets and workforce projections. There has not been any indication that the existing workforce is lacking, but expanded demand from terminal modernization and the NYAJA will require expanded employment or construction availability. Furthermore, on-the-job training is required for skilled labor and to pass down knowledge of existing infrastructure.

Figure 6: Pavement rehabilitation at an airport maintenance facility in New York (2024)



FUNDING

Funding for New York airports comes from a variety of sources.

Federal funding

Airports included in the National Plan of Integrated Airport Systems (NPIAS) are eligible for funding through the Airport Improvement Program (AIP). New York currently has 77 airports included in the NPIAS. Other federal funding sources include the 2021 Infrastructure Investment and Jobs Act (IIJA), which is expected to fund approximately $685 million over five years. New York airport recipients include:

- Adirondack Regional Airport– Reconstruction and expansion of the airport terminal.
- Albany International Airport– Terminal improvements including new boarding bridges, air traffic control tower rehabilitation.
- Buffalo Niagara International Airport – Passenger Boarding Bridges, terminal roadway rehabilitation, rehabilitation of terminal HVAC to enhance air quality and reduce emissions.
- Francis S. Gabreski Airport– Replacement of the air traffic control tower.
- Frederick Douglass-Greater Rochester International Airport – Replace boarding bridges to increase energy efficiency.
- Greater Binghamton Airport – Passenger terminal renovation including boarding bridges and roadways.
- Griffiss International Airport – Rehabilitation of the sponsor-owned air traffic control tower.
- Long Island MacArthur Airport – Upgrades to fire and life safety in main terminal building, and continuous power generator for the main terminal and maintenance building.
- Syracuse Regional Airport– Sustainability initiative to increase energy efficiency in the terminal.

State funding

New York State actively funds aviation projects. In July 2025, $25 million was awarded through the state's *Airport Investment & Revitalization for NY (AIR NY)* grants. Recipients include but are not limited to SYR, BUF, RME, PBG, 0G7 for projects on deicing fluid collection, new hangars, sustainable energy improvements, common-use electric ground service equipment (eGSE), snow equipment, and snow material storage buildings.

Figure 7: An electric pushback tractor charging



Although New York State is a leading example of airport funding, there are still shortfalls. As of March 22, 2026, the New York State budget for Fiscal Year 2027 shows $12.5 million in investments for aviation capital projects. This value has not increased since 2018 and requires bi-annual solicitations from advocates to maintain. The New York Aviation Managers Association (NYAMA) asserts that a $40 million investment would keep New York State at the forefront of aviation technology and capacity.

Local funding

Airports may generate local revenue through facility leases and Customer Facility Charges (CFC's). As of the 2018 FAA Reauthorization Bill, airports were given more flexibility for non-aeronautical land use. The bill has been expected to increase non-aeronautical development, such as office or hotel space, and aviation-adjacent manufacturing, to increase local funding.

Local participation is made easier when there is federal and state support to kickstart projects. Long Island MacArthur Airport (ISP) is an example of this, where New York State is committing $150 Million for improvements that should result in business development. The state's contributions have enabled the first step of a project; the local county is contributing an additional $50 Million.

Other funding

Most air passenger traffic in New York travels through airports operated by the PANYNJ. Unlike other airports in the state, Port Authority airports often use private funds or public-private partnerships (P3s). The Port Authority's 2026-2035 Capital Plan proposes $20 Billion in capital projects at JFK and LGA.

Public-use airports are typically eligible to collect Passenger Facility Charge (PFC) fees on tickets and services. The PFC rate has been capped at $4.50 since 2001. Since the cap has not been adjusted for inflation, its buying power has decreased over more than two decades. The total approved PFC's in New York summed to $6.87 Billion by between August 1992 and April 2061. There are 20 participating airports with an average approved PFC of $309 Million. When PANYNJ-operated airports are not included, the average approved PFC is $62 Million. All but two airports in NY are approved to charge the maximum $4.50 fee per passenger. The FAA Reauthorization Act of 2024 failed to increase the PFC cap, but the legislation does allow airports that charge the maximum $4.50 to keep a larger percentage of their primary entitlements.

Table A: Recent and projected grant funding 2021-2025

Federal Aviation Administration Airport Improvement Grants [AIG]	**$307.3 Million**
JFK	$141.6 Million
LGA	$18.9 Million
SWF	$8.0 Million
Other	$138.8 Million
Federal Aviation Administration Aviation Research and Technology Management [ARTM] Grants	**$69.7 Million**
All New York Airports	$69.7 Million
Airport Improvement Program [AIP] Funds (not including CARES or COVID relief)	**$466 Million**
JFK	$29 Million
LGA	$4 million
SWF	$27 Million
Other	$406 Million
2022 Upstate Airport Economic Development Program	**$230 Million**
NY Aviation Capital Investment Program	**$140 Million**
2021	$21 Million
2022	$20 Million
2023	$49 Million
2024	$25 Million
2025	$25 Million
Total Non-PANYNJ New York State Aviation Grants	**$984 Million**
Grand Total	**$1.21 Billion**

Table Notes and Sources:

• Infrastructure and Jobs Act & Airport Improvement Program Funding: https://www.faa.gov/airports/aip/grant_histories

•Upstate Airport Economic Development & NY Aviation Capital Investment Program Funding: https://www.governor.ny.gov/ and https://www.dot.ny.gov/

• Data does not include IIJA Facilities & Equipment allocated by the IIJA to New York State.

PUBLIC SAFETY AND SECURITY

Public Safety

Public safety is inseparable from commercial airport infrastructure and operations. In 2022, the Federal Aviation Administration published the updated *Advisory Circular 150/5300-13B: Airport Design*, which is the design manual for airfield elements. This update is based on empirical evidence from observing aircraft performance and industry incidents and clarifies requirements vs. recommendations for designers while improving the standards to account for new technology. FAA Part 139, which enforces safety standards across certified airports, was updated in February 2023 with requirements for safety management systems (SMS) for proactive identification of potential hazards, applicable to certain airports. As of Feb 19, 2026, 24 New York State airports are certified, 14 of which require an SMS based on applicability criteria such as hub classification or international passenger surface.

Security planning and perimeter fencing

Amongst the 24 airports awarded grants in the 2021 Upstate Airport Economic Development and Revitalization competition, Albany International Airport received $60 million for various projects including improved passenger security screening, and Ogdensburg International Airport received $18 million for various improvements including upgraded security doors.

FUTURE NEED

New York State's airport system faces significant long-term infrastructure and operational needs. To better scope and understand these future needs, airports have made efforts to publish or update their airport master plans. Examples include Albany International Airport (ALB) ($492.8 Million over 10 years) and Syracuse Hancock International Airport (SYR) ($1.435 Billion over 20 years).

Airports can tap into Customer Facility Charges and Passenger Facility Charges for innovation, but smaller airports without commercial carriers will find this challenging. Programs need to be supported at the State level, such as the $25 Million AIR NY Awards and the $150 Million towards ISP, to realize the market demand for aviation and innovation at smaller airports. As demonstrated by ISP's Suffolk County, there is local interest in co-funding with state and federal grants.

The New York Aviation Jobs Act (NYAJA) has played an important role in supporting aviation-related economic growth within New York.[xi] To maintain local funding and the business case for hangar expansion, legislators should protect the NYAJA.

The central policy question is less about whether New York has invested in its airports and more about whether current funding levels will remain adequate to sustain modernization over the long term. Large hub airports such as JFK and LaGuardia have benefited from extraordinary capital commitments, but smaller regional and general aviation airports often face funding gaps for maintenance, technology adoption, and workforce development. Rising construction costs and inflation also increase pressure on both public and private funding sources. As passenger expectations, environmental standards, and aviation technologies continue to evolve, current funding levels must be maintained.

RESILIENCE

Investment in sustainable energy solutions

The transition to electric vehicles is ongoing with airports around the state in various phases of the transition process. Major hubs have made progress, with the deployment of large-scale electric ground service equipment and expanding on-site charging infrastructure. The solar array being constructed as part of the new Terminal 1 at JFK, combined with fuel cells and battery storage to total 12MW of electrical capacity, enhances sustainability by providing cleaner energy to the terminal. The new Carport at JFK will contribute 19.5MW of solar generation and battery storage. New Terminal 6 will include solar panels of its own, while other existing terminals and facilities are advancing electrification.

Upstate airports such as Albany International Airport, Buffalo Niagara International Airport, and Frederick Douglass Greater Rochester International Airport are generally earlier in the electrification curve, concentrating on incremental upgrades like installing electric vehicle charging stations, converting ground support equipment, and strengthening electrical capacity. In 2025, Watertown and Adirondack Airports received funding for electric ground service equipment. Other developments in sustainable energy in New York State include funding for a geothermal and cooling system at Ithaca Tompkins International Airport.

Resiliency

Airports must consider climate change and related sea level rise in their plans for operations, maintenance and funding as increasingly extreme climate conditions add strain to existing infrastructure and workflows. Due to winter conditions, New York airports also focus resiliency efforts on cold weather operations and snow management and removal. In 2025, Buffalo Niagara, Syracuse Hancock, Griffis, and Republic Airports received funding from New York State for winter specific infrastructure.

INNOVATION

New York airports are on the cutting edge of innovation. New York airspace control facilities have received NextGen technology which optimizes aircraft separation, automation, communication, navigation, and surveillance.

In early 2026, JFK also allowed a demonstration flight from an Electrical Vertical Takeoff and Landing (eVTOL) taxi that is pursuing FAA certification, with the Port Authority Executive Director noting that "responsible exploration of these technologies now is how we prepare this region for the future."

Syracuse Hancock International Airport is participating in federal pilot programs focused on integrating eVTOL aircraft into national airspace for cargo, medical, and eventual passenger use. It was selected to host the FAA's "Airport Unmanned Aircraft System(s) UAS Detection and Mitigation Research Program." In addition, a dozen communities in the Mohawk Valley are planning a vertiport network to connect smaller cities and underserved areas.

A new generation of vehicles has also emerged on the landside. PANYNJ tested autonomous shuttles at JFK to better connect passengers between parking lots and terminals.

Figure 8: eVTOL Demonstration



Source: 2026, Joby Aviation via www.edc.nyc

Figure 9: Self-driving vehicles at JFK



Source: 2024, PANYNJ via https://www.panynj.gov/port-authority/en/press-room/press-release-archives/2024-Press-Releases/port-authority-to-host-first-self-driving-vehicle-test-to-serve-0.html



RECOMMENDATIONS TO RAISE THE GRADE

- Continue to show support for new technology, including Airspace Modernization Office initiatives, electric aircraft, and vertical take-off and landing systems, through appropriate budget and grant availability.
- Remove the federal Passenger Facility Charge cap.
- Improve the workforce pipeline in aviation. Educate children on the careers available in aviation. Support them in the workforce pipeline to become pilots, air traffic controllers, aircraft maintainers, engineers, and more. As the weather becomes more unpredictable and systems age, a robust workforce dedicated to safety is paramount.
- Develop formal asset management plans to document lifecycle maintenance strategies and provide sustainable growth projections.

SOURCES

1. New York State Department of Transportation (website), "Van Wyck Expressway Capacity and Access Improvements to JFK Airport," n.d.
2. Office of Governor Kathy Hochul, "Governor Hochul Invests $150 Million to Connect MacArthur Airport to LIRR's Ronkonkoma Station," 2026.
3. Monroe County, New York, "Construction to Start on Roundabout at the Fredrick Douglass Greater Rochester International Airport," 2022.
4. The Points Guy (Griff), "The AirTrain to LaGuardia is Officially Dead; Say Hello to More Buses," 2023.
5. Port Authority of New York & New Jersey, "Governor Hochul, Port Authority and MTA Unveil $160 Million Plan For Faster, More Frequent, More Reliable Q70 Bus Service to LaGuardia Airport," 2025.
6. Regional Plan Association, "Airports of Tomorrow – Today," 2023.
7. New York State Department of Transportation, "Economic Impacts of New York State Airports and Aviation," 2024
8. Port Authority of New York and New Jersey, "Procurement Portal," 2026.
9. Niagara Frontier Transportation Authority, "Runway 5-23 Rehabilitation," 2025
10. United States Department of Transportation, "The Bipartisan Infrastructure Law Will Deliver for New York," 2022.
11. Federal Aviation Administration, "Infrastructure Investment and Jobs Act Airport Terminal Program Grants file," 2026.
12. Office of Governor Kathy Hochul, "Governor Hochul Announces $25 Million Awarded for Airport Modernization and Safety Enhancements," 2025.



SOURCES (cont.)

13. New York State, "2026 New York State Budget," 2026.
14. New York State Assembly, "2026 Joint Legislative Budget Hearing – Transportation – February 3," 2026.
15. Federal Aviation Administration, "PFC Approved Locations, Collections, and Expiration Dates – 2025 Reports," 2025.
16. Albany County Airport Authority, "ALB Master Plan," 2024.
17. Buffalo Niagara International Airport, "Master Plan", 2026.
18. Syracuse Airport, "SYR Master Plan Update," 2025.
19. Port Authority of New York and New Jersey, "Port Authority and The New Terminal One Consortium Kick Off Construction of New York City's Largest Solar Array at John F. Kennedy International Airport," 2024.
20. Office of Governor Kathy Hochul, "Governor Hochul Announces Groundbreaking for New York State's Largest Solar Carport and Battery Storage System at JFK Airport," 2024.
21. Hudson Valley Post (Welber), "Big Changes Coming to these Airports Across New York State," 2025.
22. Ithaca.com (Vogel), "Ithaca Airport Receives Over $1 Million in State Grant Funding," 2025.
23. Port Authority of New York and New Jersey, "Port Authority of New York and New Jersey and Joby Aviation conduct first point-to-point electric air taxi demonstration flights at John F. Kennedy International Airport and Across New York City Heliport Network," 2026.
24. Syracuse.com (Moriarty), "Battery Powered Air Taxis Could Soon Be Flying Over Syracuse," 2026.
25. Federal Aviation Administration, "Airport Safety and Airspace Hazard Mitigation and Enforcement (Section 383)," 2022.
26. Business Wire, "Upstate New York Planning North America's Largest Vertiport Network with Landings.co," 2025.

Bridges



C-

GRADE COMPARISON

NY: C-

Nat'l: C

Photo: Rochester, New York, Sean Pavone

BRIDGES

EXECUTIVE SUMMARY

New York State operates one of the nation's largest highway bridge networks, with over 17,600 highway bridges supporting critical transportation needs. As of 2025, 10% are in poor condition, higher than the national average, reflecting a continued need for rehabilitation and replacement[1]. Number of poor condition bridges increased, as good condition bridges declined and fair condition bridges increased.

Significant state and federal investments have helped reverse declines in bridge capacity and accelerate repairs. Between 2023 and 2026, over $18 billion has been invested statewide, alongside major capital programs from state agencies and authorities[4].

Despite this progress, aging infrastructure, frequent extreme weather events, and inconsistent resilience standards present challenges. Emphasis on preventive maintenance, implementation of new materials and technologies, and expansion of innovative contracting methods are improving asset management, but sustained funding and broader adoption of resilient and sustainable practices will be critical.

Governor Mario M. Cuomo Bridge



Credit: New York State Thruway Authority

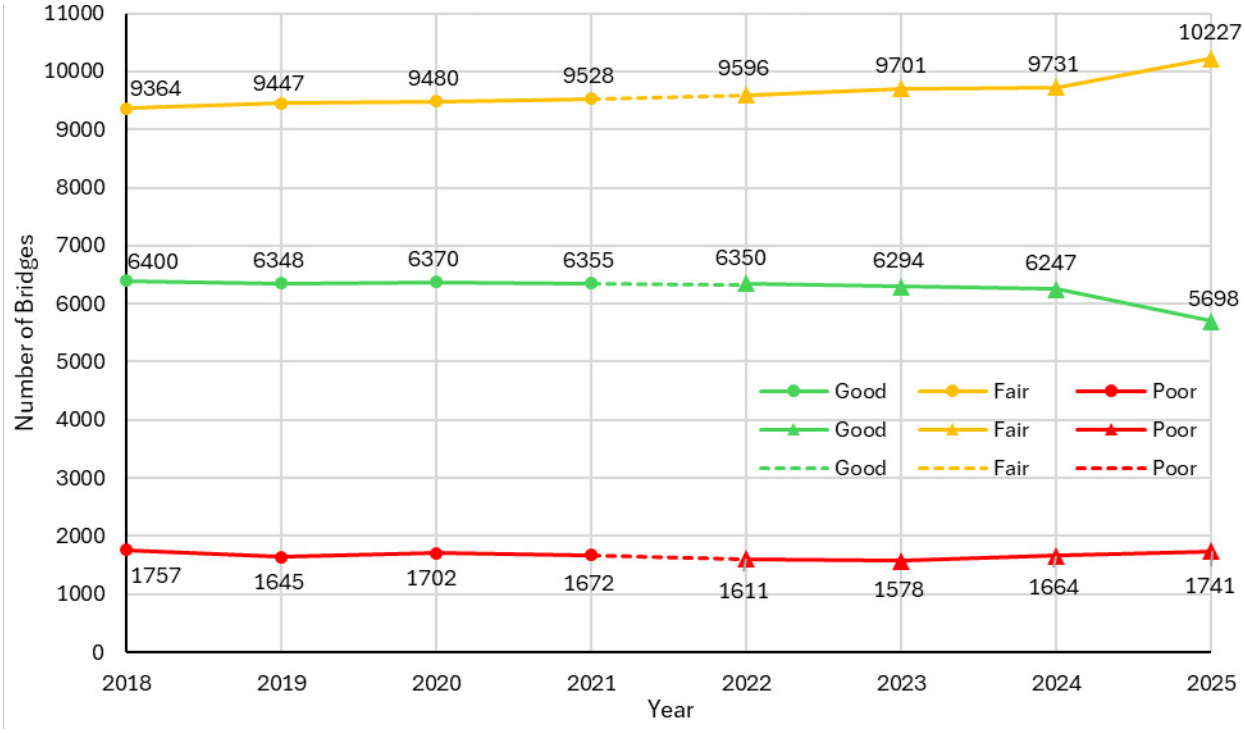
CAPACITY AND CONDITION

New York State (NYS) has the 13th largest bridge inventory in the nation, including six international bridge crossings with Canada. The New York State Department of Transportation (NYSDOT) owns and maintains approximately 43% of them with remainder owned by authorities, counties, and other local governments[2].

Bridges are inspected every two years, with some more frequently, and then are given a condition status of "good," "fair," or "poor" based on the Federal Highway Administration's (FHWA) guidelines. A bridge rated poor is not necessarily unsafe, at least one of its key components is rated poor or has localized structural components that limit its performance requiring a weight limit to be posted in some cases (aka a "posting" or "posted bridge"). A poor bridge may still be open, but it has significant wear and needs major repairs or replacement to ensure long-term safety and reliability.

In 2025, New York State reported that 1,741 bridges (9.9%) are in poor condition, higher than the nationwide percentage of 6.7%[1]. This is an increase of 69 bridges from the 2022 New York State Infrastructure Report Card, where 9.5% of NYS bridges were in poor condition. As shown in the figure below, in 2025, there was a reduction in good bridges that are offset by an increase in fair bridges. In 2021, New York State reported 715 bridges (4.1% of all New York bridges) were load posted, and in 2025, 745 bridges (4.2% of all bridges) were load posted. Although this number has remained relatively constant, it is well below the nationwide percentage (9.1%) of load posted bridges.

Figure 1: Bridge Condition Rating by Count



● = 2022 Report Card data; ▲ = 2026 Report Card data

(FHWA InfoBridge™)

A primary goal of bridge rehabilitation and replacement projects is to improve structural capacity while addressing deterioration and safety concerns. At the time of the 2022 New York State Infrastructure Report Card, the number of bridges meeting current load-carrying standards had begun to decline. That trend stabilized in 2022 and 2023 before reversing and increasing significantly through 2025. A key factor in this improvement was the passage of the Infrastructure Investment and Jobs Act (IIJA) in 2021, which provided substantial federal funding for infrastructure

improvements nationwide. The additional investment helped New York halt the decline in bridge capacity and accelerate bridge rehabilitation and replacement efforts.

Although the fair and poor condition trends are slowly increasing, there will be a delay in seeing the trend changes. This is because the effects of 2023-2026 funding typically can take several years due to lag in completing the bridge construction projects from time of funding allocation.

OPERATIONS AND MAINTENANCE

A proper bridge maintenance program allows the bridge to maintain durability and its ability to serve its full-service life in a cost-effective manner. It includes routine work such as deck sealing with corrosion inhibitors, washing, joint repairs, painting, restoration and repair of wearing surface, and repair of elements damaged by impact, fire, or flood. Maintenance is a relatively inexpensive way to significantly extend a bridge's service life, both delaying and minimizing the costs and disruptions associated with major rehabilitation or full replacement. Maintenance also reduces the user costs and enhances public safety. Highway bridges in NYS are owned by several entities and each owner is responsible for the maintenance of the bridges they own. Owners routinely share information and identify effective and best maintenance practices through venues such as the Statewide Conference on Local Bridges organized by NYSDOT.

The importance of preventative maintenance as a cost-effective tool cannot be understated. A primary example for this is the NYS Bridge Authority, which continues to maintain a well-deserved reputation for its robust preventative and corrective maintenance program across its five major Hudson River crossings (Bear Mountain, Newburgh-Beacon, Mid-Hudson, Kingston-Rhinecliff, and Rip Van Winkle). The NYS Bridge Authority has been self-sufficient throughout its more than 85-year history, operating without federal or state tax monies and reinvesting toll revenues to maintain and improve these vital crossings, guided by a vigorous, integrated program of inspection, maintenance, repair, and rehabilitation to ensure the structural integrity of its facilities and the safety of its patrons. The Authority's 2025–2029 Strategic Plan reaffirms its commitment to setting the bar for excellence in bridge management operations[10].

NYSDOT maintains a comprehensive bridgewashing program and periodically seals concrete decks. Routine pressurewashing removes debris and chlorideladen contaminants from decks and beams resulting from the use of deicing salts, preventing accelerated deterioration of concrete and steel and exposing any hidden defects. Periodic deck sealing further protects concrete from chloride intrusion caused by road salts, helping extend service life.

FUNDING AND FUTURE NEED

Bridge funding in New York remains insufficient to address the State's long-term bridge needs. Based on FHWA reporting requirements, bridges in poor condition are assumed to require replacement, while bridges in fair condition are assumed to require rehabilitation. Using these assumptions, New York estimated in 2026 that bringing all bridges to a good condition would require approximately $74.5 billion, including $16.5 billion for replacement and $58.1 billion for rehabilitation[11].

For the 2026-2029 funding cycle, approximately $9.3 billion has been programmed for bridge projects, including $6 billion in federal funding and $3.3 billion in state and local funding. While substantial, this investment falls far short of the identified needs, leaving an estimated funding gap of more than $65 billion[11].

Federal investment under the IIJA has provided critical support for bridge improvements, including approximately $2 billion in Bridge Formula Program funding for New York[4]. However, the expiration of the IIJA on September 30, 2026, creates uncertainty regarding future federal funding levels and the State's ability to address its growing backlog of bridge replacement and rehabilitation projects.

Additional support for locally owned bridges is provided NYSDOT's Bridge NY Program[3], which awarded approximately $484 million in funding for bridge and culvert projects in 2024.

Major bridge owners continue to make significant investments. Under its 2017–2025 Capital Plan[8], the Port Authority of New York and New Jersey

made significant bridge investments, most notably the $2 billion "Restoring the George" rehabilitation of the George Washington Bridge, which reached approximately 60% completion by the end of 2025. The overall Restoring the George initiative expected to wrap up construction by 2030.

Looking ahead, Port Authority of New York and New Jersey's approved $45 billion 2026–2035 Capital Plan allocates roughly $15.4 billion for bridge, tunnel, and terminal upgrades across the network. On the bridge side, the plan funds further advancement of the George Washington Bridge rehabilitation, as well as extensive rehabilitations of the Lincoln Tunnel Helix and the Outerbridge Crossing. The Lincoln Tunnel Helix is slated for a $640 million overhaul, and $336 million is earmarked for the Outerbridge Crossing. Spending on the new capital plan begins in 2026 with a $4 billion allocation from the Port Authority's approved annual budget, directed across all categories including bridge and crossing work. These investments are funded entirely through tolls, fares, and fees, as the Port Authority operates as a self-sustaining agency with no state or local tax subsidies.

New York invested $3.6 billion in road and bridge improvements[12] in 2025, upgrading over 3,700 bridges, a 19% increase from 2024. The state's $34.3 billion five-year capital plan is its largest ever[11], while the Thruway Authority is committing $600 million in 2026 and $2.8 billion through 2030 to maintain about 150 bridges[13]. The FY26 budget also provides nearly $1.4 billion annually for local infrastructure. Despite this progress, aging infrastructure, climate change, inflation and rising repair needs, which is over $19 billion in New York City alone highlight the ongoing need for vigilance, coordination, and effective planning.

PUBLIC SAFETY AND RESILIENCY

Public safety is the engineer's foremost priority. NYSDOT maintains a rigorous Bridge Safety Assurance (BSA) program in addition to a comprehensive bridge inspection program. The BSA program proactively assesses bridge vulnerabilities and deficiencies, resiliencies, and safe load carrying capacities. The bridge inspection program conducts periodic inspections of all publicly owned bridges to assess their condition and identify any safety-related issues.

Should the State identify a safety-related issue, it will be flagged, and the bridge owner will be notified. The State will determine the severity of the flag condition and if immediate action is needed to remove the public from the safety hazard, which could be lane shifting, lane closures, or closing the bridge entirely to traffic. However, the more drastic action is taken, the more likely there are incidental safety impacts to the public, such as emergency response times. Therefore, the State will coordinate with the bridge owner before any immediate actions commence. Ultimately, the BSA and bridge inspection programs give bridge owners the opportunity to properly evaluate the bridge and come up with solutions to address deficiencies and flags.

Resilience in New York State's bridge network refers to the ability of structures to withstand, adapt to, and recover from extreme weather events and other disruptions. Statewide programs have increasingly recognized the role of resilience in bridge investment decisions.

To support resilience, the BRIDGE NY Program continues as part of the State's five-year capital program, providing funding assistance for rehabilitation and replacement of locally owned bridges and culverts statewide. The BRIDGE NY Program evaluates projects based on structural condition and resiliency considerations, including hydraulic vulnerability (e.g., susceptibility to flooding), detour impacts, and community significance, and may prioritize benefits for Environmental Justice communities.

In July 2024, New York State announced more than $484 million in BRIDGE NY awards[3] for 216 local bridge and culvert projects in regions across the State, with an emphasis on enhancing resilience and safety against severe weather and climate impacts. These awards support design, right-of-way acquisition, and construction phases, and reflect ongoing State investment to harden structures against future climate stressors.

Another aspect of resiliency of bridges is withstanding bridge strikes. This was prominently brought into the spotlight with the collision and collapse of the Francis Scott Key Bridge in Baltimore, Maryland in 2024. Just over a year later, the ARM Cuauhtémoc collided with the Brooklyn Bridge's main suspension span (see figure below). Both instances caused fatalities, but the Brooklyn Bridge did not sustain any severe structural damage and was deemed safe for traffic to continue to use it. However, naval vessel bridge collisions are a rare occurrence. The most common bridge collisions happen with land vehicles. Most cases involve trucks, either exceeding posted height restrictions or hauling equipment exceeding height restrictions. Some occurrences with non-commercial vehicles do occur, where minor structural or non-structural damage can occur, as shown below.

While resilience is a growing focus, there is no single statewide resilience design standard for all bridge projects. Resilience outcomes depend on project-specific assessments, local conditions, and available funding. As such, bridges that are critical for emergency access, flood-prone crossings, and economic connectivity remain priorities within resilience-oriented funding programs, but their treatment varies by region and owner.

View of Cuauhtémoc colliding with the Brooklyn Bridge on May 17, 2025



Credit: Nelson Slinkard via X

Impact damage from truck



Credit: Suffolk County Department of Public Works

Sustainability in bridge infrastructure broadly includes environmental performance, lifecycle impacts, and materials transparency. In New York State, sustainability is increasingly supported by procurement and guidance frameworks that enable emissions and material impact considerations. For instance, in 2023, the New York State Office of General Services released guidelines on the State's Finance Law about buying low-embodied carbon concrete for reducing impact on global warming: "these guidelines establish the minimum requirements for State agencies when developing and executing contracts involving low embodied carbon concrete, and the applicability of the guidelines to State projects that involve the use of concrete."

Sustainability practice also involves planning and design decisions that seek to extend service life, reduce maintenance frequency, and minimize environmental disruption. For instance, eliminating bridge joints by using a link-slab system reduces the overall need of having to periodically replace bridge joints and conduct steel repairs, reducing the surrounding components' deterioration, which extends the bridge's service life. Bridge rehabilitation and replacement under programs like BRIDGE NY can improve sustainability by addressing long-term performance issues and reducing the likelihood of emergency interventions; project scopes often include approaches such as improved drainage or scour remediation that contribute to lifecycle durability.

INNOVATION

Innovation in bridge delivery and design in New York State reflects advancements in contracting methods, standards of modernization, and materials and durability practices. These innovations aim to increase efficiency, reduce user impacts during construction, and improve long-term performance.

Contracting and delivery: The use of alternative delivery methods, such as Design-Build, remains an important tool for accelerating bridge project completion, where authorized. NYSDOT maintains good contract framework that supports efficient delivery of complex bridge projects; while Design-Build is implemented at the state level, its use varies by project and owner. New York City Department of Transportation and other Authorities have also introduced alternative delivery methods.

Standards and guidance: The NYSDOT Bridge Manual[5] was updated in January 2025 and provides current policies and technical procedures for bridge planning, design, and construction across New York State. This update reflects ongoing standardization of engineering practice statewide, ensuring that bridge projects adhere to consistent criteria and current best practices bridge design.

Materials and durability: While specific high-performance materials (e.g., ultra-high-performance concrete, advanced composites) and accelerated construction techniques are employed on select projects, their application depends on project scope, funding, and owner preferences. Such materials and techniques are recognized nationally for enhanced durability and reduced construction time but are not uniformly used across all bridge projects statewide; innovation in materials continues to evolve as agencies integrate lessons from modern bridge replacements and durability research.

Drones and AI: NYSDOT allows the use of drones to supplement visual inspections, where allowed by FHWA, when they are cost-effective and provide value. The NYS Thruway Authority is implementing a drone inspection program funded by a $14.87 million SMART Grant[13]. The program uses automated, precisely repeated Unmanned Aerial Systems flights to capture identical inspection imagery that feed machine-learning models for change detection. The data collected can support a digital-twin framework built on stable geodetic control, repeatable data collection, and targeted 3D modeling. The information can then be used to better track condition changes and improve predictive maintenance. The Metropolitan Transportation Authority and other agencies are also incorporating Bridge Information Modeling and digital twins in their recent bridge design and construction projects.



Photo: Manhattan Bridge; Felix Mizioznikov



RECOMMENDATIONS TO RAISE THE GRADE

- Continue advancing alternative delivery methods in an economically efficient manner to optimize design and construction materials and practices, while embracing Life Cycle Costs.
- Educate and encourage coordination among bridge owners to identify and implement proactive best management practices for preventative maintenance.
- Bridge funding needs to find creative financing sources to overcome chronic underfunding, such as public-private partnerships.
- Maintaining a viable multi-year maintenance and Capital Programs and making it a management priority.
- Address the legal issues of "orphan bridges," where numerous bridges are in danger of being closed or lost forever due to prolonged ownership and maintenance disputes between Railroad agencies and state and local governments. Some of these bridges are of significant civil engineering historical value and/or on the state historic register.
- Address the legality of design-bid-build procurement; making all non-State agencies legally permitted to seek other means of procurement, such as design-build, reverse bidding, or sole-source procurement.
- Maintaining timely transparency in the reporting of bridge data to all stakeholders.
- Invest in rebuilding and maintaining in-house staff in the public sector, where the loss of in-house staff has led to less knowledge and qualified personnel to manage and execute public sector-related duties and bridge program advancement.

SOURCES

1. Federal Highway Administration (FHWA). "FHWA InfoBridge™ web portal," 2026.
2. NYSDOT. "New York State BRIDGE NY Program overview and implementation guidance," 2026.
3. NYSDOT. "BRIDGE NY awards announcement – $484M for resiliency-oriented bridge and culvert projects statewide," 2024.
4. FHWA. "Bridge Investment Program (BIP) under IIJA – competitive federal grants for bridge rehabilitation/replacement," 2025.
5. NYSDOT. "NYSDOT Bridge Manual (2025) — statewide policy guidance for bridge engineering,"2025.
6. NYS OGS. "Buy Clean Concrete guidelines for state public works procurement," 2024.
7. MTA. "MTA 2025-2029 Capital Program", 2025.
8. Port Authority of New York and New Jersey. "2006-2026 Budgets," 2025.
9. New York State Bridge Authority, "New York State Bridge Authority Capital Improvement Program 2026 – 2030," 2025.
10. New York State Bridge Authority. "New York State Bridge Authority Strategic Plan A Bridge to the Future 2025-2029," 2025.
11. New York State Office of Budget and Management. "FY2026 NYS Executive Budget," 2025.
12. New York State Governor's Press Office. "Governor Hochul Highlights Significant Improvements to New York State's Roads and Bridges in 2025," 2025.
13. New York State Thruway Authority. "New York State Thruway Authority 2026 Budget," 2025.



Photo: Redhouse Dam. Cortlandt, New York; Colliers Engineering & Design

DAMS

New York State dams are vital to the state's infrastructure, providing water supply, flood protection, hydroelectric power, irrigation, navigation, fish and wildlife habitats, and recreational spaces.

Dams in New York are an average of 86 years old, while the national average is 65 years old. New York's High Hazard and Significant Hazard dams have an average age of 98 and 92 years, respectively. When built, these dams held less risk to human life, but the increasingly populated areas are leading to growth in the number of High Hazard dams. This demands greater attention and investment in measures that reduce risks to public safety and economic assets.

State dam safety programs inspect existing dams, oversee remediation of deficient dams, and work with local officials and dam owners on emergency preparation. However, many state programs lack adequate budgets, staff and authority to ensure public safety.

