

WATER RESOURCES

OVERVIEW

Climate change is reshaping Vermont’s water resources. Annual rainfall is increasing and becoming more concentrated, and warmer winters are shifting precipitation to fall as rain instead of snow. Heavy rain can overwhelm lakes and ponds, increase stream discharge, and trigger floods. Floods transport sediment, nutrients, and debris downstream, eroding stream banks, damaging infrastructure, and degrading water quality. These changes are creating new challenges for water managers, planners, and communities. Vermont needs to proactively support coordinated water resource planning, long-term monitoring of water resource supply, use, and quality, and invest in nature-based solutions that improve community resilience to extreme events like droughts and floods.



Increase in average annual streamflow



9 days

Increase in high streamflow conditions (>70th percentile)



6.8°F

Increase in Lake Champlain surface temperature (since 1964)



75%

Rivers too channelized to access historical floodplains

STREAMFLOW

Annual and seasonal streamflow is increasing in almost every USGS monitored stream across Vermont, though the magnitude of that increase varies geographically (Table 1). Annual streamflow significantly increased an average of 19% when comparing the 1966–1995 period to the 1996–2025 period for over 80% of monitored streams. This trend is driven largely by significant seasonal increases in stream flow during winter (39% increase for 88% of monitored streams) and summer (45% increase for 36% of monitored streams). Both unregulated (i.e., streams with no human-created impediments to flow) and regulated streams (i.e., streams with human-created impediments to flow, such as dams) exhibit significant increases in annual and seasonal flow.

Table 1 Average percent change in streamflow metrics from time period 1966–1995 to time period 1996–2025 by Vermont climate division. Only stream gauge sites with significant differences are included in the table

Streamflow metrics	Whole state	Northeastern	Southeastern	Western
Annual flow	19%	18%	26%	16%
Winter flow	36%	41%	36%	30%
Summer flow	45%	44%	51%	45%

Source: USGS Water Data for the Nation (2026)

FLOODING AND DROUGHT

Recent flooding (July 2023, December 2023, July 2024) and drought (summer/fall 2025) events have impacted water resources and communities across the state. Streams experienced 9 more days of high streamflow conditions (>70th percentile) when comparing the 1966–1995 period to the 1996–2025 period for 68% of monitored streams. Fewer streams (12%) exhibited significantly more days of low streamflow conditions (<30th percentile); however, future climate assessments should continue to monitor these trends. High streamflow conditions increase erosion of streambeds and banks, sediment and nutrient loading, and flood damages to homes, businesses, and public infrastructure. Low streamflow conditions reduce water quantity and quality. During the summer 2025 drought, over 630 Vermonters reported low or dry wells, primarily in Eastern Vermont (Figure 1).

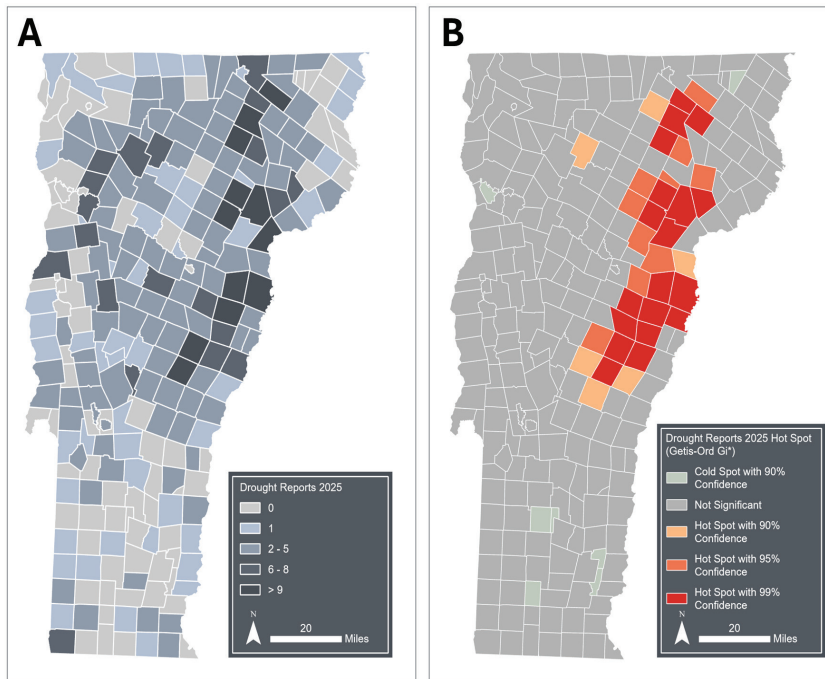


Figure 1 Statewide droughts reports in 2025 (A) and hotspots of those reports highlighting that Eastern Vermont experienced disproportionate impacts to private wells (B)

Source: Vermont Department of Environmental Conservation (2026)

WATER QUALITY

Both extreme weather events and warming winters degrade water quality (Table 2). July 2023 flooding reduced water clarity in Lake Champlain for two weeks. Increased winter runoff from midseason melt events contribute over 30% and 15% of the annual nitrogen and phosphorus load in Lake Champlain, respectively. These changes disrupt wildlife, promote growth of harmful algal blooms, and limit access to recreational activities. Water quality degradation is costly to Vermonters; approximately \$400 million was spent on clean water projects in the Lake Champlain Basin, \$160 million in the Connecticut River Basin, and \$30 million in the Lake Memphremagog, Tomifobia, and Coaticook Basins since 2016.

Table 2 Climate change drivers and associated water quality impacts

Climate change driver	Water quality impact
Increased water temperatures	Low oxygen conditions, decreased aquatic life habitat suitability, migration of certain aquatic species, increased algal blooms
Increased precipitation and extreme events	Greater transport of nutrients and sediment during events, increased algal blooms
Decreased snowfall	Decreased spring transport of nutrients, colder soils, increased winter transport carrying sediment and nutrients
Increased winter rain	Earlier/midseason transport of nutrients and sediment, increased potential of algal blooms in summer months

Source: VCA 2025: Chapter 4: Water Resources (Winer et al. 2026)

NATURE-BASED SOLUTIONS FOR FLOOD RESILIENCE

Approximately 75% of rivers surveyed in Vermont have lost the ability to inundate their floodplains due to historic channelization and development. During high streamflow events, water remains confined within channels, increasing erosion and flood damage potential downstream. Nature-based solutions, like restoring and conserving river corridors and floodplains, can mitigate these impacts. Not only do nature-based solutions benefit people living near rivers, but they also improve ecosystem functioning that can mitigate other climate change impacts like extreme heat. Resources such as the Functioning Floodplains Initiative's web-based data explorer can help communities identify, prioritize, and track nature-based solution projects.