



# Climate Change and Water Resources

## Highlights from the New York State Climate Impacts Assessment

Clean, abundant water is essential to New York State's communities, ecosystems, and economy. The state's watersheds and aquifers provide water for drinking, irrigation, industry, power generation, recreation, cultural and ceremonial practices, and natural habitats. Communities build, maintain, and operate a wide variety of water infrastructure. Some of this infrastructure collects, cleans, and transports water supplies and wastewater, and some prevents flooding. Ensuring successful operation and maintenance of this infrastructure is critical to managing New York State's water resources.

### Climate Change Impacts on New York State's Water Resources

Weather and climate greatly influence the quality and quantity of the state's water, as well as how well water infrastructure performs. As the climate changes, water resources face a wide range of climate hazards, including:

**Precipitation changes and extreme storms.** Changes in the amount and duration of precipitation, including heavy rainfall and drought, affect water quality and availability. For example:

- Heavy rain causes more polluted runoff to flow into water. It can also overwhelm wastewater systems, sometimes causing them to overflow and send sewage into water bodies.
- More precipitation can increase the amount of water in lakes, streams, and underground aquifers. Conversely, drought—especially in summer months—can decrease these water levels.



*The New Croton Reservoir in Westchester County, New York is part of the New York City water supply system.*

**Sea level rise.** Sea level rise is a particular threat to communities in low-lying coastal areas and near rivers that are affected by the ocean's tides. The effects of sea level rise can pose risks to water resources and water infrastructure. For instance:

- Rising sea levels can make storm surges and coastal flooding more severe, disrupting or even damaging both drinking water treatment and wastewater treatment facilities.
- Sea level rise can cause salt water to move farther upstream into rivers. This poses a risk to communities that rely on these water sources, because the water could become too salty to meet drinking water standards.
- Sea level rise can push shallow groundwater sources to the surface, disrupting the function of septic systems, a type of wastewater treatment system. If there is not enough distance between the septic system and the groundwater, untreated waste can rapidly move through the layer of soil in between and contaminate the groundwater.



**Temperature changes.** Higher temperatures create more potential for the growth of harmful algae (“harmful algal blooms,” or HABs). They can also lead to more demand for water. Extreme heat can cause stress to or failure of water treatment facilities.

## Water Infrastructure Concerns

Much of New York State’s water infrastructure is aging, making it vulnerable to climate change impacts. When communities first built water pipes and treatment systems, conditions were much different than they are today and will be in the future. For example, aging sewer pipes built to carry wastewater from homes and businesses can often be overwhelmed by infiltration from heavy rains, causing them to overflow and send untreated sewage into waterways. Older pipes were not designed to carry so much water at one time. In addition, many existing standards and policies for constructing and managing water systems and infrastructure are based on historical weather conditions instead of current or future weather conditions.

Because water infrastructure and water resource management are largely overseen by local governments, the capacity and resources to prepare for climate change vary depending on the size and wealth of different communities. In addition, some waters and water structures are multi-jurisdictional, flowing across county, state, Tribal, and even national boundaries. Cooperation and coordination among these jurisdictions will be even more important as the climate changes.

## Adaptation and Resilience Strategies

Adaptation and resilience measures can help protect New York’s water resources and prepare its infrastructure for a changing climate. For example:

- Infrastructure upgrades and replacements can help improve aging water systems and build climate resilience. Communities can strategically identify upgrades that also make their systems more resilient to climate change.
- Incorporating climate impact considerations into standards that govern the design and operation of water treatment facilities can help these facilities build resilience. Community decision-makers can also review and update local design standards and policies to address climate impacts on local water systems.
- Improving modeling of saltwater intrusion and estuary salt concentrations associated with sea level rise will provide water managers with better information for planning and management decisions. Communities can also identify infrastructure upgrades that will help reduce sea level rise impacts, such as tide gates.

## Learn More

Explore the New York State Climate Impacts Assessment at <https://nysclimateimpacts.org>.

## Climate Equity and Justice

Low-income communities with older sewer infrastructure may face greater exposure to water pollution. Aging infrastructure can be prone to cracks and leaks, and older designs may not be able to support the current amount of sewage and stormwater.

Low-income families can also face challenges affording the cost of both drinking water and wastewater treatment. Climate impacts that damage water infrastructure can add to these challenges.

Tribal Nation governments and utilities operate and maintain their own water supply systems but are also affected by water resource management decisions by other entities. Including Indigenous Peoples’ participation in multi-jurisdictional water management decisions offers opportunities to incorporate Indigenous knowledges in water governance and climate resilience.