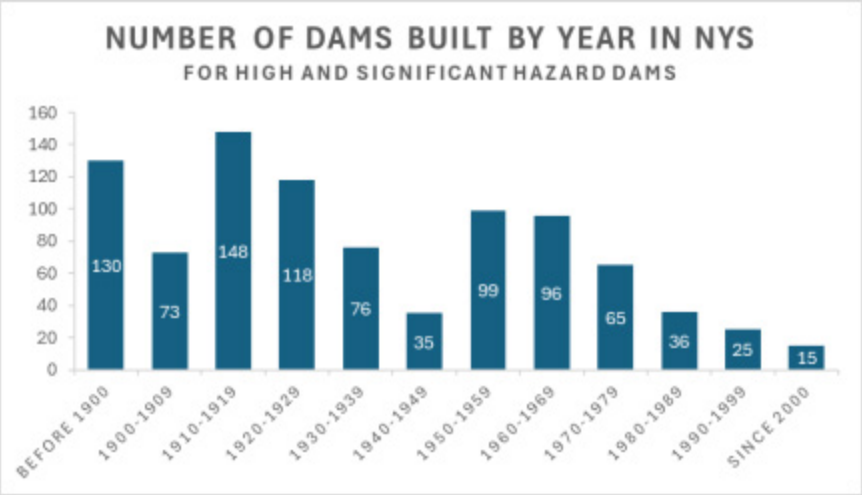
CONDITION

The condition of New York's dams is generally related to their age, changes in downstream development, and the level of ongoing inspection, maintenance and repairs performed by dam owners. As shown in the figure below, many of the state's dams were constructed decades ago, with a large portion built before current dam safety standards. This aging infrastructure provides important context for evaluating current condition ratings.

Dams are classified in New York based on the level of damage possible if the dam were to fail. Hazard classifications are assigned based on factors such as physical structure and location of the dam, potential for loss of life, damage to natural resources, and access to emergency services. A dam can be assigned one of four classes:

- **Class A** (Low Hazard) - Failure would result in only isolated damage and is unlikely to result in the loss of life or disruption to important facilities.
- **Class B** (Intermediate/Significant Hazard) - Failure would result in damage to a small number of homes or minor roads, may potentially disrupt important utilities, and is likely to pose the threat of personal injury.
- **Class C** (High Hazard) - Failure may result in widespread or serious damage to homes, main highways, important utilities, the loss of human life, and/or widespread substantial economic loss.
- **Class D** (Negligible or No Hazard) - Dam has been breached or removed.

Figure 1: Dams of New York

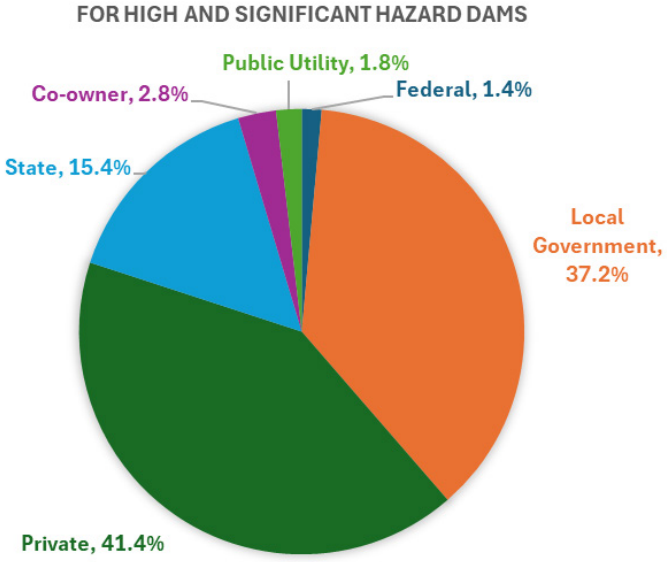


Source: (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.

In New York State there are 438 High Hazard Class C dams, and 554 Significant Hazard Class B dams. There is limited information available in the USACE National Inventory of Dams (NID) database for Class A and Class D dams due to the minimal regulatory requirements that need to be documented. However, the New York State Department of Environmental Conservation (DEC) regulates 4,479 Class A dams and 1,322 Class D dams. Due to the limited information available for Class A and Class D dams, the majority of this report will refer to High Hazard (Class C) and Significant Hazard (Class B) dams.

Dam ownership in New York State varies from Federal, State, Local Government, and Privately owned. The owner is responsible for following either state or federal regulations, which will be discussed in more detail in the Public Safety & Resilience Section. The chart below shows the distribution of dam ownership for Class B and C dams in New York State.

Figure 2: New York State Dam Ownership



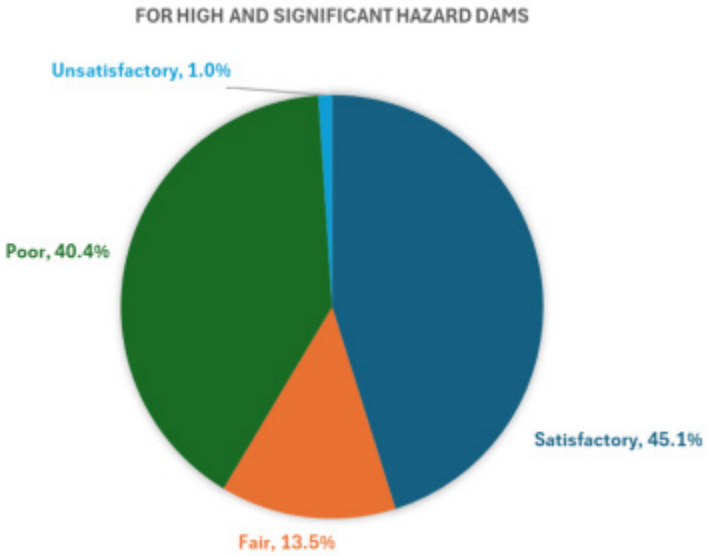
Source: (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.

In New York State, Class C and Class B dams are generally inspected every 2 and 4 years, respectively. When inspected, they may receive a condition rating of no deficiencies noted or deficiently maintained (equates to satisfactory), unsound (equates to fair or poor), and unsafe (equates to unsatisfactory). The definitions for the condition ratings within the NID database are as follows:

- **Satisfactory:** No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions, regulatory criteria, and risk guidelines.
- **Fair:** No existing dam safety deficiencies are recognized for normal operating conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency.
- **Poor:** A dam safety deficiency is recognized for normal operating conditions which may realistically occur. Remedial action is necessary.
- **Unsatisfactory:** A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
- **Not Rated:** The dam has not been inspected, is not under state or federal jurisdiction, or has been inspected but has not been rated.
- **Not Available:** Dams for which the condition assessment is restricted to approved government users.

The chart below shows the condition assessment of the High and Significant Hazard dams that are tabulated in the NID database. The dams that received a 'Not Rated' or 'Not Available' are not included in the chart; that was approximately 33% of the High and Significant Hazard Class Dams.

Figure 3: NYS Dam Condition Assessment



Source: (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.

45% of Hazard Class B and 6% of Hazard Class C dams did not have an Engineering Assessment on file, with 15% of those assessments older than 10 years. A breakdown of the Condition Assessments based on ownership are tabulated below.

Table 1: Condition Assessments by Ownership

	Owned Dams in NY (%)	Not Rated/ Available (%)	Satisfactory Rating (%)*	Fair Rating (%)*	Poor Rating (%)*	Unsatisfactory Rating (%)*
State Owned	15.4	30	21	17	32	0
Local Government Owned	37.2	6	43	15	35	1
Privately Owned	41.4	31	19	6	43	1

**These rating percentages do not include the dams with the 'Not Rated' or 'Not Available' designation*

Source: (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.)

CAPACITY

Over the decades, populations have developed land downstream from these aging dams. When built, many dams held less risk to human life, but increasingly populated areas have contributed to growth in the number of High Hazard dams. Between 2020 and 2025, the number of High Hazard dams grew from 408 to 438.

A key metric for evaluating dam spillway and flood capacity is Probable Maximum Precipitation (PMP), which is based on the concept that a physical upper limit exists for rainfall at a given location. PMP procedures were originally developed by federal agencies in the 1940's and then updated in 1978 based on the National Oceanic and Atmospheric Administration's (NOAA) legacy Hydrometeorological Reports HMR 51 (Probable Maximum Precipitation Estimates, United States East of the 105th Meridian) and updated again in 1982 based on HMR 52 (Application of Probable Maximum Precipitation Estimates).

O&M, FUNDING & FUTURE NEED

Public funding available for dams in NY State comes from federal, state, and local governments as well as some non-governmental organizations. The funding available is a small portion of the funding estimated to be required to maintain dams in safe condition. Costs will continue to rise as maintenance, repair, and rehabilitation work are deferred. Compared to other states in the United States, New York is below the average for state budget per regulated dam and High Hazard Potential Dams, as shown in Figure 4.

Federally Owned Dams

Federally owned dams account for 1.5% of New York's Class C and B dams. The regulatory agencies for these dams include the U.S. Army, U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission (FERC), U.S. Fish and Wildlife, and National Park Service. Subsequent ASDSO updates after 2016 have restricted their scope to nonfederal dams and therefore do not have any updates on federal dam rehabilitation estimates.

Non-Federally Owned Dams

The estimated cost to rehabilitate non-federally owned dams in the United States is $165.2 billion, with $3.4 billion in New York, and $1 billion needed for the New York High Hazard dams rated less than Satisfactory. These amounts are nearly triple those reported in 2016, which were $60.7 billion nationally and $1.1 billion in NY.

State Owned Dams

State owned dams account for 15.4% of NY's Class C and B dams; 49% of these dams have a condition rating of less than satisfactory. DEC does not publish estimated rehabilitation costs needed to improve the condition rating.

Local Government Owned Dams

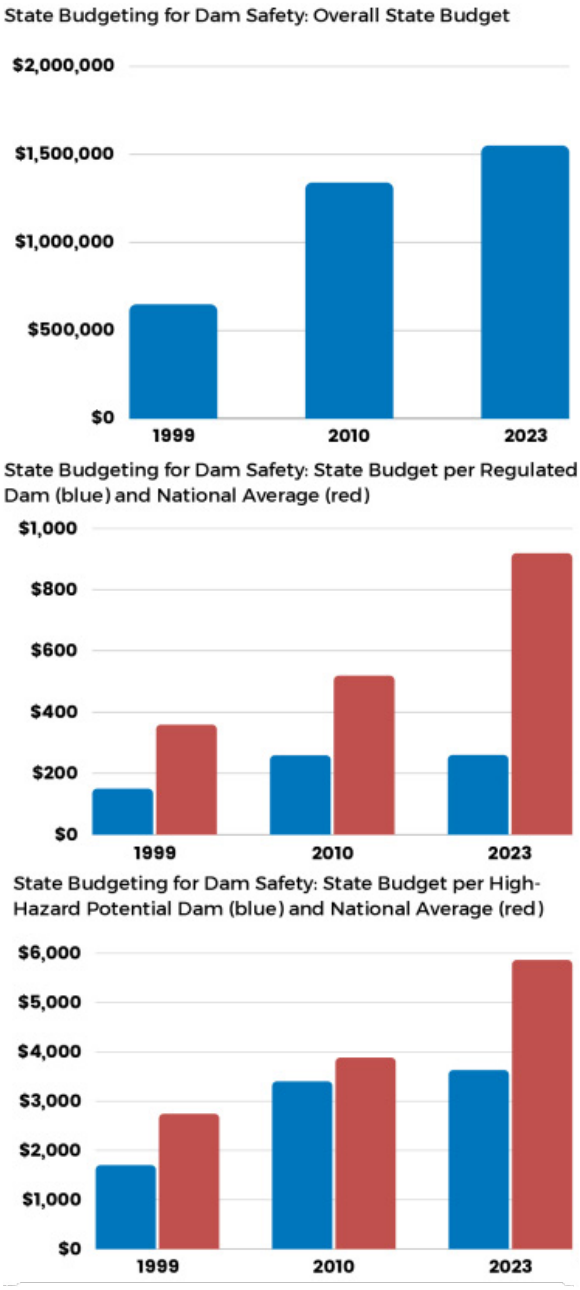
Dams owned by local governments account for 37% of NY's Class C and B dams; 51% of these dams have a condition rating of less than satisfactory. The 2018 NY State Comptroller's report estimated that the rehabilitations needed to get these dams up to a satisfactory condition rating would cost approximately $360 million. However, with the increasing number of dams in the NID database, as well as inflation and deferred maintenance, it can be predicted that this estimate is most likely 3 times that in 2026 - similar to the overall dam rehabilitation cost increase mentioned for Non-Federally Owned Dams.

Privately Owned Dams

The majority of Class C and B dams in New York State are owned privately - accounting for approximately 41%. These owners include individuals, businesses, and hydroelectric companies, and these dams are used for recreation, agricultural, and generating power. Private dam owners, as with any dam owner, have the responsibility to follow state and/or federal regulations when it comes to dam safety.

Private owners have the least access to funding of any of the dam-ownership categories. Most private dam work is funded with the owner's own capital (savings, loans, and mortgages), and many lack sufficient funding for large scale repairs to appropriately address safety concerns.

Figure 4: State Budgeting for Dam Safety



Source: (ASDSO). "Dam Safety Performance Report." New York: ASDSO, 2024.

Funding and Grants for Non-Federally Owned Dams

The Federal and State funding for dams has been far less than the estimated cost needed to improve the condition ratings of New York's High and Significant Hazard Dams. Because of this, the rehabilitation and repair process must be stretched over many funding cycles.

Various grants are available through the Federal Emergency Management Agency (FEMA), Department of Energy (DOE), and the Department of Environmental Conservation (DEC).

- FEMA - Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program for the rehabilitation of eligible high hazard potential dams. In 2024, NY DEC was allotted $9.2 million from the Infrastructure Investment and Jobs Act (IIJA). This grant is mainly for local and state entities, with private dam owners eligible to apply with a state or local government sponsorship.
- FEMA - Building Resilient Infrastructure Communities (BRIC) is a hazard mitigation program that makes federal funds available to states and local governments for hazard mitigation activities, such as upgrading and modernizing dams. This program provides $1 billion in grant funding nationally, with a maximum of $150 million per state or local government. A main FEMA source, BRIC, remains funded, but has recently experienced a funding pause. Broader FEMA climate-related programs have been cut or suspended, jeopardizing funding for New York watershed resiliency projects, including dam-related work.
- DOE - The Hydroelectric Incentives Program oversees an investment of more than $750 million nationally to support the continued operation of hydropower to meet the nation's clean energy goals and ensure a more reliable and resilient electric grid system. Hydropower dams are usually privately owned, and therefore they would be eligible for these incentives.
- DEC - Clean Water, Clean Air and Green Jobs Environmental Bond Act (2022) Program invested $4.2 billion in NYS Environmental Communities. State agencies, local governments, and partners can access funding to rehabilitate, repair or remove dams, protect water quality, help communities adapt to climate change, and improve resiliency.

This funding is a positive step forward but still falls well short of the identified $165.2 billion needed to rehabilitate all dams nationally, and more specifically, $3.4 billion in New York.



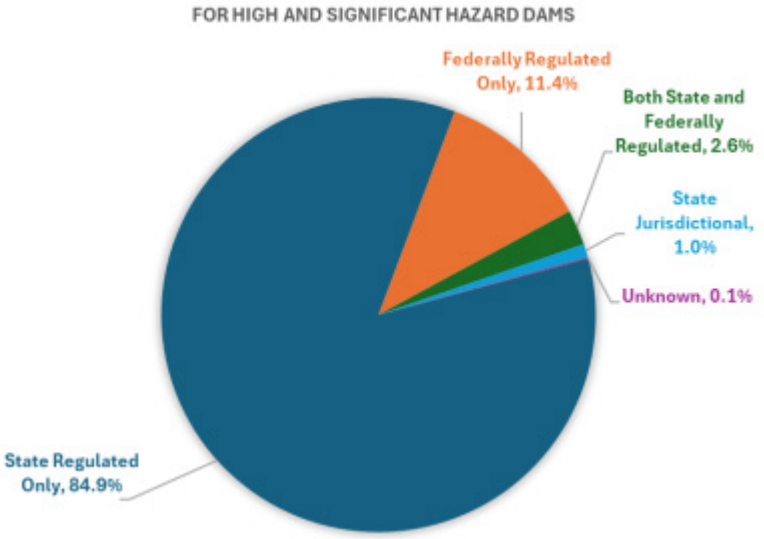
Photo: Delta Reservoir Dam; Colliers Engineering & Design

PUBLIC SAFETY & RESILIENCE

Dam failures not only pose risks to public safety, but they can also cause millions of dollars in damage and can result in the impairment of many other infrastructure systems, such as roads, bridges, and water systems. They can cause homes and roads to flood, property and personal injury, and it can negatively impact emergency response times.

State regulated Hazard Class C and B dams are required to develop an Emergency Action Plan, Annual Certification, Engineering Assessment, and Inspection and Maintenance Plan. Fortunately, 99% of High-Hazard potential dams in New York State have an Emergency Action Plan (EAP). EAP's provide dam owners and public safety officials with the appropriate procedures and communication networks needed to minimize loss of life in the event of a dam emergency. An EAP provides lines of communication to emergency managers, information on the downstream areas affected, which in turn increases the emergency response time to save lives. 162 of 1001 dams (16%) currently do not have an Emergency Action Plan on file with the DEC, including 155 of 556 Class B dams and 7 of 435 Class C dams. Similarly, 247 dams (28%) lacked a required Engineering Assessment, with noncompliance much higher among Class B dams (225 of 503) than Class C dams (22 of 364). For Annual Certifications, 118 dams (14%) had no certification on file, including 106 Class B dams and 12 Class C dams. Overall, the findings indicate substantially higher rates of noncompliance among Class B dams relative to Class C dams, particularly for Engineering Assessments and Emergency Action Plans, highlighting gaps in documentation and regulatory compliance that could affect dam safety oversight.

Figure 5: NYS Dam Regulations



Source: (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.

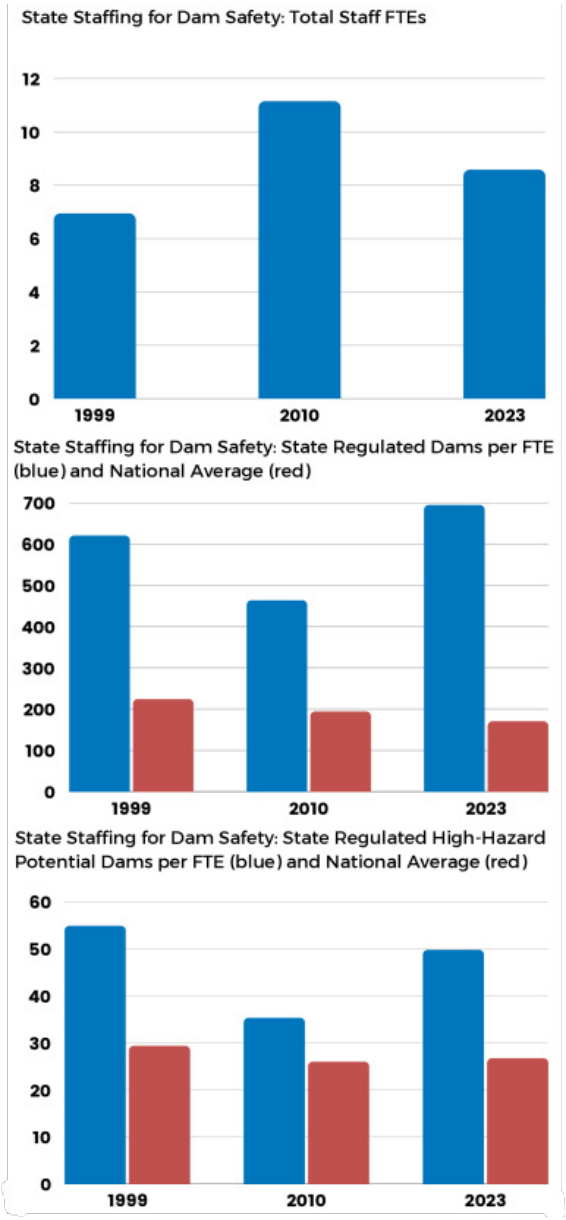
The primary state regulatory agency, DEC, is grossly understaffed in New York. There are approximately 8 full-time dam safety officials (FTE) who generally perform routine safety inspections as well as reviewing documentation of planned work. On average, each dam safety official oversees 50 High and Significant Hazard dams (approximately 100 total dams), compared to the national average of 28 dams. Maintaining enough trained staff is critical to achieving competent, and independent reviews of the safety of the New York State dams.

INNOVATION

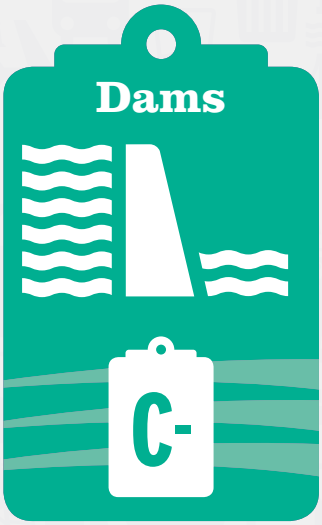
Recent improvements in computerized dam breach modeling coupled with high resolution LiDAR terrain data have greatly improved our understanding of the potential consequences of dam failures. With these advances, engineers can provide more detailed inundation mapping allowing emergency managers to plan evacuations in the event of a dam emergency. In addition, an increased amount of communication between dam owners, regulators, engineers, and emergency management better equips a team to respond in the event of an emergency, saving time, resources, and lives.

In 2025, NOAA constructed a multi-year initiative to update critical rainfall estimates with a 2030 target for development and rollout of an updated national PMP guidance. New York State is adopting these procedures, and once implemented, updated PMP estimates have the potential to reclassify additional dams in New York as having insufficient hydraulic capacity relative to current design standards.

Figure 6: New York State Staffing for Dam Safety



Source: (ASDSO). "Dam Safety Performance Report." New York: ASDSO, 2024.



RECOMMENDATIONS TO RAISE THE GRADE

To raise the grade for dam safety, several key improvements are needed across funding, regulatory capacity, policy, and public engagement.

- Increase critical investments, particularly for the rehabilitation of High and Significant Hazard dams, many of which are aging and require substantial upgrades to maintain safe conditions.
- Direct additional funding toward regulatory agencies to strengthen their ability to inspect, monitor, and enforce dam safety requirements. This is especially important given the current shortage of dam safety officials, which limits oversight capacity and slows compliance efforts.
- Grow public awareness and educate communities about dam safety risks and emergency preparedness to help reduce potential consequences in the event of a failure.
- Implement stronger enforcement mechanisms to ensure that dam owners develop and annually update Emergency Action Plans (EAPs), along with conducting regular exercises to test their effectiveness.
- Address barriers to dam removal to strengthen risk reduction strategies. Streamlining permitting requirements would make it easier for dam owners to pursue removal where appropriate, reducing long-term safety risks and maintenance burdens.

Together, these actions would significantly strengthen dam safety programs and improve the resilience of dam infrastructure in New York State.

SOURCES

Association of State Dam Safety Officials (ASDSO). "The Cost of Rehabilitating Dams in the U.S., A Methodology and Estimate." ASDSO, 2025.

Association of State Dam Safety Officials (ASDSO). "The Cost of Rehabilitating Our Nations Dams." ASDSO, 2016.

Association of State Dam Safety Officials (ASDSO). "Dam Safety Performance Report." New York: ASDSO, 2024.

Department of Environmental Conservation (DEC). "Statewide-Eligibility Guidelines for Grants to Reduce Flood Risk Through Removal or Repair of State-Owned Dams." Department of Environmental Conservation, Environmental Notice Bulletin, 3-27-2024, 2024.

DiNapoli, T. P. "Dam Infrastructure: Understanding and Managing the Risks.", 2018.

DiNapoli, T. P. "Department of Environmental Conservation, Oversight of Dam Safety." New York State, 2025.

National Academies of Science, Engineering, and Medicine (NASEM). "Modernizing Probably Maximum Precipitation Estimation." Washington, DC: The National Academies Press, 2024.

National Oceanic and Atmospheric Administration (NOAA), Physical Sciences Laboratory. "Probable Maximum Precipitation (PMP)." Boulder, CO: NOAA PSL, 2025.

Rabinow, L., Scott, M., Ofori-Awuku, F. "New York State of Dams." Rockefeller Institute of Government, 2026.

U.S. Army Corps of Engineers (USACE). "Dams of New York." Retrieved from National Inventory of Dams, 2026.



Photo: https://www.osc.ny.gov/files/local-government/publications/pdf/drinkingwatersystems.pdf

DRINKING WATER

EXECUTIVE SUMMARY

Approximately 95% of New Yorkers are served by one of the 9,000 public water systems across the state. New York State's (NYS) drinking water infrastructure provides essential public health protection and reliable service but faces growing challenges from aging assets, funding constraints, evolving regulations, emerging contaminants, and climate-related risks. Many systems operate infrastructure beyond its intended service life, including some components over a century old. Together with increasing maintenance costs, a significant rehabilitation and replacement backlog exists. Utilities also face rising energy, material, treatment, and operating costs while revenues remain constrained by variable water consumption and population changes. Although state and federal funding provides critical support, resources remain insufficient, particularly for smaller systems. Sustained investment, proactive asset management, financial planning, and resilient infrastructure are essential to ensure long-term reliability.

CONDITION & CAPACITY

Drinking water infrastructure is comprised of a variety of components that include source facilities, treatment plants, storage, pumping stations, and distribution networks that work together to deliver safe, reliable drinking water to communities.

Approximately 95% of the state's 20 million New Yorkers receive water from one of the state's 9,000 public water systems. Roughly 65% of the population is served by surface water, including about 9 million residents located within New York City. Most of the population served by groundwater supplies are located within Long Island. According to the NYS Department of Health, the remaining population of public water users is concentrated in cities, villages, and other suburban areas throughout the state.

Overall, New York's extensive watersheds in the Adirondack and Catskill regions, along with the Great Lakes and productive aquifers beneath Long Island, collectively contribute to a resilient and reliable water supply that can support future growth.

Over the past several decades, water demand has steadily decreased due to widespread conservation efforts, the installation of high-efficiency plumbing fixtures, and the increased use of water-saving appliances. Nationally, average per capita public water use declined from approximately 153 gallons per day in 1990 to 134 gallons per day by 2010. Similarly, the U.S. Environmental Protection Agency estimated that New York's per capita water use ranged between 76 and 100 gallons per day during the 2000–2015 period. Residential water consumption has

declined along with the population. Cornell's Program on Applied Demographics anticipates New York's population will decrease over the next 25 years from 19.6 million to projections that range from 19.4 to 17.2 million which should further reduce residential water consumption.

However, New York State's drinking water infrastructure continues to face significant challenges associated with aging assets and underinvestment, resulting in an overall condition that is considered fair. Much of the state's water distribution network has exceeded its intended service life. Water main breaks are routinely experienced and notable large diameter breaks in urban areas such as New York City have received media attention such as the break near Times Square in 2023 of a pipe installed in 1896 that flooded the subway.

Limited capital funding has prevented utilities from replacing infrastructure at a sustainable pace. As a result, around 40% of New York City's pipes were placed prior to the 1940s and some water mains have remained in service for over 100 years, far surpassing the typical design life of 50 to 70 years for pipelines. Delaying rehabilitation and replacement increases the likelihood of water main breaks and emergency repairs.

While distribution systems represent the greatest infrastructure concern, many water treatment plants are also approaching a critical stage in their lifecycle. A large portion of these facilities were built between the 1970s and 1990s after the passage of the Safe Drinking Water Act and subsequent amendments. Since equipment within treatment facilities is generally expected to remain in service for only 20 to 40 years, many essential mechanical and electrical components are at or beyond their expected service life. Even so, treatment plants are generally in better condition than distribution networks due to consistent regulatory oversight and inspection programs that help ensure compliance with drinking water standards and operational reliability. Furthermore, new treatment systems and plant expansions are being constructed across the state to replace aging infrastructure and address emerging contaminants.

The diversity of New York's public water systems further complicates funding challenges. Approximately 70% of the state's population is served by just 15 large water suppliers, while nearly 9,000 smaller public water systems collectively serve the remaining 30% of residents. These smaller systems often lack the customer base necessary to distribute increasing operation, maintenance, depreciation, and replacement costs across enough ratepayers, making them particularly vulnerable to financial strain.

a utility's ability to improve long-term resilience and sustainability. Although leak detection programs and water audits are increasingly used to identify system losses, smaller utilities often struggle to dedicate sufficient funding to these efforts.

Croton Dam Spillway



Source: https://www.flickr.com/photos/nycwater/14876580030

Table 1. Largest Water Supplies in New York State

SYSTEM	SERVICE AREA (Counties)	POPULATION SERVED
New York City	Bronx, Kings, New York, Queens, Richmond	8,271,000
Suffolk County Water Authority	Suffolk	1,100,000
Monroe County Water Authority	Monroe, Orleans	525,262
Onondaga County Water Authority	Onondaga	350,000
Erie County Water Authority - Direct	Erie	313,380
Buffalo Water Authority	Erie	276,000
Veolia Water New York	Rockland	270,000
Liberty Utilities New York - Lynbrook	Nassau	220,000
Yonkers City	Westchester	211,569
Rochester City	Monroe	210,000
Syracuse City	Onondaga	192,000
Veolia Water New York, RD-1	Westchester	146,732
Liberty Utilities New York - Merrick	Nassau	135,000
Mohawk Valley Water Authority	Oneida	126,250
Water Authority of Western Nassau	Nassau	120,000

Source: Safe Drinking Water Information System, United States Environmental Protection Agency

Water loss within distribution systems continues to be a widespread issue. While the American Water Works Association does not specify a specific unaccounted-for water percentage target, many New York utilities report losses substantially higher than the 10% target cited historically, with the water systems with the highest losses reporting values exceeding 40% to the New York State Department of Environmental Conservation.

Excessive water loss affects utility operations in several ways. Beyond reducing available drinking water supplies, it decreases revenue, increases energy and chemical consumption associated with treatment and pumping, and limits overall system efficiency. These financial impacts can delay infrastructure investments and reduce

OPERATION AND MAINTENANCE (O&M) & FUNDING

Maintaining and upgrading New York State's drinking water infrastructure requires sustained investment from multiple funding sources, including user fees, property tax revenues, and state and federal financial assistance. However, available funding has not kept pace with the growing costs of operating, maintaining, and modernizing water systems. As infrastructure continues to age and regulatory requirements become more stringent, many utilities face increasing financial pressure. While water systems within the state have implemented proactive asset management programs, smaller systems often lack the financial and technical resources to escape a cycle of reactive repairs.

Although programs such as the Drinking Water State Revolving Fund (DWSRF) provide critical lowcost financing, available assistance remains far below statewide demand. According to the NYS Department of Health, approximately 95% of drinkingwater infrastructure projects submitted to the DWSRF have not received funding, underscoring the persistent gap between available resources and documented infrastructure needs. While individual funding programs may offer millions in support, New York's overall 20-year need for drinking water infrastructure is estimated at upwards of $45 billion in today's dollars.

For many utilities, operating revenues have remained relatively stagnant and have generally failed to keep pace with inflation or rising operating expenses. As a result, utilities struggle to fund routine operations and maintenance while simultaneously addressing major capital improvements and new regulatory requirements.

Public water systems frequently postpone infrastructure renewal until failures occur, reflecting a reactive rather than proactive approach to asset management. Achieving long-term financial sustainability will require more consistent revenue generation and broader public support for investments in drinking water infrastructure.

Public opposition to water rate increases remains a significant obstacle to improving system finances. Because water service is generally reliable and drinking water consistently meets regulatory standards, the public often underestimates the level of investment required to maintain these systems. Water rates charged to consumers vary substantially across the state, particularly the prices charged for public versus private water systems. However, funding through rates has not kept pace with the costs of operating and maintaining the drinking water system infrastructure. Water utilities continue to provide safe and dependable service despite mounting infrastructure challenges and increasing costs for construction materials, treatment chemicals, energy, and equipment. As a result, the drinking water supply is one of the state's least visible yet most essential public services. Further compounding the issue, aging customer meters also contribute to revenue losses by becoming less accurate over time and under-recording water consumption, further reducing the financial resources needed to maintain and modernize drinking water infrastructure. While some utilities have dedicated meter replacement programs, delaying investment and upgrades only increases future repair and replacement costs as infrastructure continues to deteriorate.

Water main installation, New York City



Source: https://www.nyc.gov/site/dep/news/23-017/over-mile-new-water-mains-installed-maspeth-queens

FUTURE NEED

Ensuring the long-term sustainability of New York's drinking water systems will require significant increases in utility revenues to support infrastructure renewal, regulatory compliance, and rising operating costs.

At the same time, many utilities in New York have shifted away from funding water services through property tax revenues and instead rely primarily on volumetric water rates and user fees. While this approach promotes conservation, it also links utility revenue directly to water consumption. As customers use less water, utilities collect less revenue despite continuing to incur many of the same fixed costs associated with operating, maintaining, and replacing critical infrastructure.

Compounding this challenge, much of New York's water infrastructure was constructed decades before today's lower demand patterns emerged. Treatment plants, transmission systems, and distribution networks were designed to serve higher levels of water use and must still be maintained regardless of declining consumption. Consequently, utilities must recover the costs of these largely fixed assets over a smaller volume of water sold.

Emerging drinking water quality concerns have substantially expanded both capital and operational obligations. Mandated actions to replace lead service lines, address per and polyfluoroalkyl substances (PFAS), manage cyanotoxins, and treat other emerging contaminants have introduced significant new costs that were not anticipated when many existing systems were originally designed and constructed

Addressing these contaminants requires substantial capital investment. The estimated statewide cost of installing treatment systems capable of removing PFAS and other emerging contaminants exceeds $1.5 billion. While these enhanced standards provide

important public health protections, they also create substantial financial and operational challenges for public water suppliers. Utilities must invest in advanced treatment technologies and system upgrades to comply with evolving regulations, often while simultaneously addressing the replacement of aging infrastructure. With limited financial resources, many water systems are forced to balance competing priorities between regulatory compliance and long-overdue infrastructure renewal. Despite these challenges, 98% of New York systems reported no maximum contaminant level (MCL) violations in 2025.

Costs associated with replacements of lead service lines (LSL) will further strain utility budgets. The IIJA allocated $15 billion nationally for LSL replacement. New York has been awarded $369 million in federal IIJA funds for lead service line inventory and replacement projects as of September 2025. The Drinking Water Infrastructure Needs Survey and Assessment's (DWINSA) projected LSL percentages by state directly inform the EPA's allocation formula for distributing these funds, meaning New York's 6.15% share of national LSLs positions it as a significant recipient.

The EPA's own estimate places the total cost to replace all lead service lines in New York by the 2037 federal deadline at $2.5 billion. Using national unit cost benchmarks of $5,328 (low) to $9,015 (high) per line, the DWINSA projects a statewide replacement cost ranging from approximately $2.6 billion to $4.5 billion. The gap between the $369 million in federal IIJA funding awarded to date and the EPA's $2.5 billion total replacement cost estimate leaves a substantial unfunded balance. Combined with demonstrated cost overruns, administrative inefficiencies, and significant unspent funds from the prior state program, New York faces a complex fiscal challenge in meeting the 2037 deadline for full LSL replacement.

