

Wake County Future Water Trends

Wake County, with assistance from municipalities, residents and other partners, developed the Wake One Water Plan to support equal access to clean and abundant water for the next 50 years and beyond. The 50-year plan supports efforts to address a growing population while preserving and protecting limited natural resources. The Plan identifies One Water practices that align with the County’s One Water and PLANWake goals, using proven strategies to protect the water supply, reduce nutrient pollution, mitigate flooding and promote equal access to these benefits. The Wake One Water Plan helps address the key drivers of change in water resources in Wake County—population growth, land use changes and increasing extreme weather events.

Population Growth

More than 1.2 million people call Wake County home. As of 2024, Wake County is growing by about 66 people per day¹ – one of the highest population growth rates in the nation. In the next 50 years, Wake County’s population is expected to more than double, to well over 2 million residents. Under current growth rates, another 28,000 acres of new development could occur within 25–50 years, potentially converting all remaining unprotected farmland, rural areas and forest land in the County to housing and commercial development.²

Land Use Change

As communities grow and change, the way land is used also changes. Meeting those shifts means planning for infrastructure that can support both new development and existing neighborhoods. Converting natural land to developed land adds impervious surfaces, such as concrete and asphalt, which prevent water from soaking into the ground and replenishing the groundwater. Instead, the water runs off (Figure 1).

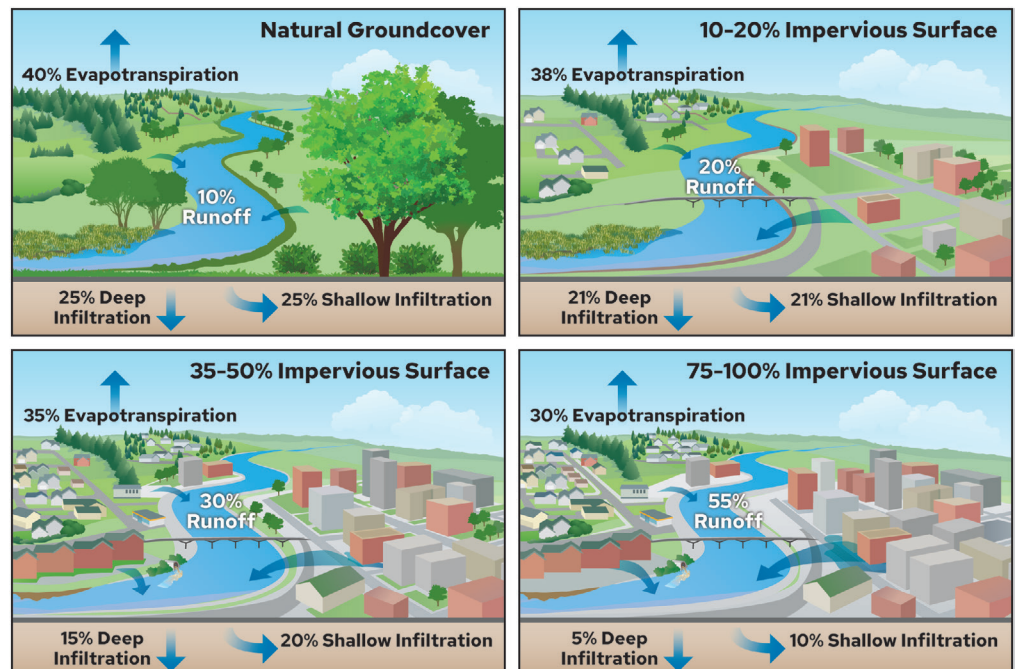


Figure 1. Comparison of impervious surface coverage to water infiltration and surface runoff. (Source: Tetra Tech; generated with data from FISRWG 2001³)

¹ <https://www.wake.gov/departments-government/planning-development-inspections/planning/census-demographics/growth-and-population-trends>