Tables 2 and 3 below include 20-year investment need projections based on project category and water supplier size. These tables are provided by the DWINSA.

Table 2: New York State 20-year Need Reported by Project Category (in billions of U.S. dollars; January 2021)

Distribution/ Transmission	Treatment	Storage	Source	Other	Total
24.5	5.4	3.2	1.1	0.9	35.1

Source: EPA Drinking Water Infrastructure Needs Survey and Assessment, 7th Edition

Table 3: New York State 20-year Need by System Size (in billions of U.S. dollars; January 2021)

Large	Medium	Small	NPNCWS*	Total
22.2	7.0	5.4	0.5	35.1

**NPNCWS - Not-For-Profit Noncommunity Water Systems*
Source: EPA Drinking Water Infrastructure Needs Survey and Assessment, 7th Edition

Although water conservation provides important environmental benefits and helps protect available water resources, it also creates financial challenges for water suppliers. To maintain reliable service and adequately invest in aging infrastructure, many systems will need to increase water rates even as overall consumption continues to decline. Future rate adjustments must account not only for reduced demand but also for inflation, increasing operational expenses, and the substantial capital investments required to modernize New York's drinking water infrastructure.

The Infrastructure Investment and Jobs Act (IIJA) provided a historic but temporary infusion of federal support that expires after FY2026. Most of this funding was through the Drinking Water State Revolving Funds (SRFs) with New York having been allotted approximately $2 billion. While this additional funding has helped utilities, it is insufficient to close the long-term funding gap for regulatory-mandated needs. Over the past several decades the costs to cover water infrastructure have largely come from State resources but the federal government continues to remain a part of drinking water solutions. As a result, long-term federal and state financing mechanisms such as the Drinking Water State Revolving Funds (SRFs) and the Water Infrastructure Finance and Innovation Act (WIFIA) remain critical tools for keeping projects affordable and enabling utilities to finance essential upgrades.

As New York pursues major legislative priorities such as the electrification of motor vehicles, expanded energy production, and the growth of high-tech industries, water availability will become increasingly important. The state has recently enacted a moratorium on new hyperscale data centers, but New York is progressing initiatives to bring computing centers, semiconductor manufacturing, and advanced chip fabrication facilities online; all are highly water- and energy-intensive industries. Constraints on reliable water supply infrastructure could therefore limit New York's ability to expand electric generation capacity and support grid reliability while being able to attract major investments in the emerging technology and manufacturing sectors.

Lastly, in addition to financial challenges, the drinking water sector is confronting a growing workforce shortage. According to the American Water Works Association 2025 benchmarking survey, 21% of utility employees are expected to become eligible for retirement within the next five years, compared with an average vacancy rate of 9%. The workforce is also aging, with more than 30% of water industry employees aged 55 or older and just 4.5% under the age of 25. At the same time, the U.S. Bureau of Labor Statistics anticipates approximately 10,000 water operator job openings each year through 2034.

PUBLIC SAFETY

Although periodic droughts affect portions of New York, the state benefits from substantial freshwater resources that provide a high degree of supply reliability. Extensive watersheds in the Adirondack and Catskill regions, the Great Lakes, and the productive aquifers underlying Long Island collectively provide a resilient water supply compared with many regions of the western United States. Despite the abundance of available water, protecting source water quality remains an ongoing challenge, as contamination risks differ considerably across watersheds and aquifers. Major sources of contamination across the state include saltwater intrusion from coastal waters, road salt from winter maintenance operations, pathogens and nitrates from failing septic systems and animal waste, nitrogen and phosphorus from agricultural and fertilizer applications, and chemical contamination from industrial and commercial uses.

Providing safe, reliable drinking water depends not only on maintaining aging infrastructure but also on meeting increasingly rigorous water quality standards. In recent years, New York State has placed strong legislative and regulatory emphasis on protecting public health by strengthening requirements for emerging drinking water contaminants and lead pipe service replacement. According to the New York State Department of Health, a total of 4,124 public water systems had violations in calendar year 2025. This represents a 0.1% decrease from the prior year, but the total number of violations issued increased from 8,188 to 9,199 in the same period. Overall, 98% of systems reported no maximum contaminant level (MCL) violations last year. In comparison to the prior year, 22 fewer systems experienced an MCL violation.

Among the state's most significant regulatory initiatives are standards addressing PFAS, including PFOA and PFOS, as well as 1,4-dioxane. New York helped lead efforts to adopt stringent drinking water regulations for these contaminants. New York State Senate Bill S3207A, which is awaiting the Governor's signature, would further expand regulations on contaminants by establishing maximum contaminant levels for PFAS compounds such as PFNA, PFHxS, and HFPO-DA.

The need for these regulations is particularly evident in

regions where emerging contaminants have been detected in drinking water sources. Elevated concentrations of PFAS have been identified in groundwater supplies on Long Island and in other areas of the state. Likewise, 1,4-Dioxane has been detected in a significant number of Long Island wells, with approximately 70% containing measurable concentrations and several exceeding the state's drinking water standard of 1 part per billion.

The needs associated with water treatment are expected to grow from existing and emerging threats as the regulatory landscape continues to evolve. With pressures to meet these treatment requirements as well as address maintenance concerns, there is ultimately a choice by water providers as to where to prioritize limited funding.

RESILIENCE & INNOVATION

In addition to ongoing financial constraints, regulatory requirements, and emerging water quality concerns, New York's drinking water systems must also contend with an increasing range of extreme weather events. Hurricanes, intense storms, prolonged cold periods, and other climate-related hazards have the potential to disrupt water supply operations, damage critical assets, and compromise system reliability. In recent years, Tropical Storm Isaias (2020), Hurricane Ida (2021), and Tropical Storm Ophelia (2023) among others have resulted in heavy rainfall and significant disruptions across the state according to the National Weather Service. Storms such as these challenge water systems through power grid outages, damage to infrastructure, and supply chain delays. These challenges highlight the need for infrastructure that is designed with resilience, redundancy, and long-term adaptability in mind.

Drinking water system resilience refers to the ability of a utility to anticipate, withstand, respond to, and recover from both natural hazards and human-caused disruptions. A resilient water system is designed not only to maintain essential service during adverse conditions but also to adapt to changing risks and restore operations efficiently following an emergency.

The integration of resilience principles into water infrastructure planning is an established practice. Utilities routinely evaluate alternatives, assess potential risks, and incorporate long-term performance considerations when developing capital improvement projects. Because many drinking water assets are expected to remain operational for 50 to 100 years, effective planning requires consideration of future conditions, potential hazards, and evolving operational demands. Incorporating resilience strategies during the early stages of project development allows utilities to improve reliability, reduce vulnerability, and maximize the long-term value of infrastructure investments.

Federal regulations also recognize the importance of proactive risk management. Under the Safe Drinking Water Act, community water systems serving more than 3,300 people are required to complete risk and resilience assessments to evaluate vulnerabilities and identify potential improvements. Following these assessments, utilities must prepare or update emergency response plans to establish procedures for responding to and recovering from potential disruptions. In 2025, the New York State Comptroller conducted an audit and found that the plans for most of the 317 water systems that were required to submit them were current and available.

In 2026, New York State established new minimum cybersecurity requirements for public water systems, including mandatory cybersecurity training for certified operators and expanded incidentreporting obligations. The State also created the $2.5 million Strengthening Essential Cybersecurity for Utilities and Resiliency Enhancements grant program to support utility cybersecurity assessments and system upgrades necessary to meet evolving regulatory expectations.

New York State's drinking water utilities are also playing an important role in advancing infrastructure modernization. Water systems throughout the state have adopted advanced oxidation process technologies to remove emerging contaminants such as 1,4-dioxane, while also implementing automated metering infrastructure and digital twin technologies to model installed infrastructure. To improve operational efficiency and identify leaks at an early stage, utilities in areas including New York City are increasingly deploying continuous water-quality monitoring equipment and smart level sensors.



RECOMMENDATIONS TO RAISE THE GRADE

- **Secure Federal and State Funding for all regulatory-driven changes.**
  Water utilities face increasing financial obligations as they work to comply with new and evolving regulatory requirements. Significant regulatory changes - particularly mandated lead service line (LSL) replacement - should be paired with dedicated funding mechanisms to offset the substantial new capital and operational burdens placed on utilities.
- **Raise Awareness for the True Cost of Water**Educating the public and policymakers about the value and true cost of water. Access to reliable and safe water requires effort, expense, and infrastructure. Current New York State water rates do not reflect the true cost of reliably conveying and treating water. Replacing antiquated pipes and treatment equipment will require significant local investment, and users should be aware of what their water rates will fund. Rates have often been kept artificially low at the expense of taxpayers and to the long-term detriment of the systems. Proposed utility rates should cover the full cost of service including operation, maintenance and capital needs.
- **Increase funding opportunities for water main replacements**
  Projects that centered around replacing deficient or functionally obsolete water mains should receive increased priority in future capital planning and grant funding considerations. There should be additional funding opportunities focused on replacement of water mains of all sizes.
- **Increase state and local support for workforce initiatives**
  Increasing state and local support to recruit, train, and retain the next generation of the drinking water sector workforce is essential for maintaining safe, reliable, and sustainable water systems. As many experienced workers approach retirement, utilities and water providers face the challenge of replacing a significant portion of their skilled workforce. Investing in education, workforce development programs, apprenticeships, and specialized training can help attract new employees while ensuring they have the knowledge and technical skills needed to operate and maintain drinking water infrastructure.
- **Provide additional incentive programs for small utility systems to consolidate into existing or proposed utility authorities.**
  Increased regulations, asset management/infrastructure planning, etc., puts an increasing burden on small systems with limited resources. Pooling resources and expanding the rate base make funding more achievable and improves technical and managerial capacity.



SOURCES

ASCE. "Report Card for Minnesota's Infrastructure," 2026.

ASCE. "Report Card for New York's Infrastructure," 2022.

ASCE. "Report Card for North Carolina's Infrastructure," 2026.

ASCE. "Solutions to Raise the Grade," 2025.

ASCE. "2025 Infrastructure Report Card: Drinking Water," 2025.

City of New York. "Mayor's Management Report: September 2025," 2025.

City of New York. "Ten-Year Capital Strategy: Fiscal Years 2022-2031," 2021.

City of New York. "Ten-Year Capital Strategy: We're investing $133.7 billion over the next decade to build a better NYC," 2021.

New York State Comptroller. "Oversight of Water Supply Emergency Plans (Follow-Up)," 2025

New York City Municipal Water Finance Authority. "Financial Reports," n.d.

New York State Department of Health. "Annual Compliance Reports," 2025.

New York State Department of Health. "Drinking Water Infrastructure Needs of New York State,"

2008.

New York State Department of Health. "Drinking Water Program: Facts and Figures,"

New York State Department of Health. "Triennial Capacity Development Program Report to the Governor," n.d.

New York State Department of Health. "2025 State of New York Public Water Supply

Annual Compliance Report," n.d.

Nolan, Erin. "Water Main Break in Midtown Manhattan Floods Subway System," 2023.

NYC Environmental Protection. "New York City Drinking Water Supply and Quality

Report," 2025.

NYC Environmental Protection. "One Water NYC: 2023 Water Demand Management

Plan," 2023.

United States Environmental Protection Agency. "America's Water Infrastructure Act

Section 2013 Compliance Data," 2013.

United States Environmental Protection Agency. "EPA's 2023 Drinking Water

Infrastructure Needs Survey and Assessment Fact Sheet," 2023.

United States Environmental Protection Agency. "Safe Drinking Water Information System," 2026.

Water Finance & Management. "Mapping Progress of IIJA Funding for Water Infrastructure," n.d.



Photo: South Street Seaport on East River. Lower Manhattan; Roman Babakin

PORTS

EXECUTIVE SUMMARY

New York's maritime transportation system is a critical component of the State and national economy, supporting international commerce, domestic freight, manufacturing, agriculture, energy, construction, tourism, and national security. New York Harbor is the State's principal international maritime gateway, while Hudson River ports, the Canal System, and Great Lakes and St. Lawrence ports extend the system throughout Upstate New York and into Canadian and domestic markets.

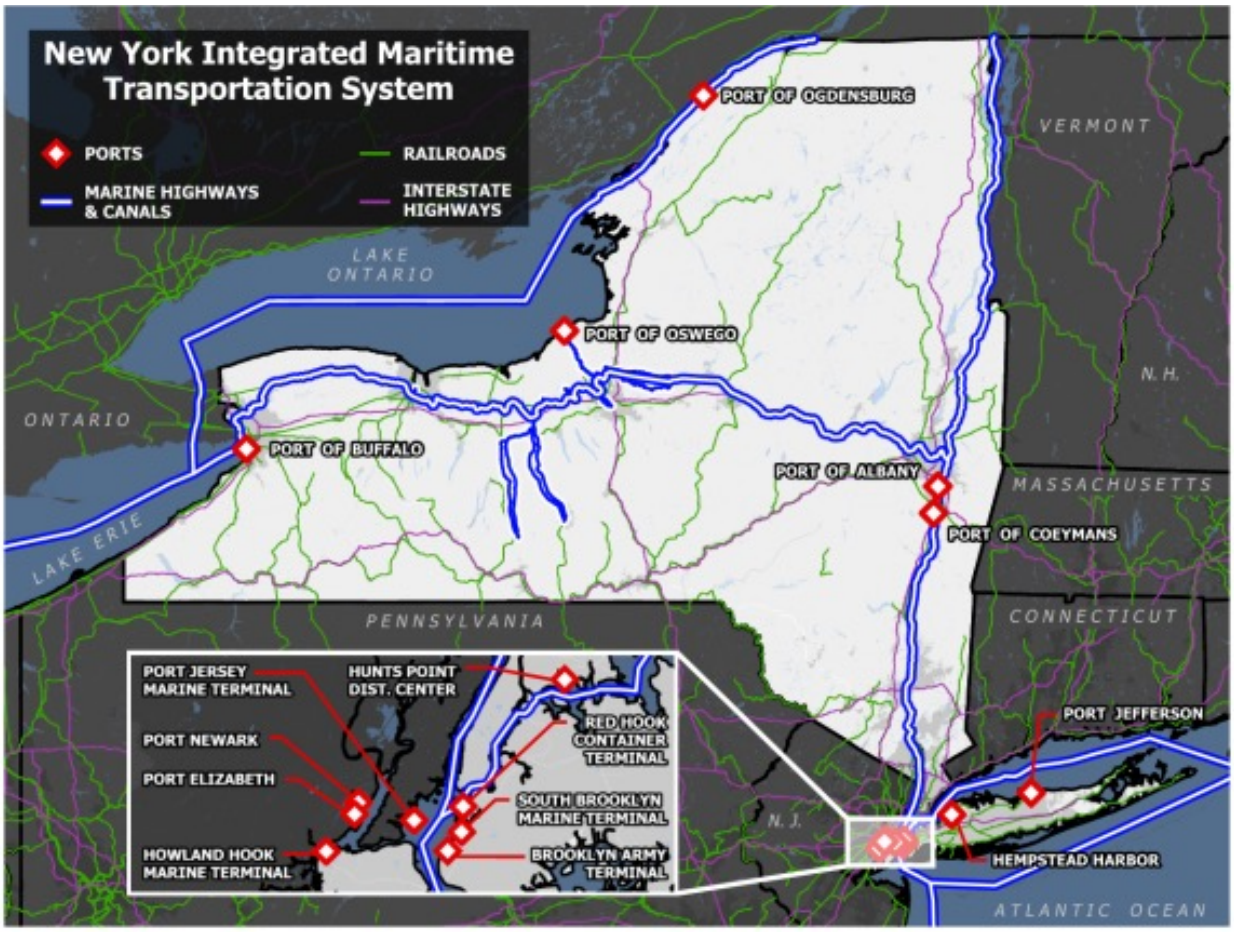
Since the 2022 Report Card, terminal modernization, freight mobility, waterfront redevelopment, clean-energy infrastructure, and economic-development investments have strengthened portions of the system. Aging marine infrastructure still requires maintenance and rehabilitation, climate and operational risks are increasing, and long-term capital needs remain substantial. However, strong cargo performance, continued public and private investment, multimodal connectivity, and ongoing modernization demonstrate measurable progress.

BACKGROUND

New York's port system includes the Port of New York and New Jersey maritime complex, Hudson River facilities including Albany and Coeymans, and Great Lakes and St. Lawrence ports including Buffalo, Oswego, and Ogdensburg. Facilities are operated through a combination of bi-state and public authorities, State and local entities, municipalities, and private terminal and maritime operators. New York Harbor provides the principal international gateway, while the Hudson River, Canal System, and Great Lakes and St. Lawrence system extend maritime access to the Capital Region, Upstate New York, Canada, and inland markets. The system depends on direct connections with rail, highways, inland waterways, and logistics facilities.

Figure 1. New York's Integrated Maritime Transportation System illustrates this statewide network, including major ports, marine highways and canals, railroads, interstate highways, and the New York metropolitan maritime complex.

Figure 1. New York's Integrated Maritime Transportation Systems

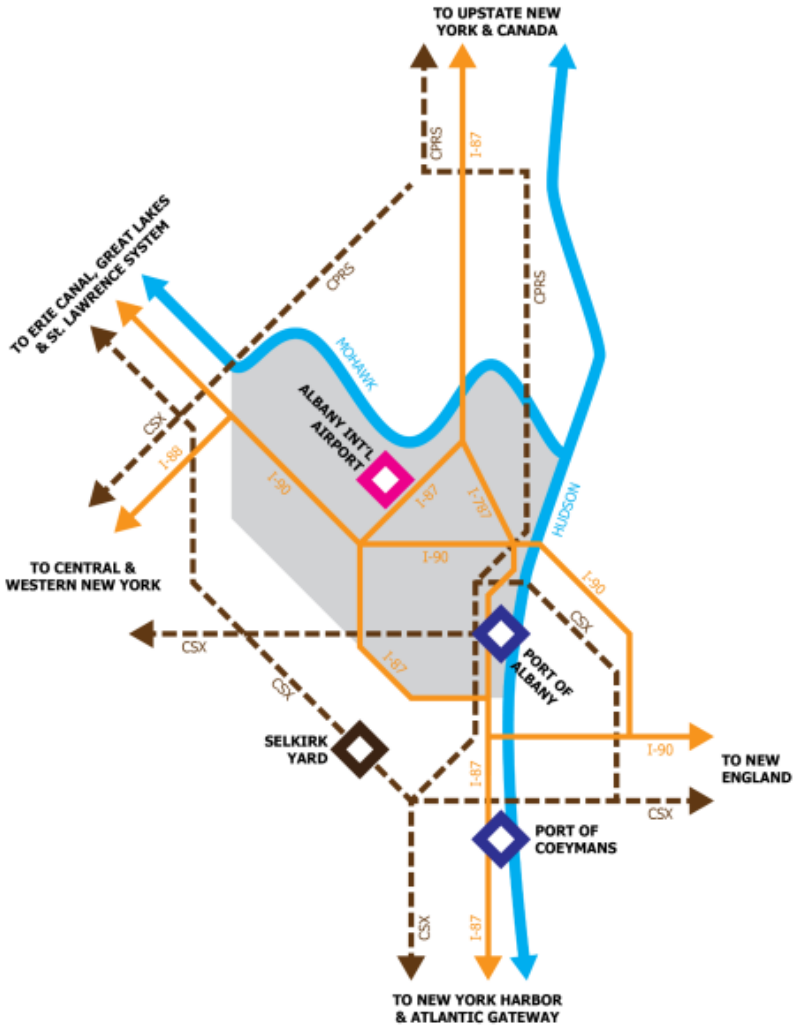


The Capital Region is an important component of this statewide maritime and logistics network. Albany and Coeymans, together with the Hudson River, nearby rail facilities, interstate highway corridors, the Canal System, manufacturing centers, and logistics facilities, provide multimodal connections among New York Harbor, Upstate New York, the Great Lakes, New England, and Canada.

Efficient transfer facilities, coordinated operations, sufficient infrastructure capacity, and system redundancy are important to the performance of New York's ports. Figures 1 and 2 illustrate the statewide maritime network and the Capital Region's multimodal connections; the assessment below focuses on measurable port condition, capacity, operations, funding, safety, resilience, and innovation.

Figure 2. Port of Albany: Strategic Multimodal Connections within New York's Maritime Transportation System illustrates Albany's relationship to the Hudson River, Canal System, rail and highway corridors, New York Harbor, Upstate New York, the Great Lakes, New England, and Canada.

Figure 2. Port of Albany: Strategic Multimodal Connections



CONDITION & CAPACITY

New York's ports continue to move substantial volumes and varieties of freight while supporting economic activity throughout the State. Maritime facilities handle containerized cargo, bulk commodities, petroleum products, construction materials, agricultural products, manufactured goods, project cargo, and emerging clean-energy components. Investments in terminal modernization, navigation improvements, cargo-handling equipment, rail facilities, and waterfront redevelopment have strengthened capabilities at numerous locations.

New York-specific activity illustrates the range of these capacity demands: New York Harbor handles the State's principal international maritime traffic; Albany and Coeymans support bulk, project, heavy-lift, manufacturing, and clean-energy cargo; and Buffalo, Oswego, and Ogdensburg support Great Lakes and St. Lawrence commerce, including agricultural, bulk, manufacturing, and cross-border freight.

Aging marine infrastructure nevertheless remains a significant concern at facilities across the State. Wharves, piers, bulkheads, berthing structures, fender systems, utilities, navigation structures, and cargo-handling facilities require continued inspection, maintenance, rehabilitation, and, where appropriate, replacement. Deferred maintenance, increasing construction costs, and competing capital needs place continuing pressure on available resources.

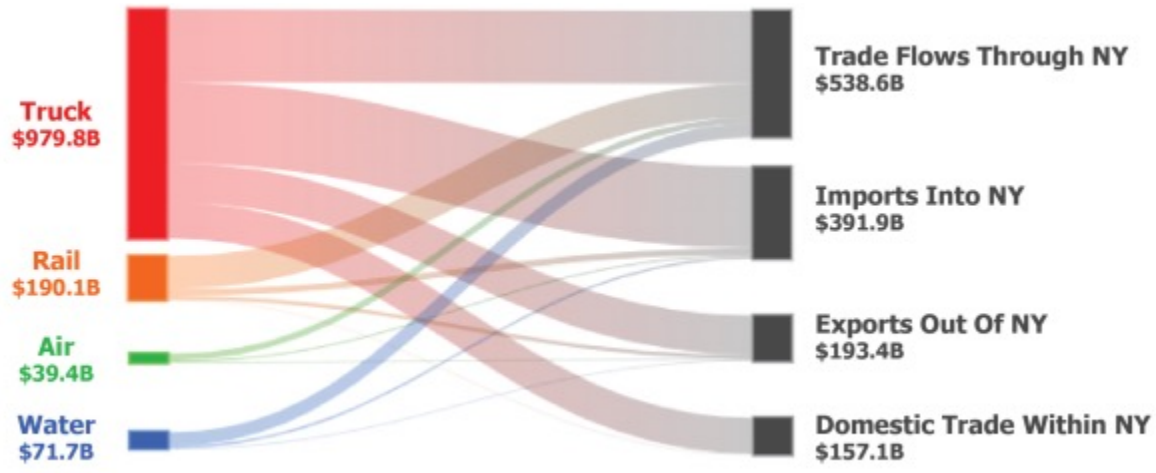
Navigation is fundamental to system performance. Routine dredging, adequate channel depths, reliable navigational aids, and safe vessel access must be maintained as vessel dimensions, cargo types, and freight patterns evolve. Port infrastructure must also be considered together with adjacent bridges and waterfront structures, including fendering, protective systems, navigational clearances, and monitoring intended to reduce risks associated with vessel impacts and marine incidents.

A major current example is the approximately $6 billion New York Harbor deepening program now in the engineering phase, reflecting the scale of future navigation and capacity investment required at the State's principal international gateway.

The maritime system's effectiveness also depends heavily on landside and inland connections. Rail corridors, highways, inland waterways, airports, and distribution centers allow cargo to travel between ports and markets. Continued investment in the Hudson River corridor, Canal System, Great Lakes and St. Lawrence system, rail connections, highways, and intermodal transfer facilities will be important to New York's long-term competitiveness.

Figure 3. How Freight Moves Through New York State illustrates the relative value of freight moving by truck, rail, air, and water and its relationship to through, import, export, and intrastate trade. Highway freight continues to play a dominant role. Trucking will remain essential to first- and last-mile movement, while rail and water provide opportunities for appropriate freight movements to reduce roadway congestion, improve efficiency, and provide additional system capacity and redundancy.

Figure 3. How Freight Moves Through New York State



The Port of Albany illustrates the evolving role of an inland multimodal port. Located at the intersection of the Hudson River, Canal System, national rail corridors, interstate highways, and major manufacturing centers, Albany provides a strategic transfer point between marine and inland freight transportation. Investments in heavy-lift cargo, clean energy, industrial redevelopment, and specialized infrastructure demonstrate how maritime facilities can support regional economic growth while strengthening the resilience of the broader freight system. The Port reports more than $813 million in measurable statewide economic impact and supports approximately 4,500 statewide jobs.

New York City's Blue Highways initiative seeks to move appropriate freight from congested streets onto the City's waterways. Planned investments include Brooklyn Marine Terminal, Hunts Point, and other maritime and microfreight facilities. The Brooklyn Marine Terminal Vision Plan identifies a proposed container-on-barge connection between Brooklyn Marine Terminal and Hunts Point; a planned 150-container daily barge could eliminate approximately 300 one-way truck trips through Red Hook. The initiative provides a downstate example of the broader statewide opportunity to better integrate marine transportation with rail, road, and distribution networks.

OPERATION & MAINTENANCE, FUNDING & FUTURE NEED

New York's future port needs extend beyond replacing deteriorated assets. Capital investment will be required for infrastructure rehabilitation, dredging, climate adaptation, multimodal connectivity, safety, digital modernization, energy transition, and emerging maritime industries.

Lifecycle asset management is becoming increasingly important to effective capital planning. Structural inspections, condition monitoring, preventive maintenance, risk-based prioritization, and data-driven decision-making can identify deterioration before it results in operational restrictions or emergency repairs. These approaches can also help direct limited capital resources toward assets with the greatest operational importance and consequences of failure.

Funding remains a major challenge. Significant public and private investments have been made, but rehabilitation, modernization, resilience, and capacity needs are substantial. Long-term and predictable funding will be important to maintaining a state of good repair and limiting the continued accumulation of deferred maintenance.

New York's maritime system is also institutionally complex. Facilities are owned and operated by a combination of port authorities, State and local agencies, municipalities, private terminal operators, railroads, maritime operators, and industrial companies. Effective planning therefore requires coordination among public and private infrastructure owners, operators, transportation providers, communities, and economic-development organizations.

Federal programs administered through the U.S. Department of Transportation, MARAD, the U.S. Army Corps of Engineers, and other agencies provide important sources of maritime and freight investment. State programs administered through transportation, economic-development, energy, and infrastructure organizations similarly support freight mobility, resilience, clean energy, and economic development.

Public-private partnerships can complement public infrastructure objectives where private capital, operating expertise, and commercial investment can be effectively combined with broader transportation and economic goals.

Greater statewide coordination could provide a framework for recognizing the complementary roles of New York Harbor, Hudson River ports, Great Lakes and St. Lawrence ports, the Canal System, marine highways, railroads, highways, airports, and logistics hubs. Such coordination could strengthen multimodal connectivity and better position New York's maritime system for changing freight, economic, and infrastructure needs.

PUBLIC SAFETY & RESILIENCE

Resilience has become a defining infrastructure challenge for New York's ports. Sea-level rise, storm surge, flooding, extreme precipitation, severe weather, supply-chain disruptions, vessel incidents, and energy interruptions can affect the availability and reliability of critical maritime infrastructure. Resilient port infrastructure includes seawalls and flood protection as well as elevation of vulnerable equipment, stormwater management, adaptable shorelines, resilient utilities, backup power, infrastructure hardening, emergency preparedness, redundancy, and the ability to maintain or rapidly restore essential freight operations.

Operational resilience is equally important. New York's combination of ocean, river, Great Lakes, Canal System, rail, and highway infrastructure provides transportation alternatives when portions of the network are disrupted. Realizing the full benefit of this diversity requires coordinated planning and strong connections among transportation modes.

Navigational and structural safety includes vessel traffic management, pilotage, tug assistance, navigational aids, communication systems, protective structures, fenders, bridge interfaces, emergency response, and monitoring technologies. Resilience of critical maritime infrastructure depends not only on reducing the probability of an incident but also on the ability of individual facilities and the larger transportation network to continue functioning and recover following an event.

Technology provides additional opportunities to improve infrastructure and operational performance. Smart sensors, real-time structural and environmental monitoring, digital twins, artificial intelligence, predictive analytics, automated cargo-management systems, and integrated data platforms can help identify infrastructure and operational problems earlier and support maintenance, safety, and capital-planning decisions. Cybersecurity is also an increasingly important component of operational resilience, as greater dependence on connected systems creates new risks to communications, cargo operations, security, and continuity of service.

Figure 4. Conceptual illustration of the elements of a future-ready maritime transportation system, including clean energy and decarbonization; climate resilience; port operations; digital infrastructure, AI and cybersecurity; workforce and operations; and supply-chain and multimodal connectivity.

Figure 4. Conceptual illustration of the elements of a future-ready maritime transportation system



New York ports use facility- and agency-specific safety, environmental, operational, and capital-program measures to evaluate performance. Greater consistency in statewide reporting of comparable port performance measures would strengthen benchmarking, support data-driven investment decisions, and improve the ability to track progress over time.

Reliable port operations also depend on skilled maritime, logistics, engineering, trades, maintenance, technology, and cybersecurity personnel. Continued workforce development and improved tracking of staffing, training, and workforce needs will be important as port infrastructure and operations become increasingly specialized and technology dependent.

INNOVATION

New York's ports increasingly support industries that extend beyond traditional cargo movement. Offshore wind, clean energy, advanced manufacturing, project cargo, heavy-lift logistics, and industrial redevelopment can create new economic opportunities while placing new demands on maritime infrastructure.

The Capital Region is well positioned to support these activities because of the combined capabilities of Albany, Coeymans, the Hudson River transportation corridor, rail and highway connections, industrial land, and access to Upstate and Canadian markets. The region shows how maritime infrastructure can support a broader manufacturing and logistics ecosystem beyond its traditional cargo-transfer functions. The Port of Albany has undertaken substantial modernization, including reconstructing and expanding maritime facilities, adding new warehousing, improving rail, and expanding heavy-lift and project-cargo infrastructure. Continued investment across the Capital Region can strengthen its role in specialized manufacturing, project cargo, energy infrastructure, and regional supply chains.

Downstate, redevelopment of Brooklyn Marine Terminal and expansion of waterborne freight through Blue Highways provide concrete examples of projects intended to expand marine freight capacity, improve intermodal connections, reduce truck dependence on congested streets, and modernize waterfront infrastructure. The Brooklyn Marine Terminal Vision Plan identifies a proposed container-on-barge connection to Hunts Point; a planned 150-container daily barge could eliminate approximately 300 one-way truck trips through Red Hook.

The value of these initiatives extends beyond cargo throughput. Modern maritime infrastructure can contribute to resilient supply chains, reduced transportation bottlenecks, industrial development, employment, and more efficient use of existing transportation assets.



Photo:Port Jefferson Harbor; Wirestock Creators



RECOMMENDATIONS TO RAISE THE GRADE

- **Develop a Statewide Maritime Transportation Strategy.** Support New York's ports, Hudson River, Canal System, Great Lakes and St. Lawrence connections, marine highways, rail corridors, highways, airports, and logistics hubs as an integrated transportation network. Planning should improve freight mobility, redundancy, supply-chain resilience, and economic competitiveness.
- **Modernize Aging Marine Infrastructure.** Continue rehabilitation and replacement of aging wharves, piers, bulkheads, berths, fender systems, navigation structures, utilities, and cargo-handling infrastructure while expanding lifecycle asset-management programs, inspection, monitoring, and preventive maintenance.
- **Expand Multimodal Freight and Marine Highway Connectivity.** Improve rail access, truck connections, inland waterways, intermodal transfer facilities, and marine highways. Build upon initiatives such as NYC Blue Highways while strengthening connections among New York Harbor, Hudson River ports, the Capital Region, Upstate New York, the Great Lakes and St. Lawrence system, New England, and Canada.
- **Invest in Climate Resilience and Infrastructure Hardening.** Accelerate investments addressing sea-level rise, storm surge, flooding, extreme weather, energy disruption, and vessel impacts while improving redundancy, emergency preparedness, and recovery capabilities.
- **Accelerate Digital Transformation and Performance Benchmarking.** Expand appropriate use of AI, digital twins, predictive maintenance, structural health monitoring, smart sensors, cybersecurity, and data-driven asset management. Performance metrics informed by Smart Port principles can help measure progress in operations, environment, energy, safety, security, and infrastructure performance.
- **Support Emerging Maritime Industries and Regional Clusters.** Continue strategic investment supporting clean energy, advanced manufacturing, heavy-lift and project cargo, industrial development, and other emerging maritime opportunities throughout the State.
- **Strengthen Workforce Development.** Expand maritime, engineering, trades, logistics, technology, cybersecurity, and clean-energy training to ensure that the workforce evolves with changing infrastructure and operational needs.
- **Strengthen Long-Term Funding and Collaboration.** Develop predictable funding strategies and improve coordination among federal, State, regional, local, public, and private stakeholders.



SOURCES

American Society of Civil Engineers (ASCE), "2025 Report Card for America's Infrastructure," 2025.

ASCE New York State Council, "2022 Report Card for New York's Infrastructure," 2022.

ASCE, "ASCE/COS 73-23: Standard Practice for Sustainable Infrastructure," 2023.

American Association of Port Authorities (AAPA), "Port Industry Statistics, Infrastructure Investment, and Policy Resources," various years.

US Department of Transportation, Maritime Administration (MARAD), "Port Infrastructure Development Program: Program Information and Awards," various years.

US Army Corps of Engineers, New York District, "New York and New Jersey Harbor Deepening and Channel Improvements Program," various years.

US Army Corps of Engineers, New York District, "New York and New Jersey Harbor Dredged Material Management Plan: 2025 Update," 2025.

US Army Corps of Engineers: Waterborne Commerce Statistics Center, "Waterborne Commerce Statistics of the United States," various years.

US Department of Transportation, Bureau of Transportation Statistics (BTS), "Freight Analysis Framework (FAF5)," various years.

New York State Department of Transportation (NYSDOT), "New York State Freight Plan," 2024.

NYSDOT, "New York State Freight Transportation Plan," 2019.

NYSDOT, "New York State Railroad Map and Rail Transportation Resources," various years.

New York Metropolitan Transportation Council (NYMTC), "Moving Forward 2055: Connecting Communities, Creating Opportunities — Regional Transportation Plan," 2025.

Capital District Transportation Committee, "Regional Freight and Goods Movement Plan," 2016.

Port Authority of New York and New Jersey (PANYNJ), "Port Master Plan 2050," 2019.

PANYNJ, "Port of New York and New Jersey: Monthly Cargo Volumes and Annual Statistics," various years.

PANYNJ, "Capital Plan and Port Infrastructure Investment Programs," various years.

Albany Port District Commission, "Port of Albany–Rensselaer: Economic Impact and Employment Information," various years.

Albany Port District Commission, "Port of Albany–Rensselaer: Port Modernization, Wharf Rehabilitation, Heavy-Lift Infrastructure, and Maritime Development Projects," various years.

Albany Port District Commission, "Port of Albany–Rensselaer: Annual Reports and Financial Statements," various years.

Port of Coeymans, "Port Facilities, Marine Terminal Operations, Heavy-Lift Capabilities, and Multimodal Transportation Connections," various years.



SOURCES (cont.)

Port of Oswego Authority, "Annual Reports, Port Development, and Infrastructure Investment Information," various years.

US Department of Transportation, Great Lakes St. Lawrence Seaway Development Corporation, "GLS Annual Report," various years.

US Department of Transportation, Great Lakes St. Lawrence Seaway Development Corporation, "Great Lakes–St. Lawrence Seaway Traffic Statistics," various years.

Great Lakes Commission, "Great Lakes Maritime Transportation System: Policy, Infrastructure, and Economic Development Resources," various years.

New York State Canal Corporation, "New York State Canal System: Infrastructure, Operations, and Capital Improvement Programs," various years.

New York City Economic Development Corporation (NYCEDC), "Brooklyn Marine Terminal Vision Plan," 2025.

NYCEDC, "Blue Highways: Advancing Waterborne Freight Transportation in New York City," various years.

NYCEDC, "Brooklyn Marine Terminal Redevelopment: Public Engagement and Supporting Planning Documents," 2025.

New York State Energy Research and Development Authority (NYSERDA), "Offshore Wind Program: Port Infrastructure, Supply Chain, and Workforce Development Resources," various years.

New York State Department of Environmental Conservation (NYSDEC), "Climate Change and Sea-Level Rise Guidance and Coastal Resilience Resources," various years.

New York State Department of State (NYSDOS), "Coastal Management Program and Coastal Resilience Planning Resources," various years.

National Oceanic and Atmospheric Administration (NOAA), "Global and Regional Sea Level Rise Scenarios for the United States, NOAA Technical Report NOS 01," 2022.

Federal Emergency Management Agency (FEMA), "National Risk Index and Flood Hazard Mapping Resources," various years.

Cybersecurity and Infrastructure Security Agency (CISA), "Marine Transportation System Security and Critical Infrastructure Resilience Resources," various years.

US Coast Guard, "Marine Transportation System Safety, Navigation, Port Security, and Waterways Management Resources," various years.

US Department of Transportation, "National Freight Strategic Plan," 2020.

US Government Accountability Office (GAO), "Reports on Port Infrastructure, Maritime Transportation, Supply Chain Resilience, and Federal Infrastructure Investment," various years.

Office of the New York State Comptroller, "Transportation, Infrastructure Investment, Economic Development, and Freight Industry Reports," various years.



Photo: The waterfront park in Auburn, New York; Zack Frank

PUBLIC PARKS

EXECUTIVE SUMMARY

New York's public parks and open spaces form an essential statewide network for recreation, ecological health, cultural heritage, and community well-being. Visitation continued its year-over-year 5% growth, yet the system faces mounting pressures: aging infrastructure, uneven funding across jurisdictions, workforce shortages, and increasing demands on fragile landscapes. Financial data through 2024 shows that local governments dedicate only a small share of their budgets to parks—about 1.2% at the county level and 3.9% to 7.2% for cities, towns, and villages—while the State system carries a $4 billion backlog in capital needs.[1] At the same time, routine maintenance is often deferred; new facilities are added without corresponding operating support, and climate-driven storms are placing additional strain on vulnerable sites. Without strategic investment, improved asset management, and a renewed focus on equitable access and long-term stewardship, New York's parks will struggle to meet public demand and protect the natural and cultural resources that define them.

Figure 1. Hudson Highlands Park, Breakneck Ridge



BACKGROUND

New York's public parks and open spaces bring incredible value as they preserve unique landscapes, provide scenic vistas, and allow for many different forms of recreational activities. Interwoven into this beautiful landscape are parklands, capturing and preserving special places from the hilly and mountain terrain of the Hudson Highlands, Catskills and Adirondacks, the fertile central plains of glacial outwash, to the coastal shorelines of Long Island and the Great Lakes. Further, the protections to that land are meant to last; once a place is dedicated as parkland, an act of the legislature and the governor is required to remove it from that designation.

CONDITION AND CAPACITY

The Statewide Comprehensive Outdoor Recreation Plan 2025-2030 ('SCORP') was released by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) in 2024. This document provides a roadmap for the future of parks and an inventory of existing facilities; in addition, it is a policy document to guide all park development in New York State, not just state-owned facilities. Importantly, this plan identified the top five outdoor recreation activities: park day use, walking/running, swimming, nature interpretation, and court games.[2]

The combined system of state, county, municipal and nonprofit parks is incredibly popular with New York residents and the many tourists who visit. Watkins Glen State Park saw the greatest volume of navigation requests, sustained foot traffic, and long dwell times of any park across the United States, according to Google Maps digital mobility data. 2024 visitation numbers indicated that the state park system saw 88.3 million visits, a 5% year over year growth.[3]

Figure 2. Empire State Trail, Maybrook Section



The impact of multiple uses on parks system cannot be understated. Parklands were often protected precisely because they included fragile or exceptional landscapes that could not support conventional development4. Because places like riverfront riparian areas, Long Island's barrier islands, and geologically distinctive summits are both sensitive and increasingly popular, their carrying capacity must be a central consideration in planning and management. This type of planning can be seen in the Adirondack Park Agency Master Plan, where lands are protected to be 'forever wild.' The continued popularity of some areas such as Breakneck Ridge and the many natural waterfalls of the mid-Hudson Valley has resulted in these sites being closed or having restricted use due to their popularity and overcrowding concerns, especially during the pandemic.

Another challenge for the public park system will be balancing funding between essential infrastructure needs and recreational or social uses—a tension that is far less common in other infrastructure sectors. New York State has invested heavily in new interpretive centers and other building facilities over the last three years to enhance tourism, recreation, and social programming; the 2025 OPRHP Annual Report shows that a significant share of the $340 million slated for 2026 will advance the same priorities.These facilities are expensive to build and maintain, which leaves less funding for the maintenance and upkeep of the outdoor facilities.

With road capacity increasingly strained, more focus should be given to creating new connections to parks through non-motorized trails and public transportation. The SCORP indicated that people prefer to use parks that are no more than 20 minutes away for their casual uses. Some underserved communities lack access to parks and open spaces; the 2024 Public Outdoor Recreation Survey identified that one-third of people say they cannot access the state's top five outdoor recreation activities (park day use, walking/running, swimming, nature interpretation, and court games). Further, as the population ages, many will need access through either walking or public transportation. In the last decade, the Empire State Trail has made accessibility improvements by providing people with access to a linear trail system which connects users to parks and open spaces. This system was established with an uncertain long-range asset management strategy, which will affect its future durability. These trends make clear that the multimodal system is not keeping pace, and the state's non-vehicular network must be strengthened to meet the transportation needs of all users.

When considering condition and capacity, it is important to examine land banking, or ensuring land is set aside for future open space needs. In 2026, as a part of the 30x30 policy, New York is undertaking the massive challenge of protecting 30,000 acres of open space by 2030. The state has established a rotating grant process with no matching requirement for others to preserve this land.

FUNDING AND FUTURE NEED

Municipalities in New York dedicate a portion of their operating and capital budgets to parks and open space, but the level of investment varies widely. Based on financial data through the end of 2024, recreational services—including parks—represent a small share of local budgets: counties spend approximately 1%, while cities, towns, and villages spend between 4% and 7%. At the state level, the 2026 budget allocates 13% to parks. Some municipalities, particularly those just outside New York City or those with strong tourism economies, spend more than the statewide averages.

Because local spending is uneven, the State supplements municipal efforts through targeted capital grant programs, including NY Plays for playground construction, NY Swims for swimming facility improvements, and the Open Space Conservation Grant Program (OSCGP) for land conservation and acquisition. In the 2026 budget, the State set aside funding to support capital improvements without assuming long-term ownership or maintenance responsibilities, which remain with local governments or nonprofit partners.

This approach may be driven in part by necessity. According to regional directors and testimony from the Commissioner at a January 2026 hearing, the state park system faces a $4 billion backlog in required capital improvements and remains chronically underfunded.[6] As construction and maintenance costs continue to rise, transparent reporting on progress and spending has become increasingly important. Many governments are responding by launching public-facing dashboards; New York's Office of General Services plans to release one this summer, NYC Parks already maintains a similar tool.

Overall, funding for parks is inconsistent across levels of government. As demand for parks grows, this uneven investment will make it more difficult to maintain existing facilities and expand access in the years ahead.

OPERATION AND MAINTENANCE

Across New York, park operations are increasingly strained by shrinking staffing levels and maintenance resources that have not kept pace with system growth. New facilities are often added without corresponding increases in operating budgets, and routine, cyclical maintenance is frequently overlooked. When these basic tasks are deferred, they eventually become highercost repairs.[7]

A major driver of this pattern is the way capital projects are financed. Capital improvements can be bonded and paid off over many years, making them easier to absorb. Routine maintenance, however, cannot be financed with longterm borrowing and must come from annual operating revenue. When revenues tighten, maintenance and staffing are the first areas cut, accelerating the shift from routine care to deferred maintenance. Other states have recently put an effort to confront this issue through multiple strategies, which have been compiled into October 2025 case study report: Meeting the Trillion Dollar Challenge[8]. Some agencies have identified low-cost operational strategies to ease this pressure; for example, New York State Parks' Reduced Mowing Policy[9], which designates 'grow zones' where native vegetation replaces mowed turf in low-use areas, freeing staff for essential maintenance while reducing equipment and fuel costs.

Workforce shortages compound the problem. According to *Local Government Workforce Trends in New York State* (December 2023), statewide parks employment has declined by 7% in recent years.[10] The State has launched initiatives such as the "Trade Fair Help" program to recruit and train skilled trades workers, and New York's public higher education and workforcetraining systems continue to supply required talent. Still, succession planning remains critical: as experienced employees retire, institutional knowledge disappears, leaving new staff responsible for infrastructure they may not fully understand.

Technology can help bridge this gap. Asset management systems can document infrastructure conditions, predict maintenance needs, and support new employees in learning the system. Yet even with better tools, agencies must acknowledge the true long-term cost of capital expansion. According to the Association of Physical Plant Administrators' *Facilities Performance Indicators* (2024), total maintenance over a capital asset's life typically equals 1% to 8% of its replacement value, depending on complexity.[11] Without planning for these ongoing costs, new capital assets inevitably lead to deferred maintenance and accelerated deterioration.

PUBLIC SAFETY

Although crime has diminished across the state overall, the popularity of parks will decrease if issues of safety including personal security, environmental hazards and emergency response capacity are not addressed to the satisfaction of the general public. Technological advances, such as license plate readers and integrated camera systems, can help enhance safety. Along with that, and just as important, are dedicated park police and park rangers. New York has an excellent program for both; however, the salary level has not kept up with other similar public safety positions. Further, our parks often rely on volunteer firefighting as well as emergency response personnel even when large events are planned. Moving into the future, these needs should be considered to ensure safety of the park users.

RESILIENCE AND INNOVATION

Throughout the development of the modern park system, successful results have depended on the integration of art, engineering, economics, landscape architecture, architecture, and forestry. That interdisciplinary approach must continue in order to meet today's challenges, particularly those posed by climate instability. Many parks are in fragile or storm-vulnerable settings—remote forests, coastlines, and river edges—where damage from severe weather is becoming more frequent. As a result, these parks are often out of service until repairs can be made, making it essential to maintain a balanced portfolio of facilities that can absorb temporary closures.

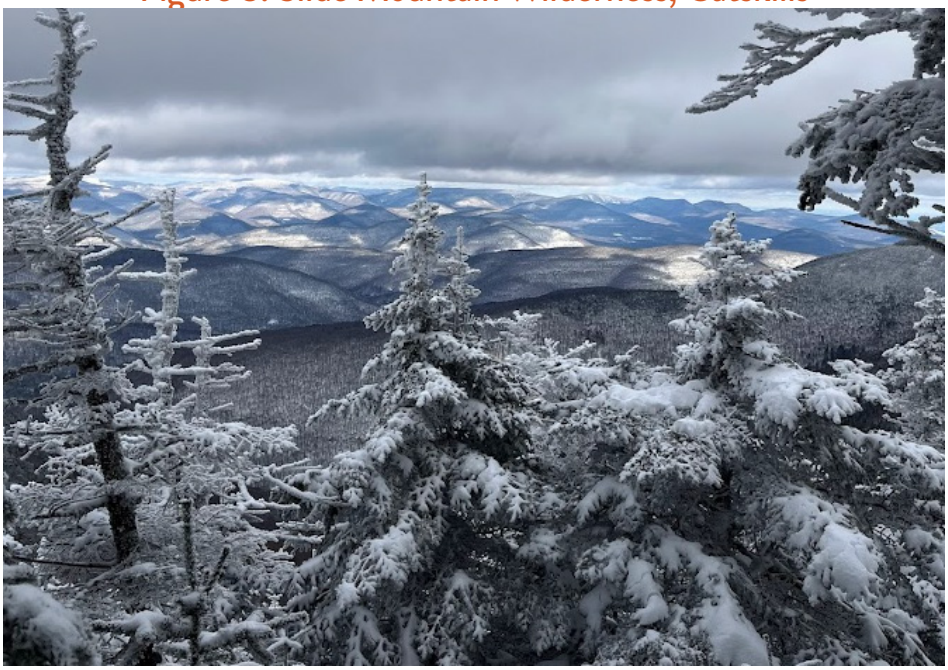
East River Park on Manhattan's east side illustrates this reality: its 16-foot hydraulic floodgates protect the coastline but must be closed when storm surge threatens, rendering the shared-use path built into their open position unavailable.

Similar disruptions occur at beaches where dune systems require rebuilding after winter storms, along interior lakes battered by heavy wave action, and even in small stream corridors where culverts are overwhelmed, washing out park roads—as seen in 2023. These patterns underscore the growing need to secure additional land in shared land banks for future park use, especially as long-term planning must account for strategic retreat from vulnerable coastlines and riparian areas. Further, the OPRHP currently has agency initiatives underway that support the 2019 Climate Leadership and Community Protection Act (CLCPA) net-zero mandate by 2050. Including sustainable design measures such as renewable energy installations, car charging stations, and climate-resilience strategies like green infrastructure and nature-based solutions.[12] Fragile and sensitive lands within parks system should be buffered from any park development and the carrying capacity of those lands must be incorporated into plans for park visitation.

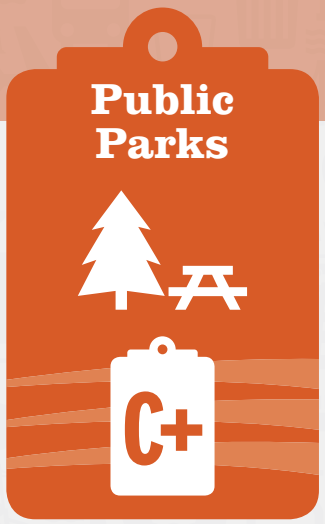
That process is best started in a progressive and incremental way so that costs can be absorbed over a long period of time. Other strategies could include expanding the 2009 Sustainability Plan, which demonstrated measurable savings through reduced mowing programs and incorporating the latest modern sustainability frameworks. Frameworks, such as the Leadership in Energy and Environmental Design Program (LEED), the Sustainable Sites Initiative rating system (SITES), and material selection for low carbon design used in park facilities.

The increased use of social media, machine learning and generative AI will also continue to influence park use, including how people discover, access and experience parks across New York. Not only will people require access through Wi-Fi and cellular communications to utilize GPS and other mobile technologies which can influence which parks experience the most use. To better distribute visitation across the full park system, these tools will help policymakers and park managers highlight lesserknown parks that offer similar recreational opportunities but receive far less use.

Figure 3. Slide Mountain Wilderness, Catskills



Park systems, by their nature, protect open space in a way that other types of infrastructure do not. Natural features such as forests and wetlands sequester carbon, and it will be important to balance the pursuit of energy-neutral goals against preservation of forest and wetlands. Whenever possible, new development projects should be located on previously disturbed land so that intact landscapes remain protected. State policies continue to reinforce this approach through expanded wetland regulations and new grant funding for shorelines and riparian buffers. However, it will be important to continue acquisition efforts for new parkland and open space as there has been a trend back toward the loss of forest areas to suburban sprawl.[13]



RECOMMENDATIONS TO RAISE THE GRADE

- **Strengthen and Stabilize Funding**
  Increase dedicated operating and capital funding for parks at all levels of government and align new capital investments with long-term operating and maintenance costs. Expand state grant programs that support local governments without shifting future maintenance burdens.
- **Rebuild and Support the Workforce**
  Address the 7% decline in parks employment by expanding recruitment pipelines, skilled-trade training, and competitive compensation. Implement succession planning to preserve institutional knowledge and ensure continuity in infrastructure care.
- **Prioritize Routine, Cyclical Maintenance**
  Adopt asset management systems that track conditions, forecast maintenance needs, and prevent routine tasks from becoming costly deferred repairs. Incorporate lifecycle maintenance costs—typically 1.5% to 8% of replacement value—into all capital planning.
- **Improve Access, Equity, and Connectivity**
  Expand non-motorized trails, transit access, and ADA-compliant facilities to meet public demand and address gaps identified in the SCORP. Modernize outdated recreation frameworks to reflect current social and transportation needs.
- **Advance Climate Resilience and Sustainable Design**
  Protect vulnerable landscapes, integrate nature-based solutions, and apply modern sustainability frameworks such as LEED and SITES. Prioritize land acquisition in support of the 30x30 goal and ensure that new development occurs on previously disturbed sites whenever possible.

SOURCES

Government Plans, Reports, and Data

New York State Office of Parks, Recreation and Historic Preservation (OPRHP); 2024; "2025–2030 New York State Statewide Comprehensive Outdoor Recreation Plan (SCORP)"; Albany, NY.; 2024.

New York State Office of Parks, Recreation and Historic Preservation (OPRHP); ` "OPRHP Annual Report"; Albany, NY; 2025

New York State Office of General Services (OGS); "Public-facing capital project dashboard (planned release)"; Albany, NY; 2026

New York State; "New York State Budget"; Albany, NY; 2026

New York State Comptroller; "Local Government Workforce Trends in New York State"; Albany, NY; 2023



SOURCES (cont.)

New York State Parks and Historic Sites; "With Reduced Mowing, State Parks Are Letting It Grow"; Albany, NY; 2024

New York State Office of Parks, Recreation and Historic Preservation (OPRHP); "OPRHP Sustainability Plan"; Albany, NY; 2009

New York State Legislature; "Climate Leadership and Community Protection Act (CLCPA)"; Albany, NY; 2019

New York State Office of Parks, Recreation and Historic Preservation (OPRHP); "Public Outdoor Recreation Survey"; Albany, NY; 2024

Historic Reports

Westchester County Park Commission; "Report of the Westchester County Park Commission"; Westchester County, NY; 1926

Westchester County Park Commission; "Report of the Westchester County Park Commission"; Westchester County, NY; 1927

Academic and Professional Sources

Watson, C.J., et al.; "Ecological and economic benefits of low-intensity urban lawn management" Reduced Mowing Frequency and Cost Savings in High- and Low-Use Areas." Journal of Applied Ecology; British Ecological Society; 2019; vol. 57, pp. 436-446

Association of Physical Plant Administrators (APPA); "Facilities Performance Indicators"; Alexandria, VA; 2024

Policy and Planning Analyses

Negret, M.; "The Land Conservation Benefits of Modernizing New York's SEQRA Process"; Regional Plan Association, New York, NY; 2026

Sarmiento, C. F. & Yashodhar, S.; "Meeting the Trillion-Dollar Challenge: Deferred Infrastructure Maintenance Practices Across Ten States", The Volcker Alliance, October 2025

Other Referenced Initiatives

NYS Office of Parks, Recreation & Historic Preservation; "Empire State Trail: Final Report"; Albany, NY; August 2021



FOOTNOTES

1. Financial data for Local Governments, "Office of the New York State Comptroller, and Testimony of Kathy Moser, Acting Director, New York State Office of Parks, Recreation & Historic Preservation", 1/27/2026.
2. "2025-2030 New York State Statewide Comprehensive Outdoor Recreation Plan", p.18, 2024
3. https://data.ny.gov/Recreation/State-Park-Annual-Attendance-Figures-by-Facility-B/8f3n-xj78/data_preview, 2024
4. "Report of the Westchester County Park Commission", 1926
5. "New York State Comptroller's Office, Local Government Interactive Database", https://www.osc.ny.gov/local-government/interactive-data, 2025
6. New York State Assembly Testimony, January 27, 2026 hearing, https://www.osc.ny.gov/local-government/interactive-data, 2026
7. Property Environment and Research Center, "Fixing National Park Maintenance for the Long Haul", November 2020, https://www.perc.org/2020/11/18/fixing-national-park-maintenance-for-the-long-haul/, 2020
8. The Volcker Alliance case studies, "Meeting the Trillion-Dollar Challenge", October 2025 (deferred infrastructure maintenance practices in ten states), October 2025
9. New York State Parks and Historic Sites "With Reduced Mowing, State Parks are Letting it Grow", November 2024; Watson et al., Journal of Applied Ecology, 2019 (estimating 36% reduction in contractor mowing costs when frequency is reduced in high and low use areas)
10. Local Government Workforce Trends in New York State, Office of the Comptroller, December 2023
11. Deferred Capital Renewal and Deferred Maintenance, "Association of Physical Plant Administrators, Part 2 Operations and Maintenance", revised February 2025, https://www.appa.org/deferred-capital-renewal-and-deferred-maintenance, February 2025
12. " OPRHP Sustainability Plan", 2009
13. The Land Conservation Benefits of Modernizing New York's SEQRA Process, Marcel Negret February 19, 2026, by

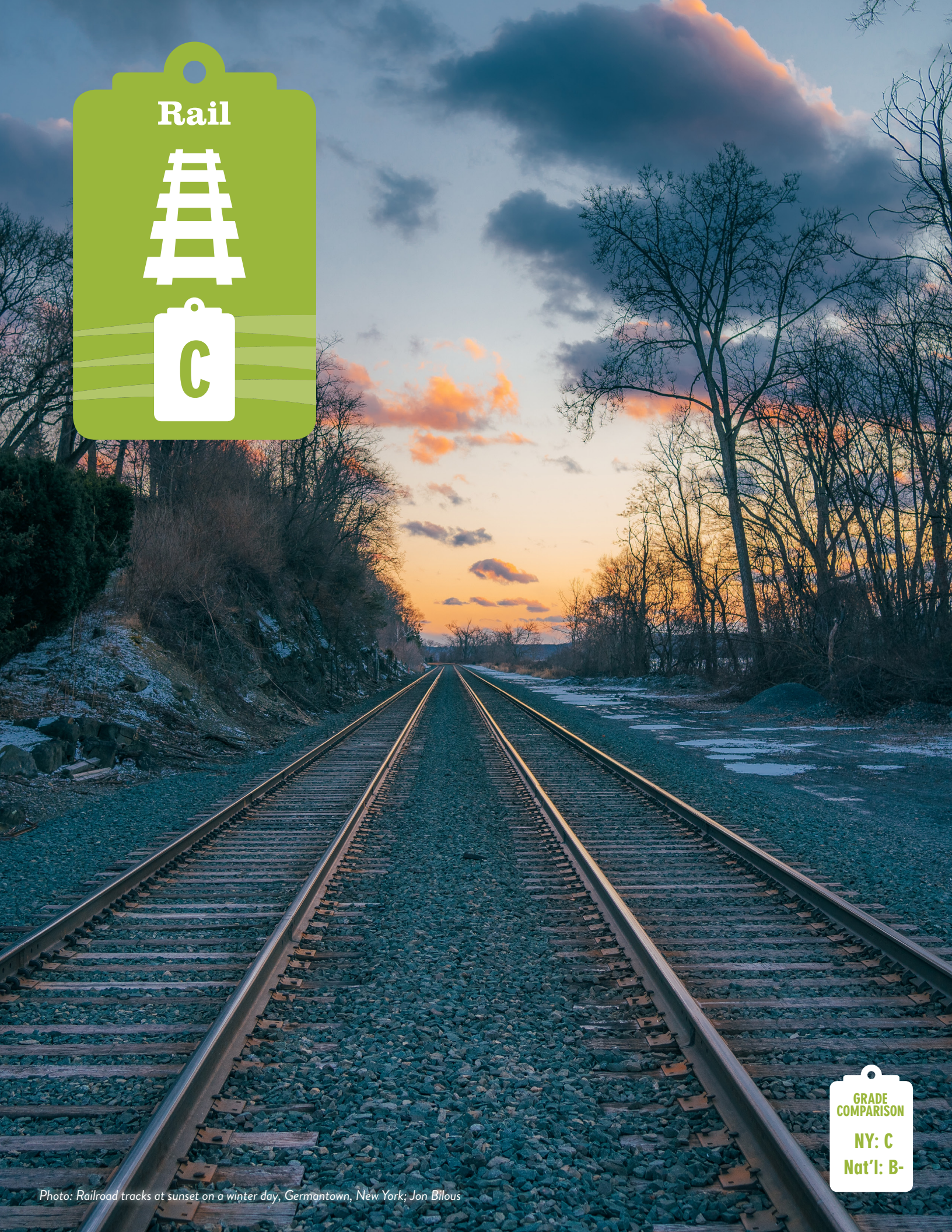


Photo: Railroad tracks at sunset on a winter day, Germantown, New York; Jon Bilous

RAIL

EXECUTIVE SUMMARY

Since the last NYS report card, record-breaking capital investments and a focus on state-of-good-repair initiatives, have improved the rail infrastructure. Key achievements include the successful opening of Grand Central Madison and completing the LIRR Main Line Expansion, which delivered 9.8 miles of new third track between Floral Park and Hicksville, eliminated eight grade crossings, and modernized five stations to enable bi-directional peak service. The system has also seen broad station and ADA-compliance upgrades across the LIRR and Metro-North networks. Simultaneously, progress continues on transformative projects like the Penn Station Access initiative for East Bronx service. Major efforts also advance the Gateway Program to address trans-Hudson capacity, alongside critical rehabilitation of the Park Avenue Viaduct and the Livingston Avenue Bridge to modernize century-old assets. Supported by a robust 2025–2029 MTA Capital Plan, these collective improvements mark a pivotal shift toward a more resilient, accessible, safer and higher-capacity rail network for all New Yorkers.

CONDITION

New York State's rail infrastructure is in mixed but improving condition. Recent capital programs have delivered major state-of-good-repair, capacity, accessibility, signal, bridge, and station upgrades across the MTA and Amtrak networks, while freight railroads continue targeted track, bridge, yard, and signal renewals. However, substantial portions of the system remain dependent on aging legacy assets, including track, structures, signals, power systems, rolling stock, and facilities. The MTA continues to identify a significant state-of-good-repair backlog, and deferred maintenance increases the risk of service disruptions, speed restrictions, emergency repairs, and shortened asset life. Overall, the condition of New York's rail network has improved through sustained investment, but maintaining reliability and safety will require continued lifecycle renewal and predictable funding

CAPACITY

Freight Rail Capacity – New York State (Current Conditions)

New York State maintains one of the most extensive and heavily utilized freight rail networks in the Northeast, supporting interstate commerce, port activity, and regional industry. The freight rail system consists of Class I national carriers, regional railroads, and short-line operators operating over approximately 3,700 miles of active track statewide. Annually, New York's freight rail network originates and terminates tens of millions of tons of goods, including construction materials, agricultural products, chemicals, food products, and intermodal freight. This system provides critical capacity that reduces highway congestion, supports port and manufacturing activity, and accommodates long-haul and bulk freight movements that are not efficiently served by truck transport. Freight rail capacity in New York State is primarily measured through track mileage, carload volumes, and tonnage handled, rather than passenger-equivalent counts.

Table 1: Freight Rail Capacity – New York State (Current Conditions)

Capacity Metric	Current Estimate	Notes
Annual Freight Tonnage Originated	~9–10 million tons	Goods shipped from NYS
Annual Freight Tonnage Terminated	~15–16 million tons	Goods delivered into NYS
Annual Freight Carloads Originated	~190,000 carloads	AAR-reported activity
Annual Freight Carloads Terminated	~260,000 carloads	Reflects import-heavy state economy
Highway Truck Trips Avoided	~3 million truck trips/year	Rail freight displacement estimate
Primary Freight Corridors	Hudson Line, CSX Water Level Route, Southern Tier Line	Key east–west and north–south corridors

Source: Association of American Railroads (AAR), "Freight Rail in New York: Facts & Economic Impact," 2025; New York State Department of Transportation (NYSDOT), "New York State Freight Transportation Plan," 2024.

Passenger and Commuter Rail Capacity – New York State (Current Conditions)

New York State operates the largest passenger and commuter rail system in the United States, serving intercity, regional, and daily commuter travel markets. Passenger rail capacity is provided through Amtrak's intercity services—most notably along the Empire Corridor, Northeast corridor and through extensive commuter rail operations managed by the Metropolitan Transportation Authority (MTA), including the Long Island Railroad (LIRR) and Metro-North Railroad. Together, these systems accommodate well over 150 million passenger trips annually, with the highest volumes concentrated in the New York City metropolitan region and the Hudson Valley. Capacity is measured through annual ridership, service frequency, route mileage, and peak-period throughput, reflecting the system's role in supporting economic activity, workforce mobility, and regional connectivity across New York State.

Table 2: Passenger & Commuter Rail Capacity – New York State

System Type	Operator	Service Area	Annual Passenger Volume (Approx.)	Capacity Notes
Intercity Passenger Rail	Amtrak	Statewide (Empire Corridor, Adirondack, Maple Leaf, Ethan Allen Express, etc.) and along the Northeast corridor.	~35-40 million riders/year	Long-distance and corridor services; shared freight corridors
Commuter Rail	(LIRR)	Long Island–NYC	~75–80 million riders/year	Highest ridership commuter rail in North America
Commuter Rail	Metro-North Railroad	Hudson Valley, CT suburbs–NYC	~65–70 million riders/year	Primary upstate-to-NYC commuter rail
Commuter Rail (Limited NYS Operations)	NJ Transit Rail	Rockland County / Interstate connections	~2–3 million NY-related trips/year	Cross-border commuter connectivity
Urban Light Rail	Buffalo Metro Rail	City of Buffalo	~4–5 million riders/year	Fixed-guideway urban transit

Sources: Amtrak, "New York State Fact Sheet," 2025; Metropolitan Transportation Authority (MTA), "2024 Annual Ridership Report," 2025; NJ TRANSIT, "Ridership Reports," 2025; Niagara Frontier Transportation Authority (NFTA), "Annual Performance Report," 2025.

OPERATION & MAINTENANCE

In New York State, replacement of revenue vehicles is a major recurring capital need for commuter and intercity passenger rail systems. Separately, the largest systemwide funding requirement across Amtrak, the MTA, and Class I freight railroads is maintaining and renewing the extensive fixed infrastructure that supports passenger and freight operations, including facilities, shops, yards, and track structures. These systems are expected to need considerable additional investment for facility repairs as well as core infrastructure needs for upstate and suburban systems in replacing existing capital assets including fare collection systems, communications and signal equipment, and power infrastructure. There are no federal guidelines that dictate O&M budget-to-asset-value ratios. Economics dictates that every asset should be properly operated and maintained, and that its reliability, availability, maintainability and safety (RAMS) operational requirements/performance are directly related to the amount of money spent on their up-keep. The Federal Office of Management Budget (OMB) guidance, such as Circular A-94, does require capital expenditure planning integrated with lifecycle cost analysis. The USDOT requires a Value-for-Money analysis (VfM) for any public transportation projects that receive federal funding. This VfM assessment, which is performed and reported prior to the procurement of new capital projects, must include an O&M assessment, plus a review and documentation of the project procurement delivery methods (DBB, D-B, JOC, IDIQ, CMAR, DBOM, P3 etc.) and hence the justification for the chosen contracting mechanism. In doing so there are now more alternative delivery construction contracts that incorporate O&M requirements, and some specifically include contracted term durations for O&M duties to be provided by the construction/developer team. By example, Amtrak is currently procuring a massive Penn Station Transformation through a DBFOM (P3) Project development agreement.

MTA 2025–2029 Capital Plan describes an "outsized state of good repair (SOGR) backlog" and notes that billions per year of additional capital funding would be required just to address SOGR, on top of normal replacement needs. APTA's Economic Cost of Failing to Modernize Public Transportation identifies multi-billion dollar SOGR backlogs across legacy systems like Amtrak, MTA, and others throughout the country, noting that years of underinvestment and deferred maintenance have produced large backlogs requiring tens of billions nationally.

From an infrastructure owner and contractor perspective, the consequences of deferred O&M/ SOGR are (1) Reliability and safety risk; aging track, signals, rolling stock, and structures drive more service disruptions, slow speed orders, and unplanned outages and there is higher risk of safety incidents (derailments, equipment failures in tunnels and stations). (2) Cost amplification 'run to fail economics'; Deferred preventive maintenance typically results in more expensive emergency repairs, shorter asset lifecycles, and, higher unit O&M costs as vehicles and infrastructure age. Every dollar not spent on timely O&M/renewal shows up later as several dollars in unscheduled work plus service losses. (3) Capital plan crowd out, as SOGR backlogs grow, more of each new capital plan has to go to basic renewal (track, power, rolling stock) instead of capacity expansion or major modernization and this constrains the region's ability to deliver transformational projects (new lines, extensions, accessibility upgrades). (4) Service quality and revenue feedback loop; Poor asset condition leads to poorer on time performance, slower speeds, and customer dissatisfaction that, in turn, can depress ridership and fare and freight haulage revenue, which tightens the O&M budget even further, making it harder to fund the very maintenance needed to restore reliability. (5) Risk to climate and resilience objectives: New York State and City climate goals assume aggressive mode shift to both rail and transit. (6) Procurement and delivery stress; large, urgent SOGR backlogs push agencies toward big, fast-track packages (design build, CMGC, emergency procurements), often under work window and access constraints in an operating environment. This creates opportunity for experienced contractors but also higher delivery risk and premium pricing.