² <https://s3.us-west-1.amazonaws.com/wakegov.com.if-us-west-1/s3fs-public/documents/2022-11/PLANWake-Amended-10-31-22.pdf> <https://directives.nrcs.usda.gov/sites/default/files2/1712931021/20691.pdf>

³ <https://directives.nrcs.usda.gov/sites/default/files2/1712931021/20691.pdf>

Traditionally, stormwater management directs runoff from newly developed land into pipes that quickly convey and discharge it to streams. These discharges create fast and intense water flows that erode streambeds and streambanks and cause downstream flooding. Furthermore, runoff often picks up pollution from impervious surfaces and carries it directly to surface water bodies, upsetting the chemical and biological balance and worsening the water quality.

Projected Climate Conditions

A 2018 Intergovernmental Panel on Climate Change report⁴ predicted that communities in the southeastern United States might experience higher temperatures, extreme weather events, and increasingly volatile direct and secondary threats.

Historical weather data from the National Oceanic and Atmospheric Administration and the Raleigh-Durham Airport since 2000 show that extreme storm events in the County increased over the past decade, including more precipitation falling over shorter periods (e.g., 6 inches of rain falling in 2 hours instead of 4 inches falling in 24 hours).⁵ These changing precipitation patterns can increase flooding, erosion, water pollution and other problems. As part of the One Water Plan development, three models were used to predict future climate conditions in Wake County. The future effects of climate conditions on water resources will vary by location and sector. The models projected higher temperatures and more variable precipitation, with intense downpours and longer drought periods.

Future Trends

These expected changes in Wake County over the next 50 years represent future conditions if no actions are taken. The effects of projected climate conditions on water resources will vary by location and sector; however, models suggest that we can expect reduced infiltration, increased stormwater runoff volume, increased frequency of flooding and high-flow events, increased pollution, and increased demand for water (Figure 2). The Wake One Water Plan outlines a series of strategies that may be implemented to reduce nutrient pollution and mitigate projected flooding impacts. By working together, Wake County and its community partners are taking action to increase resilience and preserve the high quality of life that makes Wake County great.

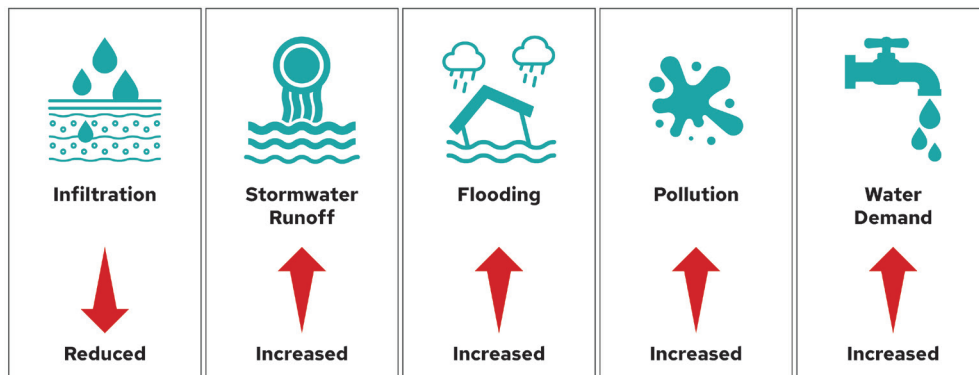


Figure 2. Summary of future water trends
(Source: Tetra Tech; generated with data from Tetra Tech and RTI 2025⁶).

⁴ <https://www.ipcc.ch/sr15/download/#full>

⁵ <https://www.ncdc.noaa.gov/cdo-web/datatools/records> and <https://www.ncei.noaa.gov/cdo-web/datatools/lcd>

⁶ Tetra Tech and RTI (Research Triangle Institute International). 2025. *Baseline Analysis Memorandum*. Report 2.3.5. Prepared for Wake County Government by Tetra Tech and RTI, Research Triangle Park, NC.