CSX's core routes through New York (Buffalo–Rochester–Syracuse–Albany mainline and Albany–NY/NJ River Line) are among its heaviest used corridors. Typical O&M type projects in the last 4 years include: Tie and rail replacement programs (continuous welded rail, surfacing); bridge rehabilitations on Hudson bridges and Mohawk Valley crossings; signal modernization (Positive Train Control integration, new interlockings), and yard and siding improvements at Selkirk Yard and intermediate terminals. NS's network in New York includes Southern Tier Line (Binghamton–Hornell–Buffalo area, partially via rights) and connections into New York via the Lehigh Line and other joint routes. In New York, that typically translates to ongoing maintenance of track and structures on shared corridors with regional and short lines and investments in terminals and yards feeding New York consumer/industrial markets. CPKC and CN NY relevant O&M include bridge and line upgrades for heavier axle loads and longer trains on cross border corridors, winter resiliency programs (snow and ice management, cold weather rail issues), and crossing and signal upgrades at key communities.

Economic and Workforce Impact

- Every $1 invested in rail generates approximately $2.50 in economic output.
- Rail employment supports high-wage jobs and broad supply chain employment: 153,000 direct jobs, 749,000 total jobs supported nationally.
- MTA employs approximately 70,000 people across its agencies (including NYCT, LIRR, MNR). Additionally, across the state there are approximately 2,270 freight railroad workers, and Amtrak employs about 3,300 New York based staff. All of which is a unionized workforce.
- Rail workers earn approximately 40% more than the national average.

FUNDING

New York rail capital and operating needs are supported by a combination of federal, state, local, agency, and private-sector resources. Recent MTA, Amtrak, NYSDOT, and freight-rail investments have advanced major state-of-good-repair and modernization work, but available funding must also cover routine operations, asset replacement, resilience, and a growing maintenance backlog. Funding should therefore be evaluated on a full lifecycle basis, with capital plans accounting for both initial construction and long-term O&M requirements. Predictable multi-year funding is essential to avoid deferred maintenance and costly emergency repairs, while alternative delivery and financing approaches such as DBOM and P3 may provide additional options for selected projects where lifecycle value and accountability can be demonstrated.

FUTURE NEED

Government provided funding, and private equity financing, are both required to maintain our essential rail operations, routine maintenance, and emergency repairs to the various rail systems in New York State. Too often the total lifecycle costs are not included appropriately in the funding of rail projects. The focus is to often on new capital expansion projects, by deferring vital monies that are needed for operations and maintenance. Insufficient funding leads to budgeting shortfalls and competing priorities, that then delay the necessary repairs and maintenance, that causes further deterioration. Assets continue to deteriorate reducing reliability, performance, safety, and material life cycles. Which then increases the amount of emergency (more costly) repairs needed, that in turn impacts the schedule of normal revenue operations. Emergency repairs always cost significantly more than routine planned maintenance. This vicious circle of deferred maintenance adds to the backlog of important asset maintenance – thus impacting budgets. Better funding and financing plans will improve cost and schedule predictability, strengthen lifecycle maintenance, align incentives around long-term performance, safety and better accountability and efficiency in rail operations. Future projects should look to make use of private equity and innovation via alternative delivery contracting such as Design-Build-Operate-Maintain (DBOM) and P3s. Government funding must look at the total cost of capital (with the inclusion of full O&M costs).

PUBLIC SAFETY

Rail freight is one of the safest ways to move goods over land, with the lowest accident rates compared to other freight modes. Rail passenger safety is much safer than road safety, with a rail fatality rate of approximately 0.43 per billion passenger miles. Amtrak, in particular has had very few passenger deaths (<15) in the last decade, albeit that most rail deaths and injuries are associated with trespassing or grade-crossing accidents. MTA MNR February 3, 2015, train striking a car that had jumped the rail crossing killing six passengers was the last recorded commuter rail deaths in New York State. Amtrak and MTA are both proactively incorporating Communications-Based Train Control (CBTC) for automatic signaling and AI-powered cameras to detect threats, creating a highly monitored data-driven environment compared to most other US states.

Rail safety in New York State (NYS) remains a critical component of transportation infrastructure performance, directly impacting public mobility, economic supply chains, and workforce protection. While significant progress has been achieved in reducing derailments, collisions, and worker incidents through regulatory oversight and technological advancements, emerging challenges—including aging infrastructure, workforce shortages, and operational complexity—continue to pose systemic risks.

RESILIENCE

Climate resilience is now core business, not a side program

NY's official climate impacts flags transportation (including rail) as highly exposed to extreme precipitation, heat and coastal flooding, calling for hardening of assets and operations statewide – see New York State Climate Impacts Assessment – Transportation chapter (2024) (Wiley NY Academy of Sciences). Hurricane Ida. (2021) produced lethal flash flooding across NYC and damaged many rail assets and triggered calls for stronger MTA resilience programs. The NYSDOT Transportation Asset Management Plan (TAMP) and Transportation Master Plan 2050 both elevate resilience and climate adaptation as explicit objectives for the whole network, including rail. The lessons are; resilience must be embedded at asset, corridor and system levels: flood safe yard siting, stormwater management in yards and rights-of-way, protecting electrical systems, and stress testing service plans under future climate scenarios, not historic weather, and that resilience and equity are joined at the hip: NY's Climate Justice Working Group and the Transportation chapter both emphasize that low-income and EJ communities are more exposed to flooding, heat, and service disruptions. Rail resilience programs are now expected to prioritize those locations. Implications for rail programs are that new and rehab rail projects in NY are now routinely expected to show climate adjusted design criteria (e.g., rainfall intensities, sea level rise). Heightened resilience KPIs (days of service lost, recovery time) and integration with citywide hazard mitigation plans (e.g., NYC Hazard Mitigation Plan Flooding).

INNOVATION

Technology and Innovation in Rail Safety

Positive train control (PTC) prevents train-to-train collisions, enforces speed restrictions and reduces human error impact.

AI and Predictive maintenance utilized in track geometry cars and sensors detect early defects, machine learning models predict failure points, and drone inspections for bridges and inaccessible areas, as improved safety.

Smart Infrastructure such as real-time monitoring systems, IoT-enabled rail components, and automated warning systems at crossings have improved safety.

Gaps and Challenges

Funding Constraints such as capital investment not keeping pace with asset deterioration and competing priorities within state and agency budgets have influenced the overall safety within the systems.

Fragmentation between agencies such as MTA, Amtrak, and the freight operators (CSX, Norfolk Southern, CPKS) has impacted coordination and there is a need for unified safety data sharing platform. Climate and resilience risks include flooding impacting track stability, extreme heat affecting rail expansion and buckling, and coastal exposure (NYC region) have been a challenge.

Over the past five years, New York's rail and transit innovation has centered on a number of infrastructure improvements including system modernization, delivery reform, and resilience, not isolated pilots. For MTA and regional transit, the major shifts are design-build and bundled procurement, CBTC signal modernization, OMNY contactless fares, ADA station upgrades, new rolling stock, zero-emission fleet infrastructure, and climate hardening. These changes are moving the market toward larger, integrated packages where systems capability, constructability, outage planning, and lifecycle performance matter as much as civil construction.

For Amtrak in New York, innovation is concentrated around the Northeast Corridor and Empire Corridor backbone: Airo dual-power trainsets for state-supported routes, NextGen Acela for premium NEC service, East River Tunnel rehabilitation, Gateway/Hudson Tunnel expansion, Penn Station transformation, and Empire Service reliability management. The common theme is reducing single-point-of-failure risk while improving passenger experience and future capacity.

New York rail innovation is now a capital-program operating model—modern trains, smarter signals, resilient tunnels, accessible stations, digital fares, and integrated delivery—creating sustained opportunities for contractors, systems integrators, rolling-stock suppliers, tunnel specialists, and program managers.



RECOMMENDATIONS TO RAISE THE GRADE

Infrastructure Investment needs to be prioritized for state-of-good-repair programs, acceleration of bridge and signal modernization, and expansion of dedicated freight corridors to reduce conflicts to improve safety. Strengthening safety governance by supporting FRA's RSAC engagement at state level, and establishing a NYS rail safety advisory task force will increase transparency in safety reporting

Workforce development including expansion of apprenticeship and certification programs, Incentivization and retention of skilled labor, and Integration of human-factor engineering in safety programs will support improvements in operations.

Technology deployment is important in implementing predictive maintenance systems statewide, expand AI-based inspection tools, and upgrading level crossing safety systems.

- Amtrak and MTA should undertake more construction projects through alternative delivery methods, inclusive of P3 (DBFOM), and allow DBOM and other contracting mechanisms that provide for full life cycle cost analysis and asset value protection.
- Stabilize and increase long term rail and transit funding (including O&M) for sustained, predictable federal, state, and local funding so agencies can address the maintenance backlog and avoid service cuts when fare revenue dips.
- All funding for new capital projects should include O&M budgeting plans; a full plan of TotEx=CapEx+OpEx should be part of every capital plan and project financial plan.
- Strengthen operations through innovation and efficiency: Use technology, data, and new operating models (demand response, integrated mobility) to improve cost effectiveness and build better connections to other modes (first/last mile, active modes) and professionalize asset/operations management.
- State funding should be provided towards STEM education at high school, as well and the promotion of trade schools where much needed specialist trades such as rail signals, electrical operations and maintenance, train mechanical maintenance, power energy systems maintenance, heavy plant operator (CDL/HGV) operations, can be taught, and certification courses would provide well-trained technicians and labor resources to fill the current resource gaps.
- For the big US and Canadian Class I's (including those active in NY), a few common forward-looking themes show up in recent analysis and FRA/STB documentation: Proactive incorporation of Precision Scheduled Railroading (PSR) and cost discipline, as this compresses operating expenses (crew, fuel, yard operations), often consolidates yards and rationalizes routes.
- After recent high-profile derailments and public concern, FRA and STB have kept pressure on Class I's to: Maintain track to high standards, Invest more in wayside detectors, inspection regimes, and training, that implies higher safety related O&M (inspections, technology, staff time), climate and resiliency work related to flooding, extreme heat, and storm impacts are increasingly in focus.



SOURCES

Federal & National Sources

Federal Railroad Administration (FRA), "Office of Safety Analysis," 2026.

National Transportation Safety Board (NTSB), "Railroad Investigation Reports," 2026.

American Public Transportation Association (APTA), "The Economic Cost of Failing to Modernize Public Transportation," 2018.

State & Regional Sources

Metropolitan Transportation Authority (MTA), "2025–2029 Capital Plan," 2025.

New York State Department of Transportation (NYSDOT), "New York State Freight Transportation Plan," 2024.

New York State Department of Transportation (NYSDOT), "Transportation Asset Management Plan," 2022.

New York State Department of Transportation (NYSDOT), "Draft New York State Transportation Master Plan 2050," 2025.

Amtrak, "New York State Fact Sheet," 2025.

New York City Emergency Management, "2024 New York City Hazard Mitigation Plan," 2024.

New York State Climate Impacts Assessment, "Transportation," 2024.

Industry & Research Sources

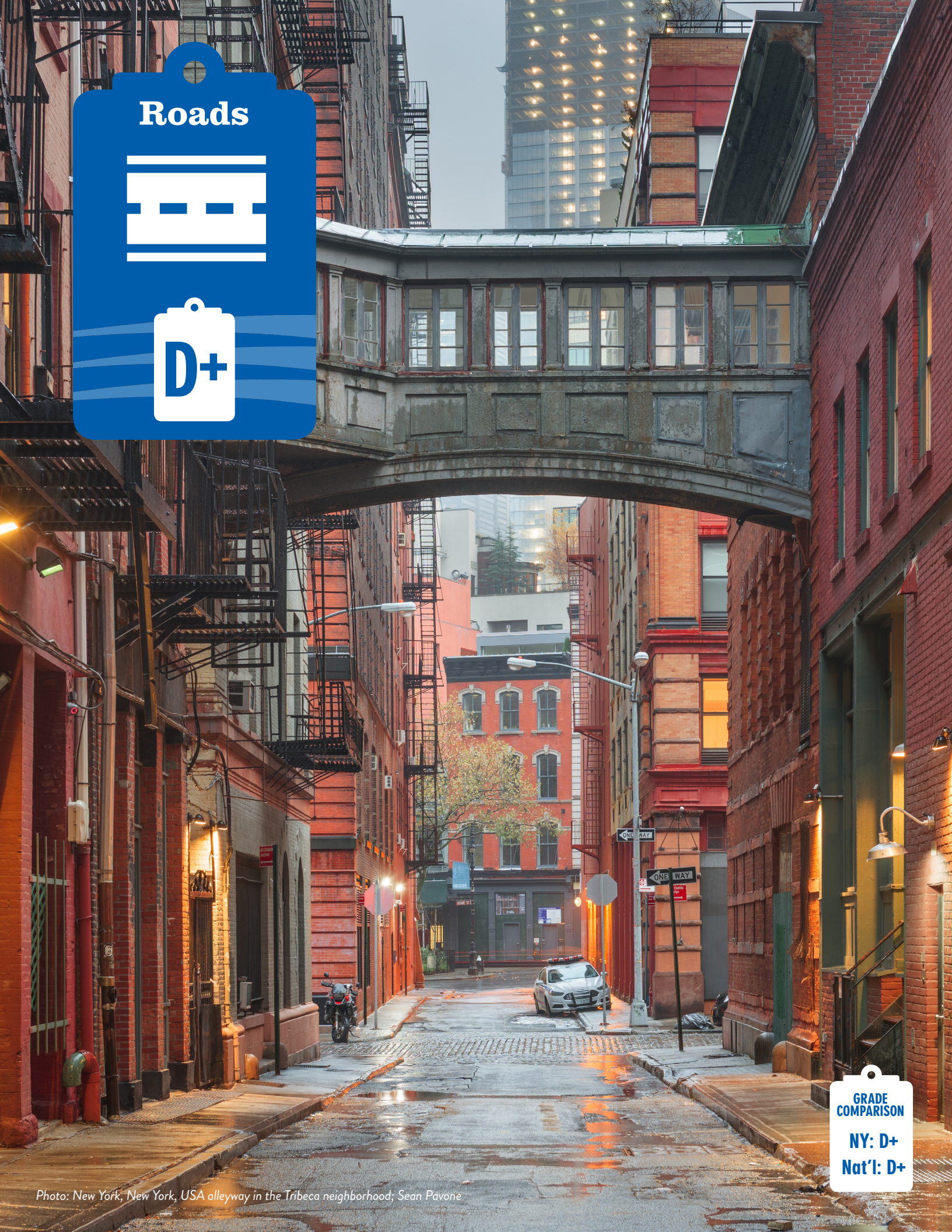
Association of American Railroads (AAR), "Freight Rail in New York: Facts & Economic Impact," 2025.

Transportation Research Board (TRB), "Rail Safety Studies," 2026.

U.S. Census Bureau, "Annual Estimates of the Resident Population for Counties: April 1, 2020 to July 1, 2025," 2026.

Source references include the New York State Freight Plan (NYSDOT) and Association of American Railroads (AAR) state rail profiles.

Roads



D+

GRADE COMPARISON

NY: D+

Nat'l: D+

Photo: New York, New York, USA alleyway in the Tribeca neighborhood; Sean Pavone

ROADS

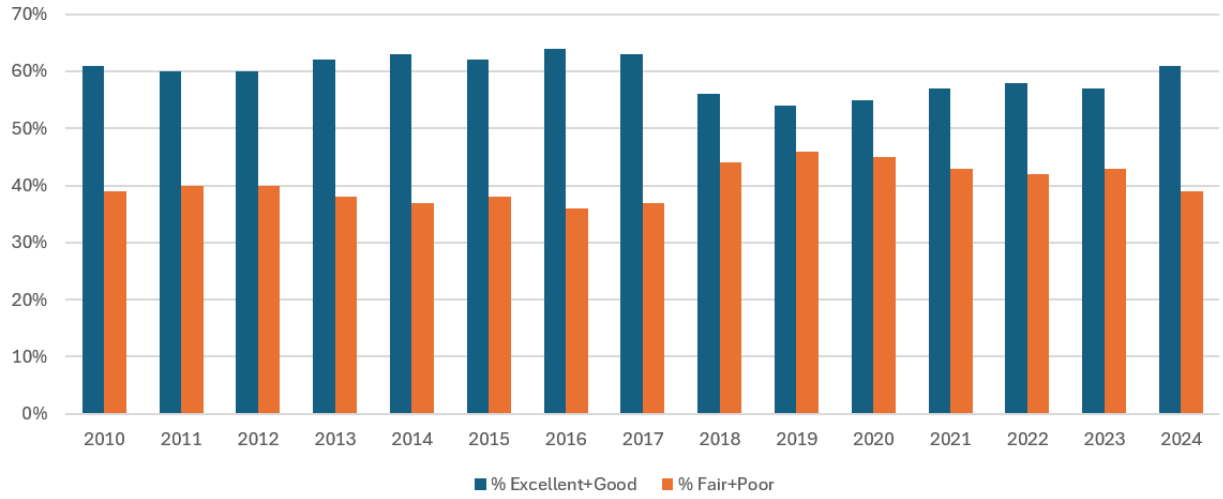
EXECUTIVE SUMMARY

New York's 116,000 miles of roadways connect communities and are vital for the economy. Recent funding boosts from federal and state sources started positive momentum. However, inflation and outdated revenue mechanisms continue to limit progress. Deferred maintenance has resulted in rough roads, congestion, and safety concerns - with drivers ultimately bearing the cost. The combination of rough roads and congestion costs the average driver an additional $718 annually. While 61% of New York's state-maintained highways are rated in excellent or good condition, a significant amount of mileage requires rehabilitation or reconstruction, and the needs on locally-owned roadways are not accounted for at all. The most recent data indicates that New York's roadway fatality rates are below the national average, though still above 2019 state levels. Vulnerable road users remain a concern. Sustaining progress will require reliable condition data, modernized funding, innovation in materials, efficient asset management and project delivery, improved resilience strategies, stronger safety outcomes, and strengthened workforce capacity to maintain and upgrade New York's extensive roadway network.

CONDITION & CAPACITY

The New York State Department of Transportation (NYSDOT) owns and maintains roughly 15,000 miles, or 13% of centerline mileage statewide. Centerline mileage is the length of a roadway measured along its centerline, regardless of the number of travel lanes. According to the latest statewide condition report of the road miles maintained by NYSDOT, in 2024, 24% of state road surfaces were excellent, 37% were good, 31% fair, and 8% were poor. For comparison, at the time of the last Report Card for New York's Infrastructure (2022), 17% of state road surfaces were excellent, 38% were good, 35% were fair, and 10% were poor.

Figure 1 – Conditions of Roads Maintained by NYSDOT



Source: NYSDOT Pavement Condition Reports

However, this data includes only roads owned and maintained by NYSDOT. Roads maintained by local municipalities make up more than 85% of the total centerline miles in New York. Data on the condition of local roads is collected at the local level, but there is no statewide database available. A review of previous studies and limited available data suggests that local roads are generally in worse condition than those maintained by NYSDOT.

New York motorists are left paying the price when roads are in poor or mediocre condition, as these surfaces may include potholes, rutting, or rough surface conditions. Poor road conditions contribute to additional vehicle operations costs including accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption, and increased tire wear. According to TRIP, a national transportation research nonprofit organization, these issues cost motorists a total of $8.8 billion statewide annually. This amount totals $728 per driver in New York City, $575 in Albany, and $498 in Buffalo.

Table 1 – Vehicle operating costs per motorist annually as a result of driving on deteriorated roads

Location	Additional Vehicle Operating Cost
Albany - Schenectady - Troy	$575
Binghamton	$558
Buffalo - Niagara Falls	$498
New York - Newark - Jersey City	$728
Poughkeepsie - Newburgh - Middletown	$612
Rochester	$438
Syracuse	$537
Utica	$413
New York Statewide	$718

Source: TRIP

Congestion also impacts New York's drivers, especially in the downstate region. New York City has a population of 8.8 million people, nearly half the population of the state. According to TRIP, each New York City driver wastes 99 hours and 33 gallons of fuel each year from sitting in traffic. A similar study is completed annually by INRIX - a traffic data analytics company; in 2025, NYC was the 2nd most congested city in the country, about 102 hours lost due to congestion.

Table 2– Annual hours and fuel lost to congestion and congestion costs per driver

Location	Hours Lost to Congestion	Annual Cost Per Driver	Gallons of Fuel Wasted Per Driver
Albany - Schenectady - Troy	43	$940	18
Binghamton	33	$594	7
Buffalo - Niagara Falls	45	$1,193	16
New York - Newark - Jersey City	99	$2,662	31
Poughkeepsie - Newburgh - Middletown	35	$818	15
Rochester	41	$1,119	16
Syracuse	29	$535	7
Utica	29	$515	6

Source: TRIP

Table 3 – Most Congested Urban Areas in the U.S.

2025 Impact Rank (2024)	Urban Area	2025 Hours Lost per Driver (2024)	Delay Change	2025 Cost Per Driver	2025 Cost per City	Downtown Speed (mph)
1 (2)	Chicago	112 (102)	10%	$2,063	$7.5B	9
2 (1)	New York City	102 (102)	0%	$1,879	$9.7B	11
3 (5)	Philadelphia	101 (77)	31%	$1,860	$4.4B	10
4 (3)	Los Angeles	87 (88)	-1%	$1,602	$8.6B	17
5 (4)	Boston	83 (79)	5%	$1,529	$2.9B	10

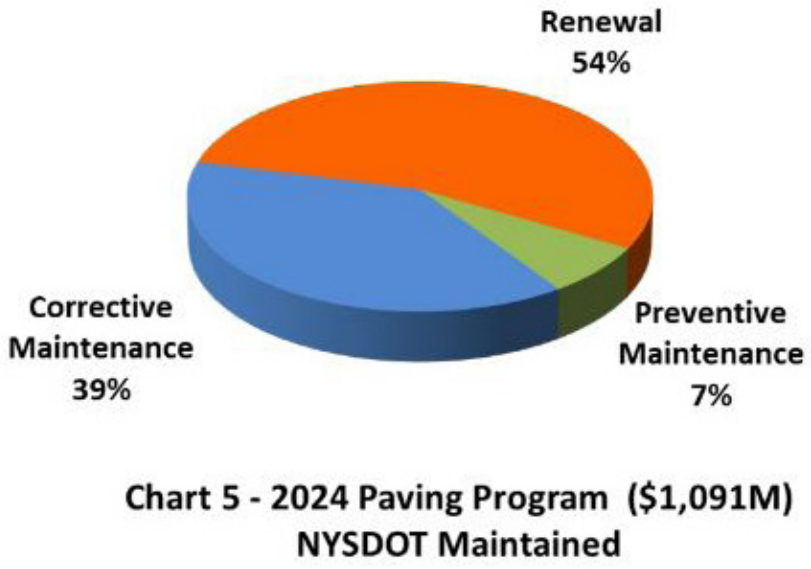
Source: INRIX

To quantify the impact of traffic congestion on truck-borne freight, the American Transportation Research Institute (ATRI) prepares an annual list of the Top 100 Truck Bottlenecks. In the 2026 ranking, New York contained three of the Top 100 Bottlenecks. This is an improvement from 2022, with three locations having dropped out of the Top 100 and no locations ranking higher than #73. Still, there are three locations that have persistently remained in the Top 100: I-278 in Brooklyn, and two locations on the Long Island Expressway (I-495) in Queens and Manhasset.

OPERATION & MAINTENANCE

Responsibility for operating and maintaining New York's roadway network is divided among NYSDOT and numerous local governments, whose maintenance capabilities and resources vary considerably. NYSDOT operates a centralized statewide maintenance program with dedicated staff, standardized procedures, and coordinated asset-management systems. Based on spending reported in NYSDOT's 2024 Pavement Condition Report, approximately $502 million annually is directed toward preventive and corrective pavement maintenance. Local highway departments, however, range substantially in size, staffing, equipment, engineering support, and technical capabilities.

Figure 2 – NYSDOT Pavement Maintenance Spending in 2024



Source: NYSDOT

NYSDOT has greater institutional capacity to manage these maintenance needs with approximately 2,100 full-time-equivalent positions assigned to preventive maintenance and 2,375 to operations in FY 2025–26. Its Enterprise Asset Management System integrates condition data, deterioration modeling, life-cycle planning, and treatment costs to help select appropriate treatments and maximize pavement service life . This approach allows NYSDOT to move beyond a "worst-first" strategy by considering an asset's condition, expected deterioration, treatment effectiveness, and life-cycle cost when prioritizing investments. The improvement in State-maintained pavement conditions documented in the preceding section provides a measurable indication of progress under this preservation-focused approach.

Implementation of similar pavement-management practices varies locally, where differences in staffing, technical resources, equipment and funding can affect agencies' ability to identify deterioration early and implement preventive maintenance. Deferred maintenance has substantial long-term cost implications, as untreated pavement defects can allow water infiltration and accelerate deterioration, expand future repairs, and cause pavements to progress from relatively inexpensive preventive treatments to costly rehabilitation or reconstruction. Preventive treatments such as crack sealing and resurfacing are significantly more cost-effective than full reconstruction, which can cost up to five times more when maintenance is delayed.

Winter maintenance further illustrates both the scale and vulnerability of roadway operations. NYSDOT currently has snow and ice control responsibility for 43,716 lane-miles, including 36,736 maintained by State forces and 6,980 through municipal agreements.

However, current statewide data documenting average winter-storm response or pavement-clearance times were not identified, limiting quantitative evaluation of performance. In 2024-2025, a statewide shortage of deicing salt exposed supply chain issues and forced agencies to use emergency procurement mechanisms at a higher cost. In general, agencies continue to make attempts to innovate and reduce road salt usage through the use of brine pre-treatment and pre-wetting salt stockpiles.

FUNDING

Roads in New York are funded through a combination of federal, state, and local sources. At the federal level, the Highway Trust Fund (HTF) finances highway programs largely through user fees, including the federal motor fuel tax. The tax has remained at 18.4 cents per gallon since 1993, while improvements in fuel efficiency and increasing electric vehicle (EV) adoption have weakened its ability to keep pace with transportation spending needs. The Infrastructure Investment and Jobs Act (IIJA) supplemented the HTF by providing approximately $13.5 billion in highway and bridge funding to New York between 2022 and 2026.

At the state level, the New York Fiscal Year (FY) 2027 Enacted Budget totals approximately $268 billion. The state continues implementation of the final year of its five-year $34.5 billion NYSDOT capital plan, the largest transportation capital program in New York's history. Approximately $6 billion is provided for transportation capital investments in FY 2027. Local roadway programs receive approximately $698 million through the Consolidated Local Street and Highway Improvement Program (CHIPS) and another $490 million through programs including PAVE-NY, Extreme Winter Recovery, Pave Our Potholes, and State Touring Routes.

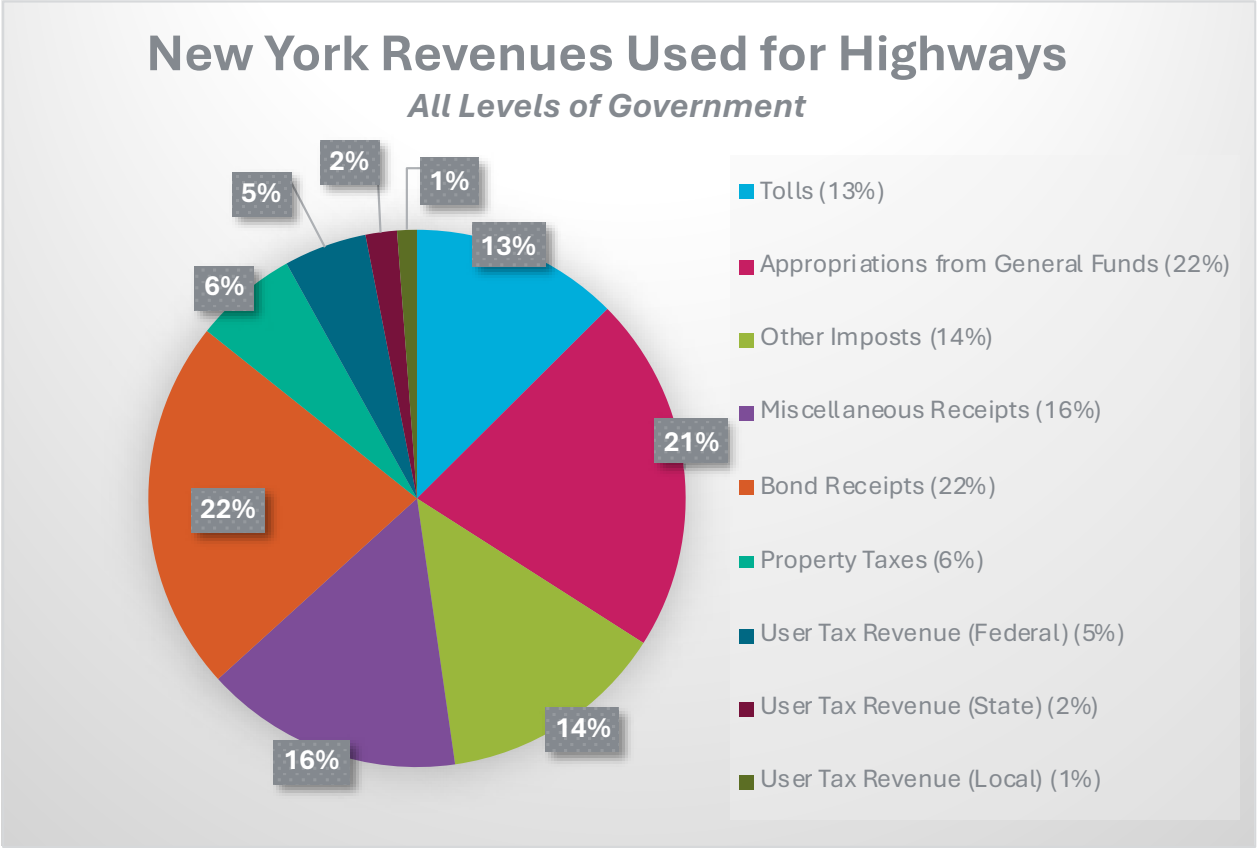
New York faces funding pressure similar to those at the federal level as fuel efficiency and EV adoption affect motor fuel tax revenues. As of July 2026, the state gasoline tax was 24.18 cents per gallon, ranking 39th among the 50 states. New York also imposes user-based fees through vehicle registration and license administration to generate revenue. New York remains one of eight states without additional registration fees for electric or hybrid vehicles..

For roadways in New York overseen by the New York State Thruway Authority, tolls serve as an important revenue source for roadway construction, operations, and long-term maintenance. The Thruway generates approximately $1 billion annually in toll and related revenues, based on 2024 reported revenues.

For many local governments, the primary highway revenue source is state aid, such as the through CHIPS and related programs. While programs such as CHIPS provide important support, they do not fully cover local roadway maintenance costs. Local governments must supplement state aid with property taxes, general revenues, sales tax distributions, bonds, and, in some cases, user-based fees such as parking fees, permits, or special assessments. Because these sources vary by local fiscal capacity, municipalities with smaller tax bases often face greater maintenance challenges.

As transportation systems continue to evolve, diversified and sustainable funding strategies will be critical to maintaining and modernizing New York's roadway network.

Figure 3 – New York Highway Revenue Sources



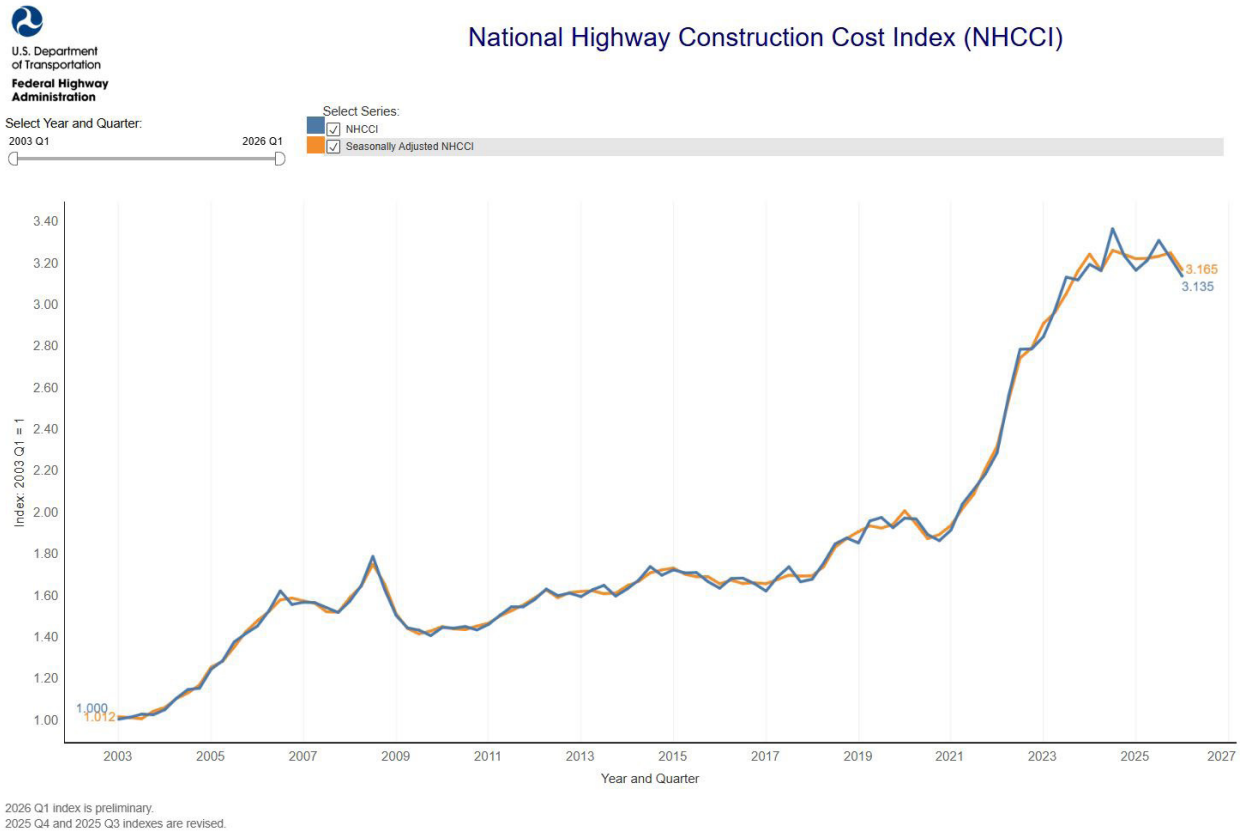
Source: FHWA Highway Statistics 2022, Table HF-1

FUTURE NEED

NYSDOT estimated in its 2024 Pavement Condition Report that $10.3 billion is needed for pavement rehabilitation on state highways alone, up from $7.76 billion in 2023 and $5.8 billion in 2020. Because comparable statewide local-road needs are not available, the total roadway need is necessarily much larger but cannot be quantified reliably. This rapidly growing rehabilitation requirement is the clearest indicator of New York's future roadway challenge.

Rising construction costs further exacerbate funding challenges. Although the NYSDOT 2022–2027 Capital Plan represents the largest transportation investment in agency history, inflation has significantly reduced its purchasing power. Approximately $800 million of recently approved funding was requested by NYSDOT to cover previously planned projects due to escalating costs. Construction costs remain subject to pressures including fuel and asphalt price volatility, inflation and borrowing costs, material tariffs, supply-chain disruptions, and shortages of qualified workers ranging from skilled laborers to engineers.

Figure 4 – National Highway Construction Cost Index



Source: FHWA

Future travel demand is also uncertain as demographic changes and evolving travel behaviors reshape roadway use. Despite projected population declines of approximately 700,000 residents between 2024 and 2049, statewide vehicle travel is expected to continue increasing. Telework may reduce peak-hour commuter volumes, while growth in e-commerce and freight movement is expected to increase commercial vehicle traffic, particularly along major freight corridors and in urban areas. This trend is significant because heavy trucks impose greater pavement loads, accelerating deterioration and increasing maintenance and rehabilitation needs. These competing trends reinforce the importance of maintaining the roadway network in a state of good repair to accommodate evolving passenger and freight demands.

The Statewide Transportation Improvement Program, NYSDOT capital program, metropolitan planning organization plans, and Transportation Master Plan 2050 provide frameworks for prioritizing investment. The challenge is translating these plans into a sustainable program that preserves existing assets, addresses rehabilitation needs, and improves information on local-road conditions.

Asset management is central to this effort. Consistent condition data, life-cycle analysis, and risk-based prioritization allow agencies to apply lower-cost preservation treatments at the appropriate time while reserving reconstruction for assets that require it. Expanding these practices and data capabilities to local road owners would improve the efficiency of statewide transportation investment.

PUBLIC SAFETY

Traffic safety remains a critical concern for New York. In 2024, New York recorded 1,101 traffic fatalities and a fatality rate of 5.54 deaths per 100,000 Population, compared to a national average of 11.54. Although New York continues to perform better than the national average, recent data show that deaths and serious injuries remain elevated compared to pre-pandemic levels. After a steady decline from 2015 through 2019, traffic fatalities increased beginning in 2020 despite reduced travel, indicating increased risk per mile driven.

Crash trends indicate that fatalities are disproportionately concentrated on non-interstate and rural roadways, where higher speeds, roadway departures, and limited shoulders contribute to more severe outcomes. Locally owned roads face additional safety challenges due to funding constraints and legacy design standards. Behavioral factors such as speeding, impaired driving, distracted driving, and inconsistent seat belt use continue to play a significant role in fatal and serious injury crashes statewide. Vulnerable road users, including pedestrians, bicyclists, and motorcyclists, account for a growing share of fatalities, particularly in urban and suburban corridors, including 289 pedestrian and 47 cyclist fatalities in 2024.

Traffic crashes impose substantial economic and societal costs on New Yorkers, totaling tens of billions of dollars annually in medical expenses, emergency response, lost productivity, and diminished quality of life. To address these impacts, New York employs a comprehensive Engineering, Enforcement, and Education approach to roadway safety. The Highway Safety Improvement Program (HSIP) directs federal investment toward proven countermeasures on both state and local roads, guided by data-driven analysis and five-year rolling performance measures. These investments align with the updated Strategic Highway Safety Plan, which prioritizes lane departures, intersections, speed management, roadway user behavior, and vulnerable road users.

Additional initiatives target school zones, work zones, and high-injury corridors, including expanded automated traffic enforcement and continued Safe Routes to School investments. Pedestrian and bicyclist safety is further addressed through statewide and local Pedestrian Safety Action Plans, emphasizing traffic calming, safer crossings, and intersection redesign. Despite New York's comparatively favorable national standing, sustained investment and coordinated action are necessary to reduce fatalities and improve outcomes for vulnerable road users.

Table 4 – Traffic Fatalities in New York, 2019-2024

Year	Total Fatalities	Fatality Rate (per 100,000 Population)	Fatality Rate (per 100M Vehicle Miles Traveled)
2019	934	4.80	0.75
2020	1,045	5.20	1.02
2021	1,156	5.82	1.08
2022	1,182	6.00	1.02
2023	1,117	5.66	0.93
2024	1,101	5.54	0.91
U.S. Avg. (2024)	–	11.54	1.19

Source: NHTSA FARS Data, U.S. Census Bureau Population Estimates)

RESILIENCE & INNOVATION

Storms, floods, droughts, and other natural hazards are combining with sea level rise, new temperature and precipitation norms, and other effects from climate change to increase the vulnerability of New York's transportation systems. New York has averaged 3 federally declared weather disasters per year over the last five years (2021-2025), with losses exceeding $1 billion each. To varying extents, all of these events damaged or disrupted the operations of transportation infrastructure vital for emergency services, evacuations, and the movement of supplies.

Statewide, approximately 726 miles of road (5.5% of the network) are at risk during a 100-year storm event. In New York City, a significant length of road is vulnerable to flood risks; 267 miles (16%) of the major roadway network is in the 100-year floodplain.

Design Guides are one example of how resilience may become part of the routine practices of transportation agencies. The Climate Resilience Design Guidelines from the engineering department of the Port Authority of New York and New Jersey standardize the agency's response to sea level rise and storm surge, using the requirements in the respective state building codes and augmenting them as needed.

New materials and technology are helping roads become more sustainable and resilient, such as greater use of permeable paving materials to reduce storm runoff, as well as the use of recycled materials in pavements. The statewide use of Warm Mix Asphalt is reducing the amount of energy needed for asphalt production along with decreasing emissions and odors.

To reduce extreme weather and future climate change risk through project and program level decision-making, NYSDOT has:

- built resiliency-related criteria into its Bridge Management System, which is used to help prioritize bridge investments
- provided $200 million annually in enhanced assistance to local governments for the rehabilitation and replacement of bridges and culverts to mitigate the impacts of flooding and scour
- revised its Bridge Manual and Highway Design Manual to accommodate future design flows for bridges and culverts

Innovation, represented by new processes, materials, methods, technologies or tools, is vital for departments of transportation to improve results and outcomes. NYSDOT is advancing digital delivery to streamline design and construction and make the best use of data throughout the project lifecycle. Other recent innovations include the implementation of Performance Engineered Mixtures for concrete and asphalt materials. Local agencies are utilizing Artificial Intelligence-based applications to assist with monitoring pavement conditions.

NYSDOT also participates in the federal Every Day Counts initiative as a way to promote and support innovation, developing new and better ways of planning, designing, building, and maintaining highways (e.g., adopted initiatives such as design-build project delivery, alternative technical concepts, bridge bundling, project bundling, subsurface utility engineering, prefabricated bridge elements and systems, digital as-builts, 3-D engineered models, e-construction, programmatic agreements, warm mix asphalt, intelligent compaction, ultra-high performance concrete, adaptive signal control technology, and others).



RECOMMENDATIONS TO RAISE THE GRADE

- Address funding gaps by supporting federal efforts to increase funding for the Highway Trust Fund, evaluating existing statewide revenue mechanisms, and exploring diversified and sustainable revenue sources. Consider wider use of value capture strategies that leverage the localized economic benefits of transportation improvements to help fund roadway investments.
- Close the pavement condition data gap by funding a statewide comprehensive needs assessment for locally-owned roads.
- Improve project delivery and cost control by evaluating delivery methods early and applying formal risk management on major projects.
- Adopt proven innovations into state and local agency practice, such as the current Federal Highway Administration's Every Day Counts innovations – *Advancing Nighttime Work Zone Safety; Beyond Bid-Build: Innovative Project Delivery Methods, Integrated Project Delivery; and, Unmanned Aircraft Systems 2.0: Innovative Infrastructure Management.*
- Enhance collaboration among transportation agencies (state-state, state-local, local-local) by sharing technical expertise and bundling projects to gain efficiencies. Connected Corridors help states work in a coordinated, shared approach, while ensuring each agency retains control over its own data and platforms. It augments safety and efficiency through actionable insights driven by reliable data sharing and common quality standards and supports further innovation with interoperable services that are nationally scalable.
- Strengthen the transportation workforce by supporting trade schools and workforce development programs while encouraging high school students to pursue careers in infrastructure, including skilled trades and civil engineering.
- Improve safety outcomes by expanding systemic safety analysis, promoting the use of FHWA Proven Safety Countermeasures, and context-sensitive solutions such as road diets. Improve quality of life through resilient, sustainable, and equitable transportation infrastructure investments that improve safety, support economic vitality, and address the needs of all users, including pedestrians, bicyclists, and micro-mobility users.



SOURCES

1. Federal Highway Administration, "Highway Statistics 2024, Table HM-10," 2026; New York State Department of Transportation, "2024 Pavement Condition Report," 2025.
2. TRIP, "New York Transportation by the Numbers." 2026.
3. Ibid.
4. INRIX, "2025 Global Traffic Scorecard," 2025.
5. American Transportation Research Institute, "Top 100 Truck Bottlenecks – 2026," 2026.
6. New York State Department of Transportation, "2024 Pavement Condition Report," 2025.
7. Public Employees Federation, "Department of Transportation (DOT), FY 2025–26 Executive Budget Analysis," 2025.
8. New York State Department of Transportation, "Transportation Asset Management Plan," 2022.
9. New York State Division of the Budget, "FY 2026 Enacted Budget Financial Plan," 2025 ; Office of the Governor of New York, "Governor Hochul Highlights Improvements to New York State Roads and Bridges," 2025.
10. New York State Department of Transportation, Office of Transportation Maintenance, "Snow and Ice – Municipal Contracts."
11. CBS 6 Albany "NY taxpayers pay for road salt shortage after new law backfires" 2025.
12. U.S. Department of Transportation, "Infrastructure Investment and Jobs Act Authorization Table," 2021.
13. New York State Division of the Budget, " 2027 NYS Enacted Budget Five-Year Capital Program and Financing Plan," 2026.
14. Tax Foundation, "Gas Taxes by State, 2026," 2026.
15. National Conference of State Legislatures, "Special Registration Fees for Electric and Hybrid Vehicles," 2026.
16. Office of the New York State Comptroller, "DiNapoli Audit: State Thruway Authority Has Improved the Accuracy of Toll Collections," 2025.
17. New York State Department of Transportation, "2024 Pavement Condition Report," 2025.
18. New York State Department of Transportation, "Transportation Asset Management Plan," 2022; TRIP, "New York Transportation by the Numbers," 2025; Federal Highway Administration, "Pavement Performance Measures and Forecasting and the Effects of Heavy Vehicles on Pavement Performance" n.d.
19. New York State Department of Transportation, "New York State Transportation Master Plan 2050," 2025.
20. New York State Department of Transportation, "Transportation Asset Management Plan," 2022.



SOURCES (cont.)

21. National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS), “Fatalities and Fatality Rates,” 2024
22. New York State Department of Transportation, ”Strategic Highway Safety Plan 2023-2027,” 2023
23. Office of the New York State Comptroller, ”Moving in the Wrong Direction: Traffic Fatalities Are Growing in New York State,” 2024.
24. National Highway Traffic Safety Administration, ”Traffic Safety Facts 2022: State Traffic Data,” 2022.
25. National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS), “Fatalities and Fatality Rates,” 2024
26. New York State Department of Transportation, ”Highway Safety Improvement Program Annual Report,” 2024.
27. New York State Department of Transportation, ”Strategic Highway Safety Plan 2023-2027,” 2023.
28. New York State Office of the State Comptroller, ”Severe Weather Events and Resiliency in New York State,” 2025.
29. Fathom. ”US Flood Risk Index”. 2026.
30. New York City Emergency Management. ”NYC Hazard Mitigation Plan.” 2024.
31. New York State Department of Transportation, ”Transportation Asset Management Plan,” 2022.
32. Ibid.
33. Federal Highway Administration, “Every Day Counts-8 Innovations,” 2025.



Photo: Men, garbage truck and collection service in New York; PeopleImages

SOLID WASTE

EXECUTIVE SUMMARY

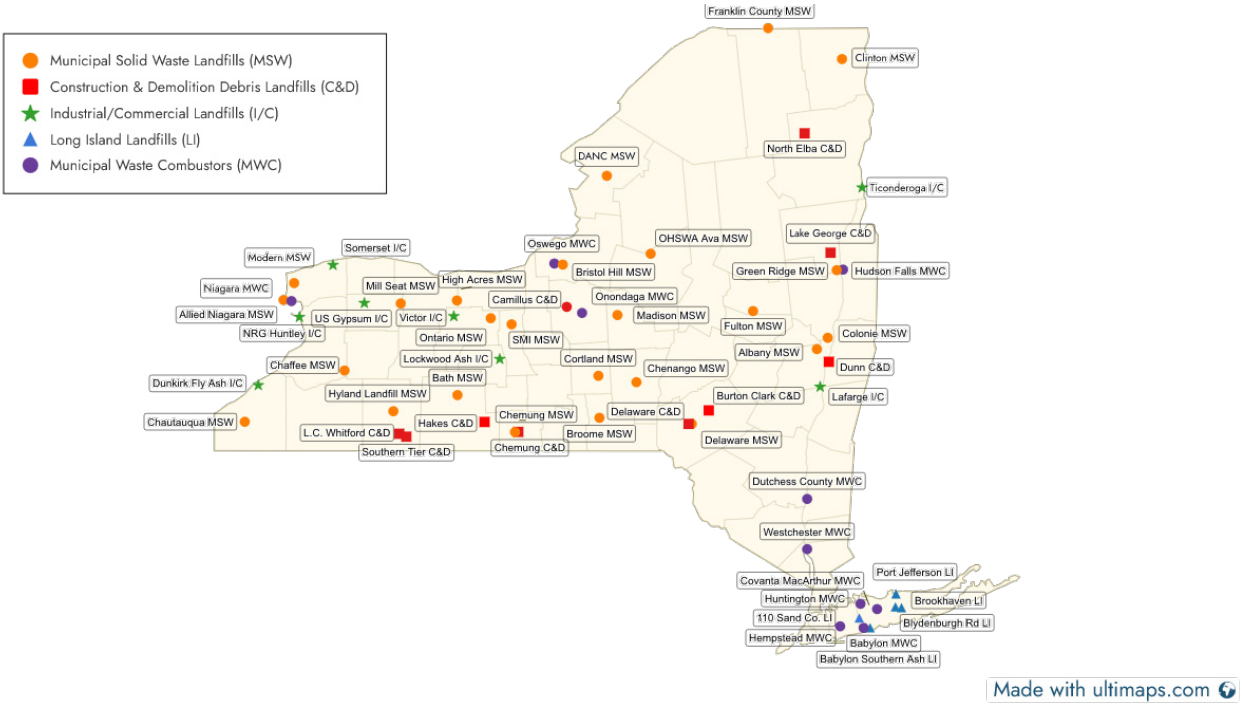
The proper management of municipal solid waste (MSW) is significant for the public health of a region. New York's state government, local governments, and private companies have developed facilities and programs over the past fifty years to protect the public health of its citizens and the environment while also establishing sustainable recycling trends. As of the 2024 Annual Reports from New York State's (NYS) solid waste management facilities, there are 48 lined landfills in the state with approximately 16 years of remaining capacity. New York residents generate about 5.12 pounds of MSW per person per day, a rate 4% higher than nationally at 4.9 pounds per person per day. As reported in the *2022 ASCE Report Card for New York's Infrastructure*, the recycling rates have leveled off or even decreased slightly, and this continues as we evaluate for the 2026 Report Card. Additionally, issues with the stagnation of waste generation appear to be caused by a lack of information available to the public. In response, an increased focus on public education including details on available New York State programs should be enacted. Efforts to further promote the reduction, reuse and recycling of materials before they become waste products need to continue to be promoted throughout the state.

CONDITION & CAPACITY

In 2024 NYS's solid waste management facilities managed a total of more than 36 million tons of materials and waste, with about a third being disposed of in landfills. According to the 2022 ASCE report, New Yorkers generated about 5.1 pounds of MSW per person per day, a rate 4% higher than the national average of 4.9 pounds per person per day. NYS has reduced the overall waste landfilled between the late 1980s and early 2000s. In the data year 2024, the amount of waste landfilled has remained similar to the 2022 data with approximately 12.4 million tons (37%) of waste disposed of in NYS landfills. The number of operating landfills has significantly declined from 348 (mostly unlined) in the 1980s to 53 (lined) in 2022 to only 48 (lined) today. The remaining landfills are categorized by waste disposal types and fall into the following categories:

- 25 municipal solid waste (MSW) landfills (everyday wastes from households, industries, and commercial establishments).
- 8 Industrial/commercial waste landfills (coal ash, paper mill sludge and similar materials).
- 10 Construction and demolition landfills (debris from building or destruction projects).
- 5 Long Island landfills, one of which is a combustion ash monofil.

Figure 1: New York State Solid Waste Facilities



Source: Compiled from Landfill - Solid Waste Management Facilities Map | State of New York and published annual reports for 2024

Despite the number of landfills and waste combustion plants decreasing, the state estimates the remaining permitted capacity to be approximately 16 years, based on the 2024 landfill annual reports. An overall reduction in capacity of approximately 4 years from the previous 2022 report. NYS still depends on privately owned facilities in other states for the disposal of 5.6 million tons per year, mostly commercial solid waste from NYC despite efforts to become self-sufficient.

The Annual Report for the year 2024 indicates that approximately 10.6 million tons of commercial and residential solid waste was disposed of in landfills located in NYS. There are ten Municipal Waste Combustors in the state, which process 4 million tons of waste per year. No information was available to determine the material recycled and composted in New York State during the year 2024.

Recently, the New York State Hazardous Waste Facility Siting Board, along with the New York State Department of Environmental Conservation (NYSDEC) Commissioner Designee, had rejected the application to expand a Hazardous Waste landfill operating within New York State. The final determination was to deny the permit stating that there is no current or near-term need for increased capacity for hazardous waste management in New York State since there is capacity in the US until 2049 and the proposed siting of the landfill is not otherwise necessary or in the public interest.

Upon rejecting said application, costs for disposal of hazardous waste material remediated from inactive hazardous waste sites in NYS have risen and many state and private remedial projects are facing increased financial disposal costs. This has created a negative impact on project costs across the state, increases to transportation cost as an example.

OPERATION & MAINTENANCE

NYS solid waste regulations have required conservative environmental containment systems since 1988. These containment systems must provide long-term isolation of waste to protect the surrounding water and air from the interred waste. These regulations have been updated numerous times to improve upon the design, construction, operation, and closure requirements. In 2024, all 25 active MSW landfills were double-lined, with all facilities indicating they had an active landfill gas collection system with landfill gas to energy plants. NYS-lined landfills have collected more than 627 million gallons of leachate for proper treatment as stated in their annual reports. These lined landfills accounted for more than 2,500 acres of lined footprint, protecting the State's groundwater resources. Over 10.9 billion cubic feet of landfill gases were collected and destroyed through flaring, with another 13.1 billion cubic feet of landfill gas being used to generate 642,005 kilowatt-hours of electricity.

The NYSDEC Division of Materials Management has instituted an "Inactive Landfill Assessment Program," which evaluates possible drinking water contamination from 1,923 inactive landfills located throughout the state. The work done for this program has been summarized in a 2021 report that is available on NYSDEC's website.

FUNDING & FUTURE NEED

Tipping fees vary across the state and are a function of the services provided by each facility. Some facilities offer discounted or scaled tipping fees based on the volume of waste delivered to the facility. Most planning units provide similar services, but for smaller planning units, those costs are distributed over a lower waste tonnage or over a smaller number of participants, which increases those rates. Many planning units have some form of flow control and dictate the waste management approach and level of recycling. Therefore, it is difficult to compare tipping fees across the state.

In addition to tipping fees, which are the primary user-pay revenue source for day-to-day solid waste facility operations in NYS, facilities may generate revenue from other service-based charges, including cart fees, district assessments, and service subscriptions, depending on their ownership and operating structure. Operating costs may also be partially offset through market revenues, including the sale of recovered recyclables, metals, and plastics, and, in some cases, energy revenues generated by waste-to-energy facilities through electricity or steam production.

For capital repairs, equipment purchases, and facility upgrades, municipalities commonly rely on local capital budgets, enterprise funds, and debt financing mechanisms such as bonds or notes, supplemented by state and federal grant programs.

NYS's Environmental Protection Fund (EPF) is a source of funding on capital projects for environmental protection. According to the NYSDEC, the State has invested more than $250 million over more than three decades in waste reduction and recycling programs through EPF. The Municipal Waste Reduction and Recycling (MWR&R) program is among the several NYSDEC state assistance programs, and the current MWR&R grant opportunity (2024-2027) supports recycling and composting infrastructure development.

At the federal level, the U.S. Environmental Protection Agency (EPA) administers the Solid Waste Infrastructure for Recycling (SWIFR) Grant Program and the Consumer Recycling Education and Outreach Grant Program funded through the Infrastructure Investment and Jobs Act (IIJA). In New York, five entities have received approximately $8.1 million in total funding through these programs to expand composting and organics processing capacity, improve food waste collection systems, and strengthen regional solid waste planning.

In addition to state and federal recycling funding programs, NYS also supports innovation in waste-to-energy and circular-economy technologies. For energy-oriented waste treatment and circular-economy innovation, the New York State Energy Research and Development Authority (NYSERDA)

provides competitive funding opportunities supporting feasibility studies, research and development, and pilot deployments of waste-to-energy and waste-to-fuels technologies. NYSERDA's Waste to Low-Carbon Fuels Pilot and Demonstration Program (PON 6031) makes up to $7.8 million available to support the development and demonstration of low-carbon fuel production pathways from waste feedstocks.

State and federal programs provide important financial support for recycling infrastructure, organics diversion initiatives, and waste management innovation in NYS. Major funding programs are summarized in the following table:

Program / Funding Source	Administering Agency	Funding Amount	Purpose
NYS' Environmental Protection Fund (EPF) – Municipal Waste Reduction & Recycling Program	EPF/NYSDEC	$250 million over more than three decades	Recycling infrastructure, equipment, collection vehicles, local education and outreach programs, and local recycling coordinator salaries
SWIFR & Consumer Recycling Education Grants (IIJA)	U.S. EPA/ NYSDEC	~$8.1 million awarded to NY entities	Expands in recycling infrastructure, organics processing capacity, and recycling education
Waste to Low-Carbon Fuels Pilot & Demonstration Program	NYSERDA	Up to $7.8 million available	Supports waste-to-fuel and circular-economy technology development
Municipal Food Scraps Recycling Initiatives	NYSDEC	$4.1 million (2022 & 2024)	Supports municipal organics diversion programs
Feeding New York State and regional food banks	EPF/NYSDEC	$10.8 million since 2018	Expands food recovery infrastructure
Local Emergency Food Relief Equipment Funding	NYSDEC	$5.1 million (2024)	Supports food recovery logistics

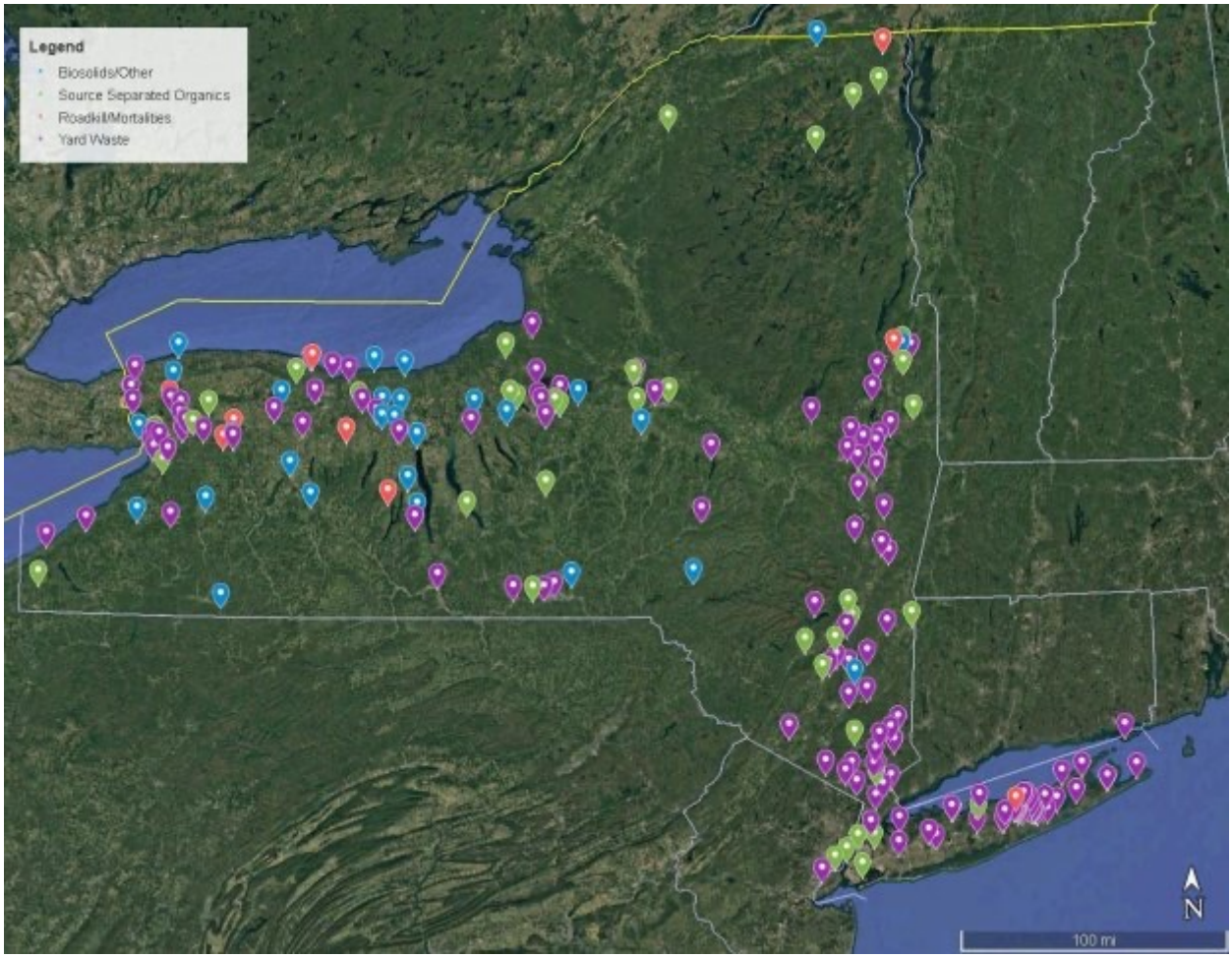
Composting & Recycling Programs

NYS is enhancing its waste management system by prioritizing waste reduction, reuse, recycling, landfill diversion, and the development of a circular economy framework. Organic diversion initiatives such as The Food Donation and Food Scraps Recycling Law (2019) requires large generators to donate edible food and recycle scraps. In addition, the Climate Leadership and Community Protection Act are driving organics diversion from landfills to help address climate impacts.

The Rochester Institute of Technology, in collaboration with the NYSDEC, has developed the Organic Resource Locator. This is a web-based mapping tool that provides information on organic waste resources throughout NYS. According to this information, there are approximately 258 composting sites throughout the state. The compositing sites fall into the following designations, with their locations shown on the following figure:

- 159 yard waste sites,
- 58 source-separated organics sites,
- 30 biosolid/other sites,
- 11 roadkill/mortality sites

Figure 2: New York State Composting sites



Source: Compiled RIT Organic Resource, Organic Resource Locator | New York State Pollution Prevention Institution | RIT

NYSDEC has invested in municipal food scraps recycling, food recovery systems, and infrastructure support to reduce waste and improve food access. Key priorities include expanding recycling education, improving recycling markets, reducing contamination, and addressing material-specific challenges such as glass recovery.

NYSDEC administers the Municipal Funding for Food Scraps Recycling Initiatives. Food scraps constitute a significant portion of NYS's municipal solid waste stream. Through this initiative, NYSDEC provided $2.9 million in 2022 and $1.3 million in 2024 to assist municipalities in starting or expanding municipal food scraps recycling programs. NYSDEC provided Local Emergency Food Relief Equipment Funding totaling $5.1 million to support food reuse and waste reduction]. NYSDEC has provided $10.8 million since 2018 through the EPF to Feeding New York State and the state's 10 regional food banks. These funds support staffing to expand participation in food donation programs and provide vehicles and equipment that increase food recovery and pickup capacity at food pantries, meal centers, and other partner agencies.

NYS Extended Producer Responsibility laws have contributed to significant gains in state landfill diversion. These programs require manufacturers to manage end-of-life products. Significant diversion has been achieved for electronics, batteries, and mercury-containing products, with additional programs under consideration. Since their respective programs were implemented, over 1.1 billion pounds of electronic waste 2,517,876 pounds of rechargeable batteries, and 42,417 mercury containing thermostats have been collected for reuse or recycling.

The Solid Waste Management Plan emphasizes a shift toward waste prevention and reuse. However, future infrastructure priorities remain, including modernizing recycling facilities, expanding organics processing, strengthening transfer, transportation, and system logistics, maintaining safe disposal capacity, managing emerging waste streams, improving data systems, and securing sustainable funding.

NYS needs to continue the transition toward a more sustainable materials management system through coordinated policy, funding, and infrastructure improvements.

PUBLIC SAFETY, INNOVATION, & RESILIENCE

NYS's solid waste management program is a comprehensive regulatory and programmatic framework to protect public health, enhance environmental performance, and improve system resilience. Municipal solid waste landfills operate under requirements set forth by 6 NYCRR Parts 360 and 363, which require environmental safeguards including double-composite liner systems, leachate collection and removal systems, groundwater monitoring, and closure and post-closure care requirements. These systems, along with landfill gas collection and management practices, help mitigate environmental impacts and support energy recovery initiatives.

In addition to landfill controls, NYS has implemented a range of product stewardship and hazardous waste management programs to reduce risks associated with potentially harmful materials. These include manufacturer-funded programs for the collection and disposal of pharmaceuticals and paints, as well as a statewide network of household hazardous waste collection facilities. Collectively, these programs divert hazardous materials from municipal waste streams and promote safer handling and disposal practices.

Emerging contaminants present growing challenges to the waste infrastructure and environmental protection. Persistent compounds, such as per- and polyfluoroalkyl substances (PFAS), may be present in landfill leachate and are difficult to remove through conventional treatment processes. New York State has strengthened monitoring and regulatory efforts to address these contaminants while continuing remediation of legacy sites through programs such as the State Superfund and Environmental Restoration Program.

Infrastructure resilience has become increasingly important in response to climate-related risks. Under the Community Risk and Resiliency Act, waste management facilities must consider hazards such as flooding and extreme weather in siting and design. Additionally, the State provides planning tools to assist municipalities in managing large volumes of debris generated during disaster events, improving system preparedness and response capabilities.

Despite these safeguards, vulnerabilities remain. NYS continues to rely heavily on the export of waste to out-of-state disposal facilities, particularly for New York City and Long Island areas, which may present risks during disruptions to transportation or disposal capacity. Inactive and legacy landfills are located near waterways or low-lying areas that may be vulnerable to flooding. Operational safety risks have also evolved with changing waste streams. Lithium-ion batteries have become a leading cause of fires in waste collection vehicles and recycling facilities. Regulatory measures, including battery stewardship programs, have been implemented to address these risks.

Innovation is a key component for advancing and strengthening the Solid Waste Management systems performance. More than $25 million has been invested in NYS-supported research initiatives, including partnerships with academic institutions, focused on improving recycling technologies, materials recovery systems, and data-driven planning.

Additional support from state agencies promotes the development of recycling markets, material recovery technology, sustainable materials management practices, and environmentally preferable procurement policies. These efforts collectively strengthen the efficiency and safety, help drive technological innovation, expand the markets for recycled and sustainable materials and help the long-term resilience of NYS's waste management system.



RECOMMENDATIONS TO RAISE THE GRADE

NYS continues to implement stewardship programs and management plans to strengthen solid waste management statewide. However, the recommended grade has gone from B- in 2022 to C+ in 2026 for the main reason that the landfill capacity is stagnant without future added capacity for most waste materials and has decreased for hazardous waste materials. The following are recommendations to increase the effectiveness and transparency to the public.

- Continue implementing stewardship programs and management plans to strengthen solid waste management statewide.
- Prioritize the continued development, support, and funding of initiatives that reduce waste disposal in landfills.
- Maintain public education as a key focus to increase awareness of available programs and encourage reuse and recycling before materials are discarded.
- Increase and improve the quality of Recycling and Composting data, as currently there is very limited information available.
- Mitigate increased disposal cost by addressing the availability of disposal options of hazardous waste material remediated from inactive hazardous waste sites in NYS.
- Continue the transition toward a more sustainable materials management system through coordinated policy, funding, and infrastructure improvements..

SOURCES

New York State Department of Environmental Conservation (NYSDEC), accessed 2026.

US Environmental Protection Agency (USEPA), accessed 2026.

American Society of Civil Engineers (ASCE), “Report Card for New York State Infrastructure,” 2022.

New York State Department of Environmental Conservation (NYSDEC), “New York State Inactive Landfill Initiative: Comprehensive Plan to Address Priority Solid Waste Sites for Potential Impacts on Drinking Water Quality,” 2021.

New York State GIS Clearinghouse, “Active Landfills, 2025,” 2025.

NYSDEC, “New York State Hazardous Waste Facility Siting Plan,” 2010.

Environmental Conservation Law ECL27-1102.7, n.d.

NYSDEC, “Hazardous Waste Management Facility Siting Board October 2025 decision on Chemical Waste Management’s (CWM) application to build a new Hazardous Waste landfill on their property in Model City, New York,” 2025.

Stormwater

D



GRADE COMPARISON

NY: D

Nat'l: D

Photo: Rural road flooded in Grayson County, VA from Hurricane Helene; HokieTim

STORMWATER

EXECUTIVE SUMMARY

New York's stormwater systems capture and treat runoff from rain and snowmelt, protecting drinking water, aquatic habitats, and communities from flooding. More than 500 regulated stormwater programs operate statewide. NYSDOT runs the state's largest, with roughly 16,000 outfalls across 13,000 lane miles of highway.

Stormwater carries pollutants into surface waters, a leading cause of water-quality impairment. In fact, EPA finds roughly half of the nation's impaired waterways are due to stormwater. New York has responded with growing investment in green infrastructure, which treats runoff at its source. Even so, more than half of the state's impaired waterbodies still lack an active cleanup plan.

The scale of unmet need remains large; an estimated $5 billion in stormwater infrastructure investment is needed statewide over 20 years.

New York Stormwater at a Glance

- **500+ regulated stormwater (MS4) programs statewide — municipalities, counties, state agencies, and other institutions**
- **NYSDOT maintains the largest MS4 in New York State with approximately 16,000 outfalls over 13,000 lane miles of highway statewide**
- **847 of 4,679 monitored waterbody segments are impaired; only 332 have an active cleanup (TMDL) plan**
- **~$5 billion in unmet stormwater infrastructure needs statewide (2022) over the subsequent 20 years.**
- **Between 2021 and 2025, about $ 26 million, which is 80% of Clean Water State Revolving Fund stormwater-related assistance, went to green infrastructure.**

INTRODUCTION AND BACKGROUND

Stormwater infrastructure includes the natural and built systems that collect, convey, store, and treat runoff from rain and snowmelt. In New York, this includes gray infrastructure such as gutters, storm sewers, and engineered drainage systems, as well as green infrastructure that uses soils, vegetation, and infiltration practices to manage runoff closer to its source.

Effective stormwater management protects drinking water, aquatic habitat, recreation, property, and public infrastructure by reducing pollution, erosion, and flooding. Impervious surfaces such as roads, rooftops, and parking lots prevent water from soaking into the ground, increasing runoff rate and volume and allowing pollutants such as sediment, nutrients, bacteria, oil, and trash to wash into nearby waterways.

Demands on municipal stormwater systems are increasing because continued urban development expands impervious surfaces and polluted runoff remains a major water-quality concern. Climate change, expanding stormwater regulations, and updated design criteria are also requiring communities to adapt to changing conditions.

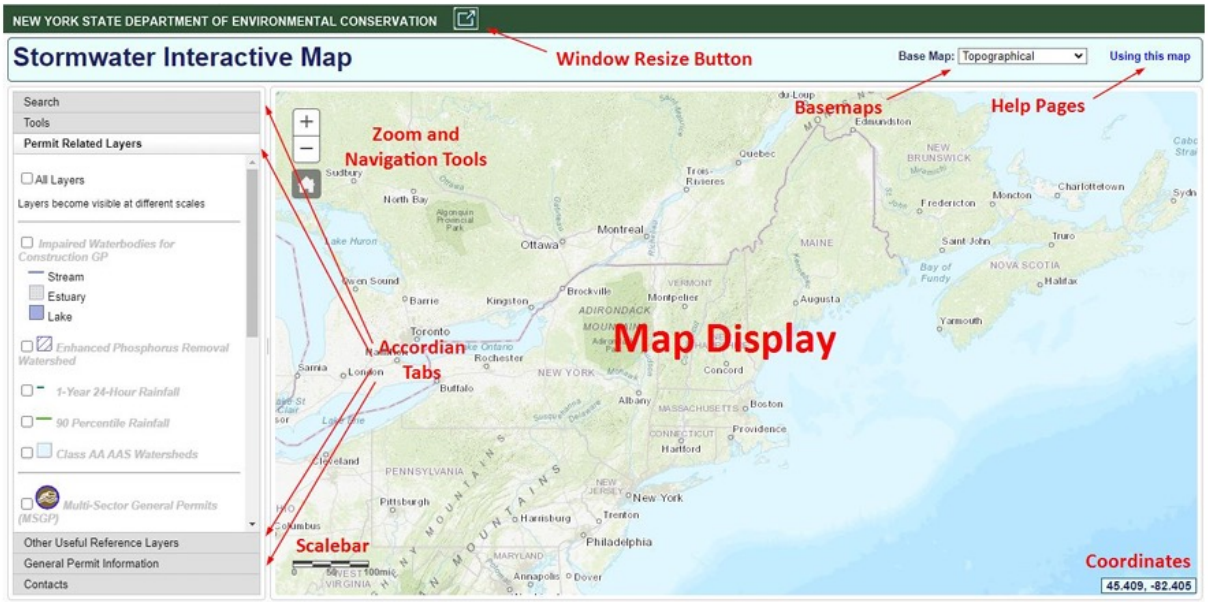
New York manages stormwater through a combination of local action and state and federal regulation. The New York State Department of Environmental Conservation (NYSDEC) requires a permit for three categories of stormwater-related activity:

New York's Three Core Stormwater Permits

- **Industrial activity (Multi-Sector General Permit): covers stormwater runoff from certain industrial sites. Facilities must develop a pollution-prevention plan and report monitoring results to NYSDEC annually.**
- **Municipal systems (MS4 General Permit): required under the federal Stormwater Phase II rule. Municipal operators must develop and carry out a stormwater management program that reduces pollutant discharges.**
- **Construction activity (Construction General Permit): required for projects disturbing one acre or more of soil. Permittees must develop a pollution-prevention plan to prevent construction-related pollutants from reaching surface waters. Some municipalities such as NYC have more stringent requirements.**

NYSDEC's online Stormwater Interactive Map lets the public see which permits are active for a given location, along with nearby impaired waterbodies and rainfall data. It is a practical tool for anyone researching stormwater conditions in a specific community.

Figure 1: The key sections of the NYSDEC Interactive Map



CAPACITY

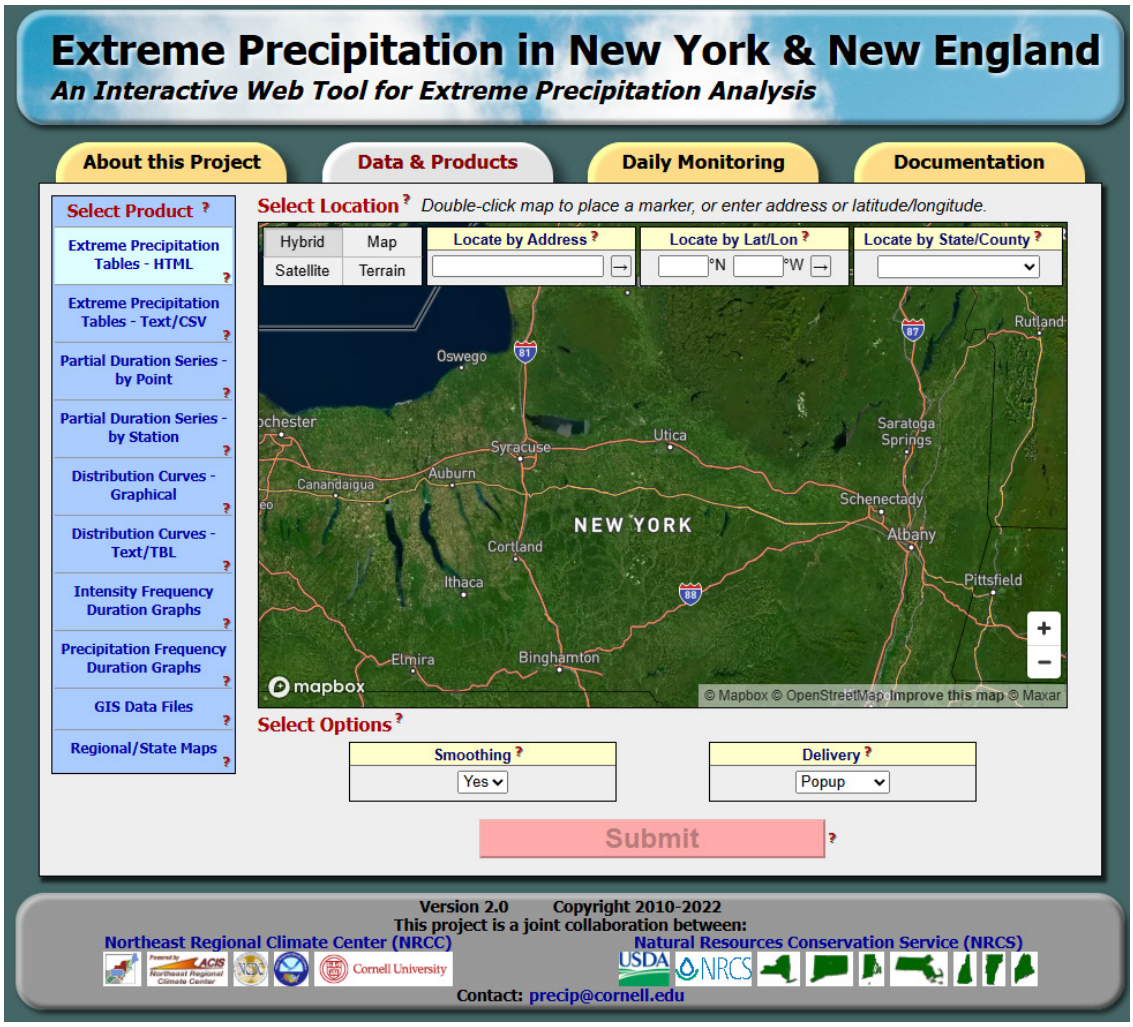
Capacity describes whether existing stormwater systems can convey and manage the quantity of runoff generated under current and future conditions while also protecting water quality.

Providing adequate stormwater drainage capacity is becoming increasingly challenging. Gray infrastructure in built-out areas was designed and constructed using the criteria and engineering estimates of the time. Many of these systems have reached or exceeded their useful service lives.

Stormwater system components are designed around a wide range of rainfall frequencies. For instance, stormwater drainage systems on freeways are designed for a 10-year frequency but can be increased to a 50-year frequency in a sag vertical curve or to a 100-year frequency if the proposed highway is in an established regulatory floodway or floodplain.

Updated rainfall data can be taken from the Extreme Precipitation Tool Project led by Cornell University and the National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server (PFDS).

Figure 2: Cornell's Extreme Precipitation Data provides localized rainfall data used in designing stormwater systems



CONDITION

Inspection obligations for stormwater assets in New York largely depend on permit requirements rather than a single statewide standard. NYSDEC's MS4 general permit requires regulated operators to carry out monitoring, inspection, and maintenance programs — including inspection of municipally owned stormwater management practices and outfalls — generally on a multi-year cycle tied to the permit term.

For example, NYSDOT conducts systematic inspections of drainage outfalls within its highway right-of-way statewide, using a documented protocol to locate, inspect, and screen outfalls for illicit discharges that NYSDOT considers compliant with NYSDEC MS4 permit requirements. Beyond these permit-driven programs, no single standardized protocol governs condition assessment across all stormwater asset owners, and reported inspection intensity varies with each operator's capacity and resources.

On the water quality side, EPA tracks 4,679 waterbody segments in New York, of which 847 are impaired. Only 332 of these impaired waterbodies have an active cleanup (Total Maximum Daily Load) plan in place to improve water quality.

FUNDING

Funding sources in New York include local budgets, developer-funded stormwater controls, state and federal grants, and loan programs such as the CWSRF. The table below provides a quick snapshot of the major funding sources and how they are used.

Funding Source	How It's Used
Local budgets	General-fund appropriations that compete annually with other municipal priorities.
Developer-funded controls	Stormwater infrastructure built and paid for as part of new development or redevelopment projects.
State and federal grants	Competitive awards
Clean Water State Revolving Fund (CWSRF)	Low-interest loans for gray and green infrastructure projects.
2022 Environmental Bond Act	One-time $4.2 billion authorization; funds are being allocated across multiple project categories, including stormwater, over several years rather than on an annual basis.

New York State's 2022 Clean Water, Clean Air, and Green Jobs Environmental Bond Act authorized $4.2 billion for environmental and community projects statewide, including at least $1.1 billion for restoration and flood risk reduction and a separate minimum of $650 million for water quality improvement and resilient infrastructure — a category that prioritizes, but is not limited to, municipal stormwater projects. This is a one-time capital authorization being drawn down across multiple years and project categories, not an annual stormwater appropriation.

Further, New York State launched the Bond Act-funded Green Resiliency Grant program in 2024, awarding $60 million to 13 stormwater and resiliency projects in its inaugural round, and announced a second $60 million round in April 2025.

NYSDEC has prioritized green infrastructure to improve stormwater quality. For example, about $26 million, or about 80% of Clean Water State Revolving Fund stormwater-related assistance from 2021 to 2025, went to green infrastructure projects. The table below summarizes the allocation.

Year	Gray Infrastructure	Green Infrastructure
2021	No agreement executed	$10,110,498
2022	No agreement executed	$3,350,132
2023	$2,683,722	$5,190,000
2024	No agreement executed	$7,148,577
2025	$4,394,955	$116,574

FUTURE NEED

Future needs are driven by the interaction of growth, regulatory requirements, aging assets, and changing rainfall patterns. Urban growth and redevelopment can increase runoff demand unless post-construction requirements offset the impacts of increased imperviousness. At the same time, older infrastructure in established communities often requires renewal or replacement, creating parallel pressure on capital budgets.

The 2022 Clean Watersheds Needs Survey provides a statewide quantified baseline of $5.198 billion for stormwater management over the subsequent 20 years. These needs are dominated by gray infrastructure assets ($4.950 billion), indicating that many communities anticipate major capital needs for stormwater conveyance structures and related systems, as well as green infrastructure assets ($236 million) and general stormwater programming needs ($12 million).

OPERATION AND MAINTENANCE

More than 500 regulated stormwater (MS4) programs operate statewide, including small and large municipalities, counties, and state agencies.

Responsibility for operation and maintenance (O&M) is distributed. Municipalities and counties typically maintain local streets, catch basins, and storm drains; NYSDOT maintains drainage assets along state highways; and private owners — commercial sites, industrial facilities, and large developments — may own on-site stormwater controls that require inspection and maintenance to function as designed.

MS4 permit requirements encourage municipalities to formalize Operation and Maintenance by documenting procedures, implementing good housekeeping practices, providing training, and tracking compliance.

PUBLIC SAFETY

Stormwater infrastructure is directly tied to public safety: overwhelmed drainage systems can cause flash flooding, roadway overtopping, sinkholes from pipe collapse, and damage to bridges and culverts. Flooding also creates indirect safety hazards by disrupting emergency response routes, damaging critical utilities, and causing long-duration recovery burdens.

Recent FEMA disaster declarations for flood-related incidents in New York show a clear increase in

frequency: 8 major declarations between 2020 and 2026, compared with 4 between 2013 and 2019. These events demonstrate that flooding is not isolated to a single region and that the state faces repeated stressors from intense rainfall and storm systems.

Stormwater owners are responding in several ways: incorporating updated precipitation-frequency data into design criteria, prioritizing capital upgrades at known flooding hotspots, and coordinating with emergency management on early-warning and response planning. Continued investment in these areas is needed to protect both assets and lives, particularly in flood-prone and historically underserved communities.

RESILIENCE

Resilience is the ability of stormwater systems and their managing institutions to anticipate, withstand, recover from, and adapt to disruptive events. For stormwater, resilience is increasingly shaped by more severe storms, sea-level rise in coastal areas, and compounded flooding risks.

New York's recent sequence of declared flood disasters, including remnants of Hurricane Ida (2021) and Tropical Storm Debby (2024), underscores growing exposure to intense rainfall events.

Resilient stormwater systems therefore require both structural capacity (gray and green infrastructure) and institutional capacity (maintenance programs, emergency protocols, and interagency coordination). Cost-benefit analysis should be implemented to prioritize upgrades with the greatest impact.

INNOVATION

Stormwater innovation includes new technologies and materials, new delivery approaches, and programmatic innovations

Examples relevant to New York include expanding green infrastructure and LID practices through construction and post-construction guidance; using GIS-based inventories, such as the Stormwater Interactive Map, and web maps for streams and lakes; and improving permit tools and standardized forms to help regulated entities implement consistent best practices. Innovation also includes integrating stormwater objectives into transportation projects (e.g., complete streets, green corridors) and into climate adaptation planning.

Green infrastructure and low-impact development are increasingly central to stormwater condition and performance because they reduce runoff volume at the source and provide treatment through filtration, infiltration, and biological uptake.

Figure 3: Before Green Median installation for Queens Village in NYC

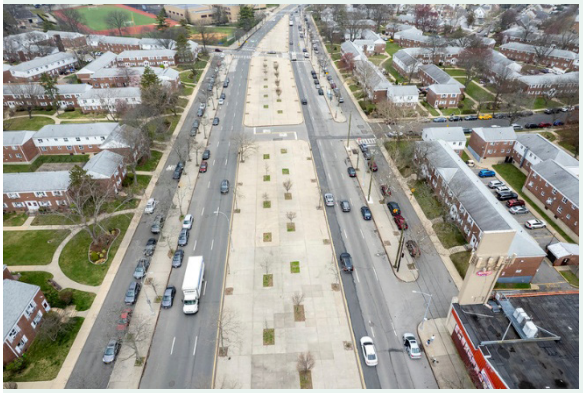


Figure 4: After Large Green Infrastructure for Medians for Queens Village in NYC





RECOMMENDATIONS TO RAISE THE GRADE

The following actions, organized from foundational data needs through funding, regulation, public engagement, and coordination, would most directly raise New York's stormwater infrastructure grade:

- Establish a statewide database of stormwater assets.
- Develop a database tracking changes in impervious area throughout the state.
- Develop Total Maximum Daily Load plans for all impaired waterbodies.
- Implement technologically integrated statewide management and reporting for MS4 operators.
- Develop a dedicated stormwater-specific funding and financing program, drawing on best practices from the existing Clean Water State Revolving Fund and stormwater utilities from across the country.
- Encourage communities to create stormwater utilities that institute rates reflecting the true cost of treating and handling stormwater runoff.
- Develop a comprehensive, publicly facing education campaign on the true costs, savings, risks, and avoided hazards associated with resilient stormwater investments, disseminated through broadly accessible platforms.
- Compile a full survey of New York-specific stormwater patents and research funding.
- Advance watershed-scale coordination to improve water quality outcomes across jurisdictional boundaries.



SOURCES

Citations are not used inline in this chapter; sources are listed below in the order they are first referenced, grouped by chapter section.

INTRODUCTION AND BACKGROUND

- NYSDEC, "Multi-Sector General Permit (MSGP)," n.d.
- NYSDEC, "General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems, GP-0-24-001," 2023.
- NYSDEC, "MS4 Permit and Forms," n.d.
- NYSDEC, "Stormwater Permit for Construction Activity," n.d.
- NYSDEC, "Construction Stormwater Toolbox," n.d.
- NYSDEC, "Stormwater Interactive Map," n.d.
- NYSDOT, "SPDES Fact Sheet- New York State Department of Transportation," 2025.

CAPACITY

- New York DOT, "Highway Design Manual, Chapter 8," 2026.
- NYDEC, "Stormwater Management Design Manual," 2024.
- NOAA, "Atlas 15 Precipitation-Frequency Update," n.d.
- NRCC & NRCS, "Extreme Precipitation in New York and New England," 2022.

CONDITION

- EPA, "New York 2020–2022 303(d) Fact Sheet," 2025.
- NYSDOT, "Instructions for Conducting Outfall Inspections," 2015.
- NYSDEC, "Stormwater Overview," n.d.

FUNDING

- EPA, "Clean Water State Revolving Fund (CWSRF) Annual Summary Project Reports, Totals by Category," 2021–2025.
- EPA, "2022 Clean Watersheds Needs Survey Report to Congress," 2022.
- NYSDEC, "Clean Water, Clean Air, and Green Jobs Environmental Bond Act," n.d.
- Governor Kathy Hochul, "On Earth Day, Governor Hochul Announces $60 Million in Environmental Bond Act Funding for Green Resiliency Grants," 2025.
- Western Kentucky University, "Stormwater Utility Survey," 2025.



SOURCES (cont.)

PUBLIC SAFETY

- FEMA, "Disasters and Other Declarations, search results (filtered: Incident Type = Flood, State = New York, years 2020–2026)," 2026.
- FEMA, "DR-4839-NY — Severe Storm and Flooding," 2024.
- FEMA, "DR-4825-NY — Remnants of Tropical Storm Debby," 2024.
- FEMA, "DR-4818 — Saint Regis Mohawk Tribe Severe Storm and Flooding," 2024.
- FEMA, "DR-4814-NY — Severe Storm, Tornadoes, and Flooding," 2024.
- FEMA, "DR-4755-NY — Severe Storm and Flooding," 2024.
- FEMA, "DR-4723-NY — Severe Storms and Flooding," 2023.

RESILIENCE AND INNOVATION

- NYSDEC, "Streams, Rivers, Lakes and Ponds GIS Page," n.d.
- NYC Water, "Large Green Infrastructure Medians for Queens Village," n.d.

ADDITIONAL BACKGROUND SOURCES

- NYSDEC, "Construction Stormwater Toolbox — Design Section," n.d.
- NYSDEC, "Construction Stormwater Toolbox — Blue Book Section," 2016.
- NYSDEC, "Water Quality Standards and Classifications," n.d.
- NYSDEC, "Combined Sewer Overflow (CSO) Program," n.d.
- NYSDEC, "New York City CSO Program," n.d.
- NYSDEC, "Combined Sewer Overflows 2023 Annual Report," 2024.
- NYSDEC, "Combined Sewer Overflows 2024 Annual Report," 2025. EPA, "Clean Watersheds Needs Survey (CWNS)," n.d.
- EPA, "How's My Waterway?," n.d.
- EPA, "2022 Clean Watersheds Needs Survey Report to Congress" (uploaded PDF; no separate public URL for this uploaded copy), 2022.
- FEMA, "EM-3613-NY — Severe Storm and Flooding," n.d.
- FEMA, "EM-3590-NY — Severe Winter Storm," n.d.
- FEMA, "Disasters and Other Declarations, search results (uploaded PDF capture; no separate public URL for this uploaded copy)," 2026.
- Western Kentucky University, "Stormwater Utility Survey 2025," 2025.
- NOAA, "Atlas 14 Precipitation-Frequency Data Server," n.d.
- ASCE, "Bridging the Gap," n.d.
- NYSDEC, "Waterbody Inventory and Priority Waterbodies List, Estuary Segment Dataset." 2026.



Photo: New York elevated subway, metropolitan bridge, metro track above street. Railway transport over road. Railroad line. Queens public transportation. Long Island city; Dogora Sun

TRANSIT

EXECUTIVE SUMMARY

New York has the highest transit ridership in the nation, with an estimated 4.3 billion passenger trips across all modes statewide in 2025. Though significant, this total represents just 85% of pre-pandemic ridership levels. The condition of the state's transit infrastructure has not substantially improved from the last report card and remains a concern, as only 68% of the Metropolitan Transportation Authority's (MTA) $1.5 trillion asset portfolio is in a state of good repair, and 20% of the approximately 20,000 revenue vehicles statewide are operating past their useful service life. Transit agencies remain heavily dependent on state and federal funding, though congestion pricing has the potential to significantly augment existing funding sources. To raise the current C-grade, New York must escalate its capital expenditure to reduce its maintenance backlog and fund essential modernizations, including signal automation and fleet electrification.

CAPACITY

New York has the highest transit ridership in the nation and is uniquely transit-dependent, due to a robust and well-diversified transit system within New York City and the surrounding metropolitan area. The MTA owns, operates, and maintains most transit assets within the state. This includes New York City Transit (NYCT), the largest transit authority in the nation by passenger trips. In 2023, the MTA's subway, bus, and commuter bus lines completed 2.6 billion passenger trips (APTA, 2025). The MTA is also responsible for commuter rail service in the NYC metropolitan area, operating two of the largest commuter railroads in the nation, the Long Island Rail Road (LIRR) and Metro-North Railroad (MNR), which together served 150 million passenger trips in 2023. Amtrak owns and operates Penn Station in New York city, facilitating intercity rail access along the Northeast Corridor.

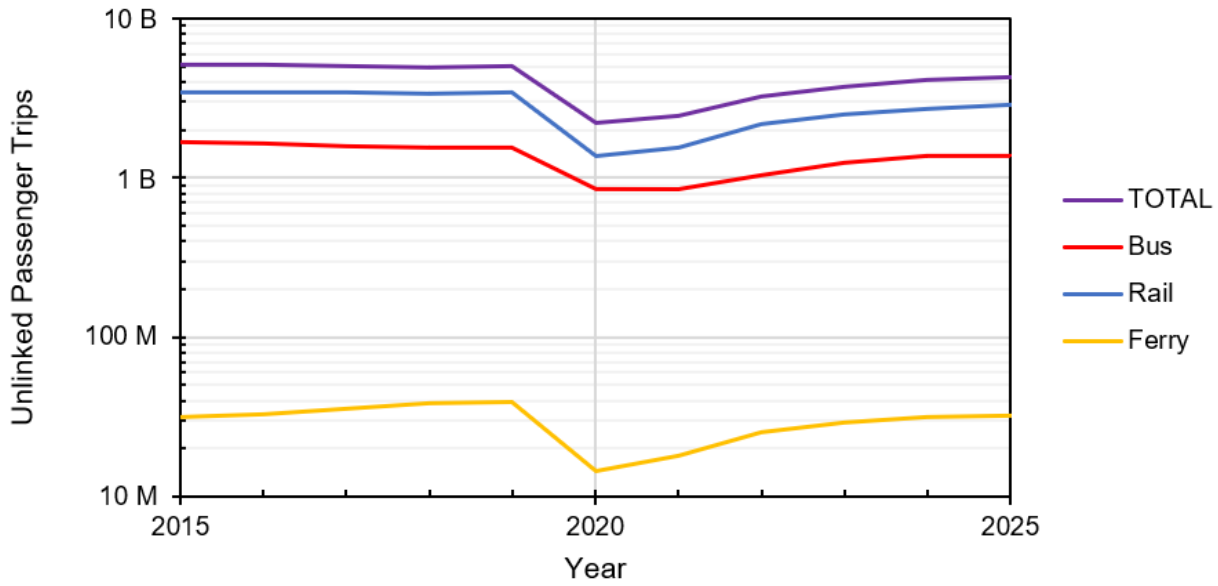
While the MTA is responsible for a significant portion of ridership and capacity within the state, there are a significant number of other non-MTA agencies and operators within the state, providing service on the periphery and beyond the NYC metropolitan area, with service spanning across the entire state. The Port Authority Trans-Hudson Corporation serving both New York and New Jersey via rail service, is the 20th largest transit agency in the country, by ridership. Westchester County, Nassau County, Niagara Frontier Transportation Authority (NFTA), and Capital District Transportation Authority (CDTA) are among the top 50 largest bus agencies in the nation as measured by ridership. The New York City Department of Transportation, New York City Economic Development Corporation, and Port Imperial Ferry Corporation (servicing both NY and NJ) are the 2nd, 3rd, and 4th largest ferryboat agencies in the nation by ridership (APTA, 2025).

Transit ridership within the state has recovered slowly since the end of the COVID-19 pandemic. Figure 1 shows that statewide unlinked passenger trips (i.e., individual vehicle boardings) across all modes of transit dropped from about 5 billion in 2019 to 2.2 billion in 2020 (FTA, 2026a). Ridership recovered to 4.3 billion passenger trips by 2025, which represents an 85% return to pre-pandemic levels. Bus, rail, and ferry ridership recovery were 89%, 83%, and 82%, respectively in 2025, with bus ridership recovery leading across all transit modes. MTA is planning to spend $3.6 billion through 2029 to support capacity and expansion efforts. Of this total, the MTA plans to spend $2.75 billion to begin construction of the Interborough Express (IBX), a project that will connect Brooklyn and Queens along an existing disused rail corridor. The IBX will improve service and capacity for more than 900,000 New Yorkers, potentially reducing travel times by as much as 30 minutes for certain trips.

To address long-standing capacity constraints and regional bottlenecks, major infrastructure overhauls are already underway, such as the Port Authority Bus Terminal Replacement project. This project will transform the world's busiest bus terminal into a modern facility capable of supporting an all-electric bus fleet and significantly increasing staging capacity to remove commuter buses from local streets. Simultaneously, the Penn Station Access project is expanding the reach of the existing commuter rail network by converting underutilized rail lines to provide a direct one-seat ride from the East Bronx to Manhattan's West Side, adding four new Americans with Disabilities Act-compliant stations and serving an estimated 50,000 daily riders.

The MTA also plans to spend an additional $5.4 billion on signal modernization efforts, expanding the sections of the system that can operate with communications-based train control (CBTC). When compared to the existing legacy signal system, CBTC can enable trains to run more closely together, allowing for more frequent service, increasing capacity along existing transit lines.

Figure 1: Transit ridership trends in New York State by mode over the past decade, through December 2025



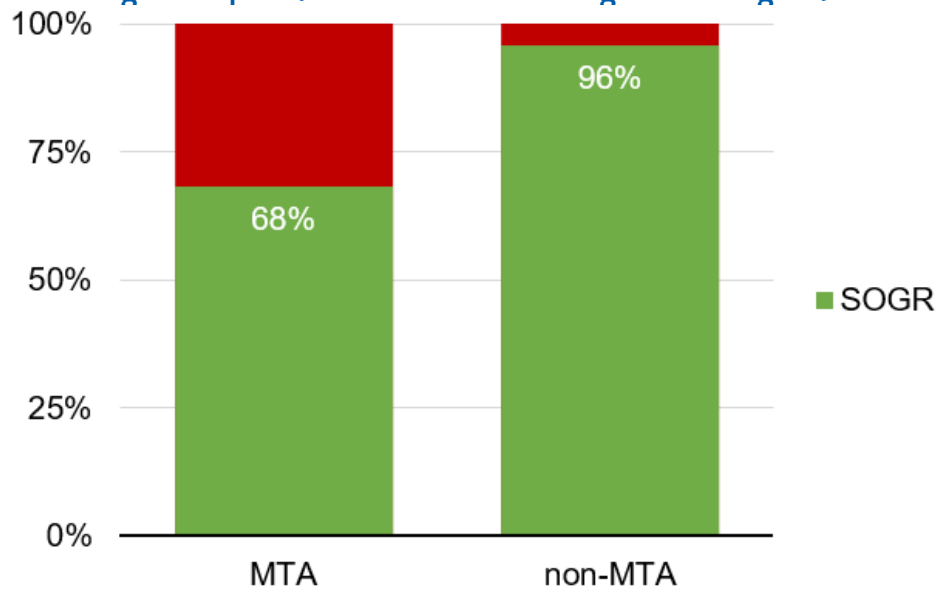
Source: FTA, 2026a

CONDITION

The MTA is responsible for maintaining a transit infrastructure asset portfolio valued at $1.5 trillion, with about 68% of these assets classified as being in a state of good repair according to National Transit Database (NTD) data (FTA, 2025a). State of good repair is defined as an asset condition rating of adequate or better (3.0 or greater on the USDOT asset condition rating scale; FTA, 2019). Based on data provided in the MTA's latest capital plan, prior year spending has not significantly reduced the state of good repair backlog for NYCT station components, track, line structures, communications, or power assets. Projected spending is expected to appreciably reduce the state of good repair backlog for line structures, communications and power assets, though a significant repair backlog is expected to remain in 2029. Where longitudinal data is provided, the state of good repair backlog is not expected to reduce for LIRR assets, though the backlog for signal assets is expected to increase from 43% in 2025 to 51% by 2029. By contrast, the backlog of MNR communications and signals is expected to reduce from 51% in 2025 to 35% by 2029. On balance, given projected spending, the state of good repair backlog for MTA assets is unlikely to significantly reduce by the end of the current capital program in 2029.

NTD data for non-MTA agencies is comparatively more limited. Across all assets for which a condition assessment was reported, 96% were listed as in a state of good repair. This percentage was lower for some agencies with a greater number of assets in the inventory, such as NFTA (90%) and Regional Transit Service (RTS), which serves Rochester and surrounding counties (83%).

Figure 2: Percentage of National Transit Database facility inventory listed in state of good repair (asset condition rating of 3 or higher)

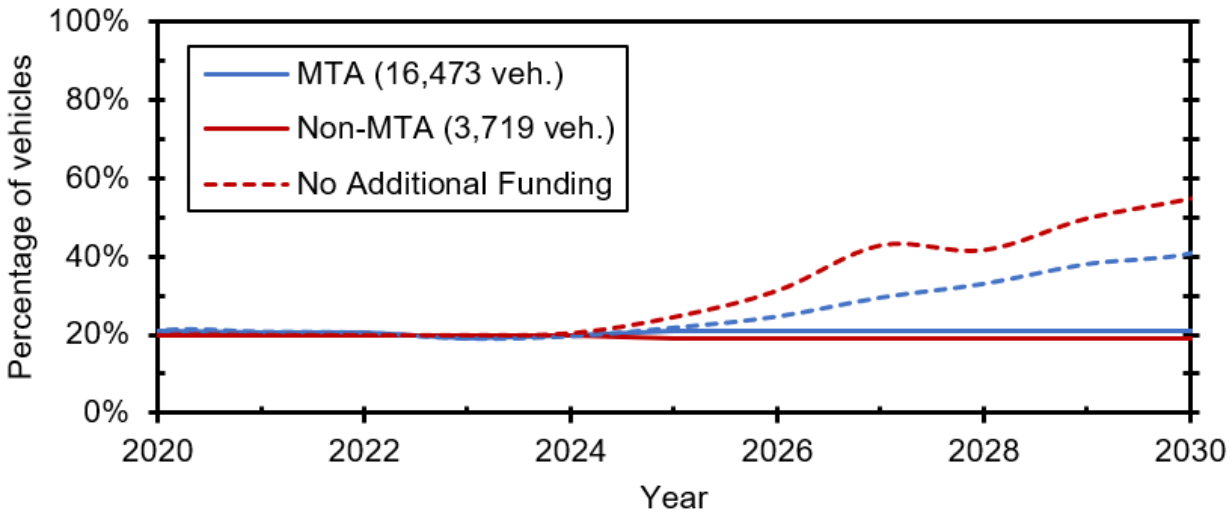


Source: FTA, 2025a data

Given that most non-MTA agencies primarily provide bus and ferry service, they are generally not responsible for maintaining a significant number of facilities or assets along a right-of-way. As such, revenue vehicles (e.g., buses, ferries) are of comparatively greater importance for non-MTA agencies. The refurbishment and replacement of revenue vehicles represent a highly visible component of transit infrastructure spending. According to NTD data, in 2024, MTA had approximately 16,400 revenue vehicles; non-MTA agencies had 3,700 revenue vehicles. One measure of the unmet core investment backlog is the number of revenue vehicles that are near

or beyond the end of their service life. Older buses and rail cars are costly to maintain, less reliable, and put pressure on existing finances to keep them running. As shown in Figure 3, from 2020 to 2025, the number of revenue vehicles beyond end of service life has remained relatively constant, around approximately 20% of the MTA and non-MTA fleet. This percentage equates to 4,000 of the 20,000 revenue vehicles (FTA, 2025b). At current funding levels, it is unlikely that this percentage will substantially decrease by 2030. In the absence of any additional funding, as many as 60% of non-MTA and 40% of MTA revenue vehicles are projected to be beyond their end of useful life by 2030.

Figure 3: Projected percentage of public transit revenue vehicles in New York State beyond end of service life with current investment levels (solid lines) and without additional investment (dashed lines)

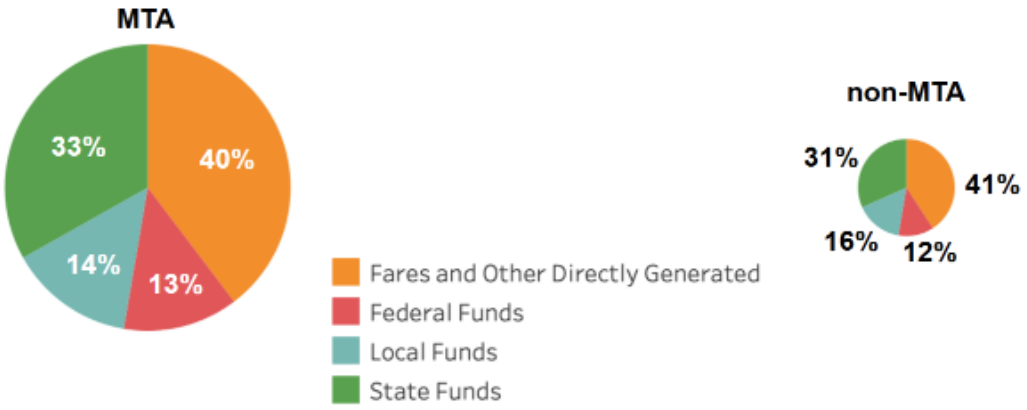


Source: FTA, 2025a data

FUNDING AND FUTURE NEED

New York's transit network is sustained by a complex, multi-layered funding model comprising farebox revenue, dedicated state and local taxes, and significant federal assistance. The MTA is the main source of public transit spending in the state, according to the Federal Transit Administration's NTD report on Fiscal Year (FY) 2024 spending data (FTA, 2025c). MTA reported $17.7 billion in operating costs in FY 2024. These operating costs were financed through $7 billion in fares and tolls, $2.5 billion in local funds, $5.9 billion in state funding, and $2.3 billion in federal funding. Farebox revenue and tolls covered approximately 40% of the MTA's operating costs, while the remainder was supported by government funding sources. Non-MTA transit agencies operate on a smaller scale, incurring $2 billion in operating costs, covered by $829 million in farebox revenue, $319 million in local funding, $642 million in state funding, and $241 million in federal funding. Non-MTA agencies have a similar farebox recovery rate, covering approximately 41% of operating costs from fares and tolls. Figure 4 summarizes the proportional breakdown of these revenue sources.

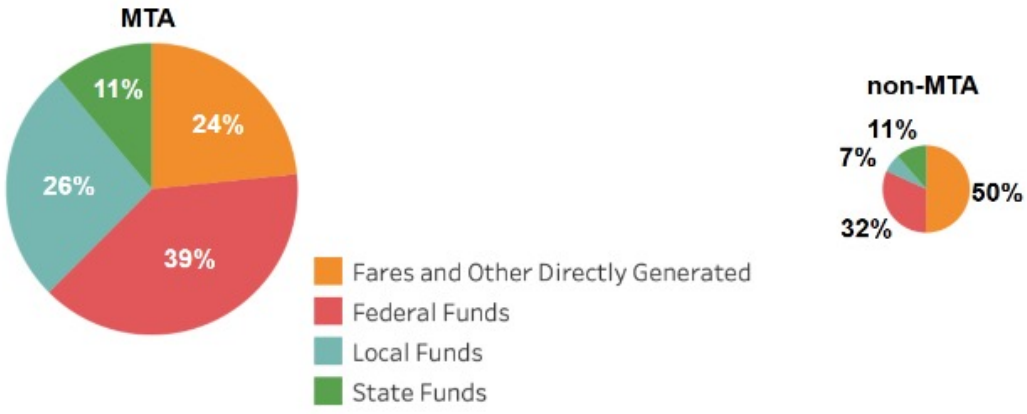
Figure 4: Operating budget funding sources for MTA ($17.7 billion) and non-MTA ($2.0 billion) agencies



Source: FTA, 2025c

Funding for capital investment programs is dominated by the MTA, which reported $6.5 billion in capital expenditures in FY 2024, compared with $584 million across all non-MTA transit agencies. The MTA's capital funding structure relies heavily on government support, with federal funding representing the largest source (39%), followed by local funding sources (26%), directly generated revenue (23%), and state funding (11%). Notably, the NTD dataset does not include revenue from congestion pricing, which began generating revenue in 2025. According to MTA reporting, the program generated $468 million in net revenue between January and October 2025. These revenues are intended to support borrowing for the MTA capital program and represent a new dedicated funding stream for further transit investment. By contrast, according to NTD data, capital investment programs at non-MTA transit agencies were primarily supported by direct revenue generation (fare revenue and tolls; 50%), followed by federal funding sources (32%), state funding (11%), and local sources (7%), as summarized in Figure 5.

Figure 5: Capital budget funding sources for MTA ($6.5 billion) and non-MTA ($584 million) agencies



Source: FTA, 2025c

In New York, federal funding represents nearly 40% of overall transit capital expenditures. This high degree of dependence, especially for capital investment, makes New York's transit systems susceptible to uncertainty in federal policy and budget decisions. While recent federal infrastructure programs have provided a substantial infusion of capital, the long-term amount, timing, and reliability of federal funding remain subject to changes in federal priorities and appropriations cycles, as recently exemplified by the Gateway Tunnel Project, Second Avenue Subway Expansion, and Empire Corridor Upgrades. As a result, continued reliance on federal funds heightens financial risk and complicates long-term capital planning for transit agencies statewide.

OPERATION AND MAINTENANCE

The operation and maintenance (O&M) of New York's vast transit network requires a massive and consistent financial commitment. Maintenance is a central pillar of the MTA's long-term strategy, with 73% of the MTA capital plan (MTA, 2025a), approximately $50 billion over the next five years, dedicated to state of good repair and normal asset replacement. This includes activities such as replacement of aging substations, repair of critical structures, and regular rehabilitation of track, signals, and switches along transit lines. Non-MTA transit agencies throughout the state face similar O&M challenges, though on a smaller scale.

According to the New York Public Transit Association (NYPTA, 2025), non-MTA agencies received $948 million in state operating appropriations for the fiscal year ending in 2026, approximately 21% of the total appropriation provided to the MTA. Beyond the MTA, the largest standalone transit agencies by operating budget include the Niagara Frontier Transportation Authority ($281.6 million for 2025), the Capital District Transportation Authority ($135.7 million), and the Rochester Genesee Regional Transportation Authority (approximately $80 million).

PUBLIC SAFETY

Safety outcomes across New York's transit systems are largely defined by their regional operating environments and transit modes. While incident rates remain low relative to the volume of travel, performance varies between the MTA's high-capacity rail network and the bus-dominant operations of non-MTA agencies. The MTA consistently reports lower incident rates per passenger journey than other statewide operators. According to the NTD (FTA, 2026b), in 2024, the MTA collision rates per million passenger trips fell 3% year over year and injury rates decreased 7% in 2024 . Public safety on the NYC Subway has significantly improved since implementation of the 2022 Subway Safety Plan. The plan, which included increasing police presence on platforms and continued installation of security cameras in subway cars, helped to reduce crime rates per rider by 30% year-on-year to reach a 16-year low (MTA, 2025c). Commuter rail safety is also trending positively; LIRR customer injury rates per million riders dropped 27% in 2024 , and mainline derailments decreased from four in 2023 to one in 2025. Safety on Metro-North has followed a similar trend, with zero recorded mainline train collisions or derailment incidents in the most recent reporting period and zero grade crossing incidents for two consecutive years.

Non-MTA agencies operating in smaller urbanized areas primarily manage bus networks, where safety risks are driven predominantly by roadway interactions and exposure to mixed traffic. These systems recorded 1.03 collisions per million trips in 2024. While absolute crime levels are lower than in MTA systems, non-MTA agencies face a notably higher incidence of assaults against transit workers, recording 9.3 incidents per million trips compared to 0.5 incidents per million trips for the MTA. Similarly, non-MTA injury rates were 3.2 injuries per million trips in 2024, more than double the rate of MTA agencies. Overall, while incident rates remain relatively low across New York's transit systems, safety outcomes vary by operator group. The MTA's higher ridership and operating complexity contrast with generally lower per-passenger incident rates, while smaller transit systems outside the MTA show higher rates in several safety categories.

RESILIENCE

The MTA has made significant investments in resilience over the past decade. Initially spurred into action by the consequences of Superstorm Sandy, the MTA has made consistent progress in expanding its systemwide resilience efforts. In 2024, the MTA released its first Climate Resilience Roadmap (MTA, 2024a), projecting the need for $6 billion in dedicated climate resilience spending through 2034. In addition to coastal flood risk and rising sea levels, MTA assets are vulnerable to stormwater flooding via extreme precipitation, extreme heat, wind, and winter weather. Much of this additional spending aims to reduce the risk and operational consequences of these non-coastal hazards. The MTA has recognized collaboration and partnership with adjacent agencies as a critical risk reduction strategy, as outside agencies are responsible for other infrastructure systems (e.g., stormwater sewers) whose improvement at strategic locations would provide significant benefit to vulnerable MTA assets.

Guided by the Climate Resilience Roadmap, the MTA plans to spend $700 million through 2029 to protect the subway system from stormwater flooding. The majority of these funds, $477 million, is budgeted to rehabilitate aging pump rooms and expand their capacity to better accommodate heavy rainfall events. The remainder, $233 million, is budgeted for additional stormwater protections aimed at reducing inflow into the subways, such as elevated subway steps and street vents at chronically impacted stations. An additional $800 million is allocated through 2029 to reduce flood and landslide risk along the MNR Hudson Line. This includes $170 million to improve stormwater drainage at Mott Haven Yard, a facility critical to the operation of all MNR lines (MTA, 2025b).

Information on non-MTA agencies is limited, though these agencies likely share a similar degree of exposure to extreme weather-related impacts. There remains a significant opportunity for other regional operators and smaller agencies to assess their vulnerability and enhance their resilience to extreme weather-related impacts and significant service disruptions.

INNOVATION

Through strategic investment into innovative new technologies, the MTA and other transit agencies are advancing the state of practice and making meaningful progress towards fleetwide electrification goals. Metro-North has begun a fleetwide modernization of its locomotive fleet through the deployment of new dual-mode locomotives (MTA, 2024b). Metro-North trains will be capable of running under electric power via third-rail or under diesel power, producing 85% less pollutants (soot, nitrogen oxides) than the existing fleet. The 2025-2029 Capital Plan (MTA, 2025a) further commits to purchasing 500 electric buses, with the goal of having a fully emissions-free fleet by 2040, which aligns with state policy. This policy is supported statewide through the Zero-Emission Transit Transition (ZETT) program (NYS, 2025), which has awarded nearly $80 million to non-MTA agencies such as the CDTA and NFTA to fund electric and hydrogen-electric buses alongside the necessary charging and refueling infrastructure.

The MTA has made further investments in innovation aimed at improving infrastructure and service reliability. NYCT continues to invest in (CBTC) signaling, enabling trains to safely run closer together, increasing service speeds, frequency, and capacity. Agencies in the New York City metropolitan area are also leveraging private-sector innovation through the Transit Tech Lab, facilitating prototyping and deployment of new technologies aimed at solving practical problems and positively impacting service and operations. As of February 2026, the Transit Tech Lab had successfully deployed over 100 proofs of concepts, and 60 pilot projects. It has fully scaled up 16 technologies, including Preteckt, a predictive maintenance platform that uses artificial intelligence to provide repair plans for a quarter of the NYCT bus fleet, increasing the efficiency and effectiveness of bus repair operations.

New York's Innovative Mobility Initiative is investing more than $24 million in microtransit, dial-a-ride, and other technology-enabled, on-demand services that expand transit coverage for riders who face barriers to traditional fixed-route service, including $6 million awarded to five upstate counties (NYSDOT, 2024). Putnam County's microtransit pilot program, launched in 2025 illustrates this approach at the local level, providing affordable, wheelchair-accessible shared rides, increasing transit accessibility within the county (Putnam County, 2025).



RECOMMENDATIONS TO RAISE THE GRADE

- Establish a stable, recurring capital revenue stream to reduce the high dependency on federal capital funds and the systemic reliance on debt financing.
- Adequately address the state of good repair backlog statewide by prioritizing funding necessary to accelerate the replacement of aging infrastructure and revenue vehicles already operating beyond their intended service life.
- Accelerate modernization and capacity projects statewide, including the deployment of Communications-Based Train Control (CBTC).
- Fully fund the MTA Climate Resilience Roadmap: Secure the $6 billion needed through 2034 to protect vulnerable assets from stormwater flooding, extreme heat, and sea-level rise, ensuring the system remains operational during increasingly frequent extreme weather events.
- Address the resilience gap at non-MTA agencies through long-term climate risk and resilience planning efforts.

SOURCES

American Public Transportation Association (APTA), "2025 public transportation fact book," 2025.

Federal Transit Administration (FTA), "Transit Economic Requirements Model (TERM): User's Guide," 2019.

Federal Transit Administration (FTA), "National Transit Database: 2024 Annual Database Facility Inventory," 2025a.

Federal Transit Administration (FTA), "National Transit Database: 2024 Annual Database Revenue Vehicle Inventory," 2025b.

Federal Transit Administration (FTA), "National Transit Database: 2024 Funding Sources - Funds Expended by Type (Operating and Capital)," 2025c.

Federal Transit Administration (FTA), "National Transit Database: January 2026 Complete Monthly Ridership (with adjustments and estimates), 2026a.

Federal Transit Administration (FTA), "National Transit Database: January 2026 Safety & Security Time Series (Threshold Adjusted)," 2026b.

Metropolitan Transportation Authority (MTA), "Climate Resilience Roadmap," 2024a.

Metropolitan Transportation Authority (MTA), "MTA Unveils New Modern Metro-North Locomotives," 2024b.

Metropolitan Transportation Authority (MTA), "2025-2029 Capital Plan: The Future Rides With Us," 2025a.

Metropolitan Transportation Authority (MTA), "Climate Resilience Roadmap Update," 2025b.

Metropolitan Transportation Authority (MTA), "ICYMI: Safer Subways: Governor Hochul Announces Subway Crime on Track to Reach Lowest Levels in a Generation in 2025.," 2025c.

New York State (NYS), "Governor Hochul Announces Nearly $80 Million to Support Expanded Use of Zero-Emission Vehicles Across New York State," 2025.

New York State Department of Transportation (NYSDOT). "Public Transportation Funding Sources: Innovative Mobility Imitative," 2024.

New York Public Transit Association (NYPTA), "NYPTA 2025–26 enacted budget review," 2025.

Putnam County, "Putnam County and Via to Debut New Microtransit Pilot Program Starting May 12th, 2025," 2025.



Photo: Owls Head Wastewater Treatment Plant in the Bay Ridge neighborhood of Brooklyn, New York; Felix Lipov

WASTEWATER

EXECUTIVE SUMMARY

New York State's wastewater infrastructure is essential to protecting public health and water quality but faces increasing challenges from aging assets, wet weather impacts, evolving regulatory requirements, and climate-related risks. With more than 35,000 miles of sewers statewide and approximately 40% over 60 years old, many systems are operating beyond their intended design life. Although publicly owned treatment works (POTWs) generally demonstrate high compliance with State Pollutant Discharge Elimination System (SPDES) permits, significant issues remain with combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and failing onsite wastewater systems particularly during periods of heavy rainfall and snowmelt. Addressing these challenges will require sustained investment through fully-funded State Revolving Funds and grant programs administered by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Environmental Facilities Corporation (EFC), expanded use of asset management and Long Term Control Plans, and continued support for workforce development, retainage, and innovation. Ensuring wastewater revenues support the full cost of service, including operations, maintenance, capital investment, and long term resilience, will be critical to maintaining reliable, compliant, and resilient wastewater systems across New York State.

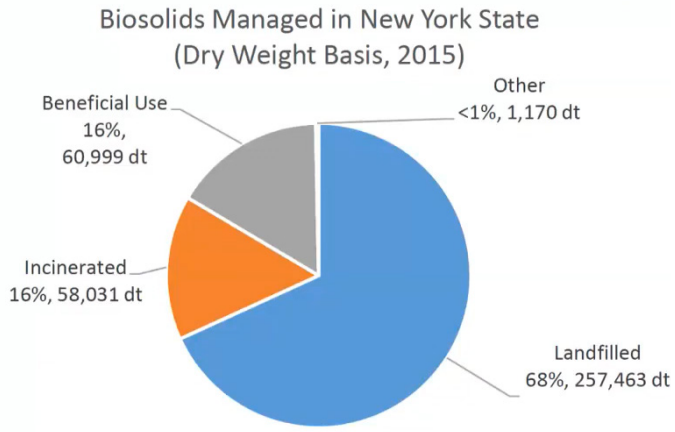
CONDITION & CAPACITY

According to the NYSDEC, of New York State's over 35,000 miles of sewers, approximately 40% are more than 60 years old and about 10% were constructed over 100 years ago. Aging sewer infrastructure leads to increased groundwater and stormwater entering the sanitary sewer system through cracked pipes and faulty connections (infiltration and inflow, or I&I), leaking wastewater escaping into the surrounding soil (exfiltration), broken pipes, clogging, and equipment failures. These issues exacerbate service deficiencies in systems already operating at or near capacity. These limitations can cause CSOs, SSOs, and/or non-compliance. CSOs and SSOs are the release of partially treated or untreated sanitary waste which can contaminate surface waters and threaten public health and the environment. Aging infrastructure also forces Utility Operators to prioritize manpower and budget on reactionary measures as opposed to planned maintenance (precautionary).

The vast majority of discharge data that the NYSDEC receives from the currently 620 SPDES permitted POTWs, 1,365 SPDES permitted Industrial facilities, and 4,901 SPDES permitted Private, Commercial or Institutional facilities, are within the limits specified in the facility's SPDES Permit. During the state fiscal year (SFY) 2023/2024, nearly 97% of the data reported to the NYSDEC was compliant with the limits of the SPDES Permit. Over that same period, 20% of New York State's 312 major-class facilities met a Significant Non-Compliance Criteria at least once. According to the NYSDEC in the SFY 2023/2024 Annual Report, due to expanded efforts by the NYSDEC, in cooperation with the United States Environmental Protection Agency (EPA), the statewide rate of Significant Non-Compliance for major-class facilities has been declining since a high of 32% in 2015. The NYSDEC defines a major-class municipal facility as a POTW that treats wastewater flows of 1.0 million gallons per day (MGD) or greater.

The 2018 NYSDEC Section 305(b) Water Quality Reports have identified approximately 25% of the State's population is served by private on-site wastewater systems. In that same report, inadequate and failing systems, including cesspools and septic systems (most over 50 years old), are identified as major or contributing sources in 27% of waterbodies assessed as "impaired" because of conventional onsite septic systems' inability to remove nitrogen. In response to the failure and shortcomings of these systems, the Clean Water Infrastructure Act of 2017 established the State Septic System Replacement Fund to assist in funding to replace existing failing onsite wastewater treatment systems which have significant environmental impacts. This issue is particularly significant in low-lying regions, where the proximity of waste from malfunctioning septic systems to ground and surface waters heightens environmental risks. In the specific case of Suffolk County, there are over 250,000 cesspools as of 2017 (excluding another 110,000 septic systems) that are suspected to contribute to degrading aquifer and surface water quality. In response, initiatives have been undertaken through the Suffolk County Subwatersheds Wastewater Plan to replace failing septic/cesspool systems and expand sewers/treatment capacity.

The capacity of POTWs may be affected as the NYSDEC implements regulations and restrictions on biosolids disposal due to contamination concerns from per- and polyfluoroalkyl substances (PFAS). As per the NYSDEC, there are a total of 620 SPDES permitted POTWs (SFY 2023/24) Wastewater Resource Recovery Facilities (WRRFs) in New York State, of which 16% recycle biosolids, accounting for approximately 61,000 dry tons annually.



Source: NYSDEC Webinar – PFAS in Biosolids Rules Part 361-2 and 3

As EPA and NYSDEC continue to evaluate and monitor elevated levels of PFAS in biosolids, the impact of banning land application of biosolids is also being monitored. The New York Water Environment Association (NYWEA), an educational water quality association with over 2,400 water quality professionals within NYS, noted that the following consequences may result: farmers using biosolids face higher costs, WRRFs rate payers experience increased biosolids disposal costs, and greater carbon emissions.

FUNDING & FUTURE NEED

Modern wastewater infrastructure first began in the U.S. around the end of the 19th and beginning of the 20th century. The Clean Water Act (CWA) of 1972 brought wastewater treatment across the country and up to a standard of at least secondary treatment. With this mandate came federal grants originally for 75% of project costs under the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) and supplemented with state and local funds for the remaining 25% of project costs.

Over time, the financial burden on municipalities has increased. In 1981 the federal share of project costs was reduced from 75% to 55% and the CWA amendments in 1987 (P.L. 100-4) shifted the federal grants from issuing funds directly to the municipalities to utilize the State Revolving Fund (SRF) program. While costs of local wastewater investment has grown faster than inflation, federal and state support has decreased and shifted primarily from grants to loans. This transition has increased long-term debt obligations for local governments while much of the original Clean Water Act-era infrastructure is reaching the end of its useful life and regulatory standards continue to evolve.

Wastewater utility governance and financing structures vary widely across New York State. In some municipalities, wastewater services are managed as fully integrated departments such as a Department of Public Works while in others they operate as a separate entity such as a Sewer District. Revenue sources typically include taxes and sewer user fees and may be maintained within enterprise funds or combined with municipal budgets. Where wastewater revenues are discretionary or subject to political cycles, long-term capital investments can be deprioritized in favor of short-term operating needs, resulting in reactive rather than strategic investment. Ownership structures such as municipalities managing collection systems while separate entities manage treatment can reduce incentives for infrastructure investment and contribute to funding shortfalls for wastewater infrastructure.

The 2025 New York State Clean Water Funding Report describes the State's funding need not as a single statewide "gap number," but as an ongoing need for sustained, predictable capital investment. Fully funded SRFs are identified as necessary to keep pace with future repair and modernization needs, regulatory compliance, and climate adaptation. In SFY 2025, New York's coordinated clean water investment exceeded $3.8 billion, anchored by EFC's record $3.4 billion in financing and grants. Wastewater and sewer work accounted for a major share of this total, including $2.6 billion in EFC assistance and $530 million in federal funding through the Infrastructure Investment and Jobs Act (IIJA). The report identifies key funding sources that make projects feasible, including low interest financing and grants through the State Revolving Fund SRF; large statewide grant programs like WIIA/IMG ($445 million) and NYSDEC WQIP ($223 million); "pipeline" support such as Wastewater Infrastructure Engineering Planning Grants (EPG) ($3 million) to fund required engineering reports; and targeted programs for green infrastructure and resilience (e.g., Green Resiliency Grant $60 million, Green Innovation Grant Program $17 million). Complementary federal tools including FEMA Public Assistance and Hazard Mitigation ($647 million noted) and Community Development Block Grant ($27 million) further support eligible projects, particularly after disaster events.

To better project future investment needs, municipalities can adopt asset management practices to support medium and long-term capital planning. These approaches allow utilities to balance risk, opportunity and cost, shaping future funding arrangements at all levels of government through increased understanding of the need. This can include anticipated future needs for climate resilience, regulatory change, and technological innovation. In 2022, NYSDEC and EFC conducted an asset management program with 27 municipalities and developed the Asset Management Guide for Publicly Owned Treatment Works, which is now available online. Expanded adoption of asset management is expected to play a critical role in shaping future funding strategies and improving system sustainability.

OPERATION & MAINTENANCE

Certified operators are essential to the safe and effective operation of New York's WRRFs, providing the technical expertise and institutional knowledge necessary to maintain system performance and inform long-term asset management planning. However, New York continues to reflect a national trend of an aging wastewater workforce, with impending retirements and persistently low numbers of new operators entering the profession over many years. While operators are often highly knowledgeable about system needs and operational risks, limited staffing capacity and financial constraints can restrict their ability to fully plan for or implement long-term solutions. Recent data from the 2023–2024 fiscal year indicate a modest uptick in operator applications, examination pass rates, and certification renewals; however, it is too early to determine whether this represents a sustained shift or a short term fluctuation within a longer term workforce challenge. As facilities continue to implement advanced treatment processes, automation, and monitoring technologies, Supervisory Control and Data Acquisition (SCADA) systems are increasingly being installed or expanded across the state. These systems can significantly enhance operational efficiency and response capability, but they also require specialized training and ongoing professional development to ensure they are used effectively and maintained over time.

Workforce development remains one of the most significant challenges facing New York's wastewater sector, as utilities contend with an aging workforce, increasing regulatory and technological complexity, and difficulties attracting new operators. The New York Water Environment Association (NYWEA), in partnership with the NYSDEC, plays a critical role in addressing this challenge through administration of the state's wastewater operator certification program, support for pre-certification and continuing education training, and targeted scholarship programs that reduce barriers to entry and encourage professional advancement. Programs such as the Brian Romeiser Pre-Certification Operator Scholarship and the Lucy Grassano Memorial Scholarship help recruit, develop, and retain qualified operators by providing financial assistance, training opportunities, and professional recognition. These efforts strengthen the pipeline of skilled wastewater professionals and help ensure New York's treatment facilities maintain the expertise necessary to protect public health, meet permit requirements, and support the long-term reliability of the state's wastewater infrastructure.

The NYSDEC has placed increased emphasis on documenting routine maintenance as part of SPDES compliance. This focus extends beyond treatment plants to include collection system management activities such as sewer televising, routine pipe cleaning, and inlet maintenance—particularly within combined sewer systems. In larger systems, this enhanced focus has supported investments in maintenance equipment and staff capacity. For example, the Buffalo Sewer Authority has expanded its maintenance program through the procurement of new vacuum trucks, enabling the cleaning of more than 57,000 linear feet of sewer, nearly 5,000 drainage structures, and the identification and repair of approximately 140 previously unknown or deteriorated assets. New York City had upwards of 800 miles of sewer cleaned and over 3,400 tons of sediment in 2025.

Across the state, there are approximately 318 publicly owned sewer systems (POSS) regulated by NYSDEC, each responsible for both collection system maintenance and wastewater treatment. These systems range widely in scale and complexity—from major urban systems serving New York City, Buffalo, and Albany, to small rural and seasonal systems serving villages such as Speculator and Rushville, and hamlets like Inlet, each with populations under 1,000. This diversity presents ongoing challenges for consistent operations and maintenance performance, particularly for smaller systems with limited staff, technical resources, and revenue base

PUBLIC SAFETY

The 2013 Sewage Pollution Right to Know Act requires POTWs and POSSs to notify the NYSDEC and the public of untreated and partially treated sewage discharges. Noncompliance with reporting and discharge requirements is addressed through NYSDEC's SPDES permitting and enforcement programs, including consent decrees and administrative orders. Spill reports and notifications are updated regularly and made publicly accessible through NYSDEC's online databases, improving transparency and public awareness of wastewater discharges.

Wet weather conditions, including rain and snowmelt, remain the leading cause of reported sewage discharges statewide. These releases pose public health and environmental risks by degrading water quality, increasing pathogen levels, promoting harmful algal blooms, and reducing dissolved oxygen in receiving waters. To improve public awareness and operational response, several municipalities have begun incorporating real time CSO monitoring and probability forecasting at priority outfalls.

According to the NYSDEC SPDES Annual Compliance Report for SFY 2023–2024, New York State documented approximately 3,575 CSO discharge events outside of New York City, resulting in an estimated 8.8 billion gallons of combined sewage and stormwater released to rivers, streams, and lakes. In New York City, modeling estimated an additional 28.9 billion gallons discharged during 109 CSO events in 2023. While CSOs are designed as a pressure relief mechanism to prevent system backups and treatment plant failures during extreme wet weather, their frequency and volume continue to raise public safety and water quality concerns.

To address the risks of CSOs, New York City's Department of Environmental Protection (DEP) entered a Long-Term Control Plan (LTCP) with NYSDEC in 2012, which remains in active implementation. The program has achieved meaningful progress through infrastructure upgrades, storage expansions, deployment of green infrastructure, and enhanced system monitoring, with additional improvements planned for future phases. This progress was clearly shown in a 2025 NYCDEP annual report that showed a 14.7% reduction in CSO events from 2024 to 2025. Other municipalities, including Albany, have also adopted LTCPs tailored to local system conditions. In central New York, Onondaga County's "Save the Rain" Program has demonstrated how large scale green infrastructure investments can reduce the frequency of CSO activations while providing co benefits such as flood mitigation and neighborhood revitalization. Similarly, the Buffalo Sewer Authority has reduced CSO volumes through real time control structures and is advancing its LTCP with continued investments in both green and gray infrastructure.

RESILIENCE

As a result of Superstorm Sandy in October 2012 and other high-profile storm events such as Hurricane Irene in 2011, public and political attention has been brought to the vulnerability of New York State's wastewater infrastructure to natural disasters and climate change/ rising sea level.

The New York City (NYC) Wastewater Resiliency Program is a strong example of how municipalities are taking a programmatic approach to resiliency across their systems by incorporating resiliency at every level, systematically assessing climate risks, and upgrading facilities to withstand future coastal flooding driven by storm surge and sea-level rise. Through the NYC Wastewater Resiliency Plan, the DEP found that all 14 wastewater treatment plants and about 60% of pumping stations are vulnerable to a FEMA 100 year flood plus 30 inches of projected sea-level rise, and developed site specific, cost effective solutions to protect critical assets - particularly electrical and mechanical equipment. Key actions include adopting stronger design standards, elevating or flood proofing equipment, sealing buildings, constructing barriers, expanding backup power, and integrating resiliency upgrades into planned capital projects. Targeted investments of roughly $315 million are expected to avoid more than $2.5 billion in flood damages over 50 years, reduce sewage overflows, speed post storm recovery, and protect public health and water quality as climate risks increase.

The importance of resiliency is seen in the available funding for improvement projects as EFC required that all projects funded through the Storm Mitigation Loan Program follow strict Elevation Criteria to ensure that new infrastructure is protected to flood hazards anticipated in the future plus varying degrees of additional height above the flood plain. This will ensure that the same damage does not occur in future events. As natural disasters increase in frequency and intensity, focus and funding must be sustained to ensure that infrastructure is better prepared for the future. Strong modeling, policy, and structures are required to create and implement a future-flood proof wastewater system.

Beyond climate risk, cybersecurity is becoming a larger concern for protecting the resiliency of our wastewater infrastructure. On March 11, 2026 the NYSDEC adopted the proposed amendments to 6 NYCRR Parts 616, 650, and 750 to establish new cybersecurity requirements for wastewater treatment facilities. The proposed rules would: (1) allow submitters of cybersecurity information to request FOIL confidentiality, (2) require certified wastewater operators to complete cybersecurity training, and (3) mandate cybersecurity incident reporting, emergency response planning, and cybersecurity controls for SPDES permittees and POTWs. These new requirements for cybersecurity are an important part of beginning the process of improving the cybersecurity resiliency of critical wastewater infrastructure, as utilities move towards implementing the changes to their facilities

INNOVATION

Although New York does not generally face significant water supply constraints, innovative water reuse projects are playing an important role in reducing stress on aging wastewater infrastructure and combined sewer systems, particularly in dense urban areas. A notable example is the Brooklyn Domino redevelopment, which incorporates a non potable water reuse system designed to capture and treat wastewater from multiple buildings. The system uses an advanced membrane bioreactor process with UV/ozone disinfection and can treat up to 400,000 gallons per day for onsite reuse, including toilet flushing, building cooling, and irrigation. By diverting substantial flows from the combined sewer system, the project helps mitigate CSOs and frees capacity at downstream wastewater treatment facilities, demonstrating the broader infrastructure and resilience benefits of decentralized reuse.

Another major area of focus is the evaluation and implementation of PFAS removal from wastewater streams, including source control through pre treatment at industrial facilities and treatment of landfill leachate. As potential state and federal regulations for PFAS in wastewater discharges continue to develop, POTWs may face significant compliance challenges without effective treatment solutions. Some New York POTWs are beginning to evaluate pretreatment options for PFAS-containing landfill leachate, such as the Village of Malone, which is pursuing a project to develop pretreatment for emerging contaminants at its wastewater treatment plant.

Additional challenges facing wastewater utilities include climate change impacts, rising energy demands, and funding constraints. POTWs have the potential to contribute to energy resilience through resource recovery, particularly by generating biogas from anaerobic digestion. However, biogas projects can be controversial at the state level because biogas is often used in ways similar to conventional natural gas, leading to concerns that investment in biogas infrastructure could be perceived as supporting fossil fuel dependence rather than advancing decarbonization goals. At the same time, limited and uncertain funding remains a significant barrier, restricting utilities' ability to adopt innovative technologies that could improve treatment performance, reduce emissions, and enhance long-term system resilience.



RECOMMENDATIONS TO RAISE THE GRADE

- Develop asset management capabilities for institutions and utility operators by expanding the NYSDEC and EFC pilot program, completing the NYSDEC asset management guidance materials for public use, and supporting asset management training through professional organizations such as ASCE, NYWEA and IAM (The Institute of Asset Management)
- Provide funding to create, as well as require, Capital Improvement Plans and Capacity, Management, Operation and Maintenance (CMOM) Programs
- Accommodate an adequate, consistent, and affordable funding stream achieved with rate payer studies, and 'ring-fencing' wastewater revenue or utilizing enterprise funds to cover the full cost of operation, maintenance, capital costs, and innovation
- Expand labor and technical resources for utilities through facilitating utility consolidation, improved operator training and certification, and increased research and development investment
- Promote federal grants and loans, including reauthorizing (Water Infrastructure Finance and Innovation Act) WIFIA and (America's Water Infrastructure Act) AWIA
- Publish and support the findings of the 2022 Clean Water Needs Survey and continue reauthorization of the Clean Water Needs Survey in the future.
- Continue to promote the shift from failing onsite septic systems to wastewater collection and treatment through education, public outreach, legislation, and funding opportunities.
- Advance technical and financial support for cross-sector collaboration in energy, biosolids and resource recovery.

SOURCES

New York State, "2018 and 2020/2022 Section 305(b) Water Quality Reports," 2018 and 2022.

Office of the New York State Comptroller, "A Partially Treated Problem: Overflows from Combined Sewers," 2018

NYSDEC, "Wastewater Treatment Plant Resources," accessed 2026.

NYSDEC, "Asset Management Guide for Publicly Owned Treatment Works," 2021.

NYSDEC, "Sewage Pollution Right to Know," accessed 2026.

NYCDEP, "Wastewater Resiliency Plan, Climate Risk Assessment and Adaption Study," 2013.

NYSEFC, "2026 Intended Use Plan," 2026.

NYSDEC, "SPDES Compliance and Enforcement SPY 2023/2024 Annual Report," 2024.

Suffolk County Department of Health Services, "Suffolk County Subwatersheds Wastewater Plan," 2020

NYCDEP, "14 Wastewater Resource Recovery Facilities' SPDES Permits Combined Sewer Overflows Best Management Practices Annual Report," 2026.