

QUINTE CONSERVATION ONTARIO



Enhanced Drought Management

Introduction to the Local Government

Ontario's thirty-six conservation authorities are unique in Canada, as their regions are delineated by watersheds rather than political boundaries. The authorities are community-based management agencies that undertake watershed-based programs to protect people and property from natural hazards, and conserve natural resources for economic, social and environmental benefits. Quinte Conservation, located in Southeastern Ontario, covers approximately 6,600 km² with 130,000 inhabitants. The region includes the Moira, Napanee and Salmon river watersheds, and all of Prince Edward County. Quinte Conservation works with 18 municipalities, ranging from urban centres, such as Belleville, to rural, agricultural areas where half the watershed's population is located.

The Quinte watershed has a unique geology and hydrogeology, with a southern region composed mainly of fractured limestone with shallow soils and a northern region composed of Precambrian bedrock of the Canadian Shield. While inhabitants close to Lake Ontario are serviced by municipal water, over 50 percent of the population relies on private wells which draw water from shallow, rain-fed

"Hydrological records show that more than half the years since 2001 have had low water conditions, with the last few years having been even more extreme." Mark Boone, Hydrogeologist, Quinte Conservation.

aquifers. The groundwater table is shallow and, while recharge from rainfall is quick, storage capacity of the bedrock is limited.

Significant climate-related events and impacts

Quinte Conservation utilizes Ontario's low water response system, which classifies low water conditions between 1 (low risk) and 3 (high risk) according to the severity of water supply through the watershed¹. In recent years, the number of Level 2 conditions has become far more common (medium risk). In the summer of 2016, a Level 3 drought response (defined by condition where supply no longer meets demand) was declared for the first time due to very low ground and surface water levels. The Level 3 declaration affected the entire watershed with water conservation measures in place throughout the region.

"Droughts have a physical and emotional toll on people, particularly small-scale farmers. It is physically difficult to work in extreme heat and to find labourers. Droughts are different than most other climate events – they can be long and stressful." John Wise, Stonemills Township councillor and past member of the Drought Management Committee

During the 2016 drought, private landowners were the most impacted population segment in the watershed. Wells dried up, forcing citizens to import water in various ways. Farmers experienced decreased crop yields and crop insurance claims increased significantly. The drought also spurred conflicts between landowners with producing wells and those with dry ones. Emergency bylaws were put in place by some municipalities to prevent excessive water drawing from lakes

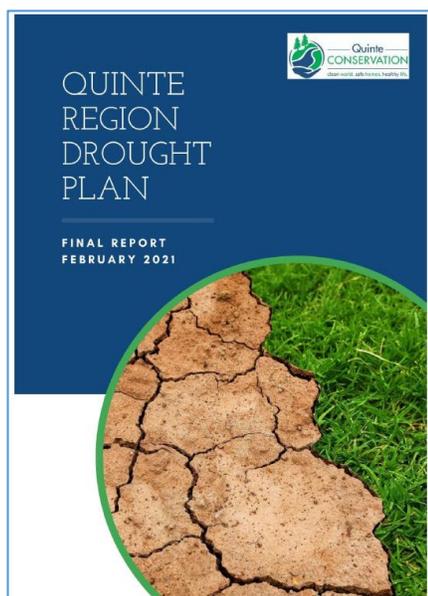
¹ Level 1: water conditions indicate the potential for water supply problems, Level 2: minor water supply issues with a potential for major supply problems, and Level 3: serious problem and the potential for water supply failing to meet demand.

and rivers. Moreover, the low water conditions also had significant impacts on aquatic life.

Quinte Conservation Response to Drought

Quinte Conservation's immediate response to the 2016 drought was to advise local residents of the low water conditions and promote water conservation. Residents were also advised to plan for alternate water supplies in the event of dry wells.

The drought raised awareness of water issues and the low water response thresholds, yet the Conservation Authority knew that further action was needed to adapt effectively to future droughts. With funding from the Federation of Canadian Municipalities (FCM), Quinte Conservation developed its drought management plan, the Quinte Region Drought Plan (2021), which sought input from a steering committee consisting of municipal representatives, provincial agencies and the local Indigenous communities.



Quinte Region Drought Plan

Climate and water data used

In developing the *Quinte Region Drought Plan* it was important to better understand climate change impacts on the watershed. Quinte Conservation had already developed a water budget model using information from the Government of Ontario's Source Water Protection program.

This water budget model was based on climate data from Environment and Climate Change Canada and Natural Resources Canada, weather stations in the area, population growth factors, and evapotranspiration rates to identify areas susceptible to water stress. An ensemble of climate change models was also used to analyze future climate parameters

Streamflow gauges, operated and maintained by the Water Survey of Canada, provided flow data for the region. Groundwater levels were also obtained for 30 nearby wells part of the Provincial Groundwater Monitoring Network. In general, the *Quinte Region Drought Plan* was based on predicted rainfall and streamflow.

"Astonishingly, we lose two-thirds of our annual precipitation to evapo-transpiration. Our water budget model shows that we would lose an additional 10 percent with climate change. This means less water going forward." Mark Boone

Key Points of the Quinte Region Drought Plan

The *Quinte Region Drought Plan* provides a drought warning pathway, following the protocol of Ontario's Low Water Response Plan. The Plan also recommends policy actions, particularly pertaining to new developments, aimed at promoting a sustainable water supply, with an emphasis on water conservation and water use efficiency.

The Conservation Authority's Low Water Response Team, consisting of representatives from various water user groups, acts as the lead during low water conditions. The Team's role and the role of partner agencies and groups (including municipalities, First Nations, other Conservation Authorities, Ontario government departments, water user groups, and the Federal government) is outlined in the Drought Plan. The Plan also describes the triggers for each low water threshold, the tools to address water supply, and actions to be taken by the different agencies and groups.

"The drought plan focuses on community water supply, and gives municipalities and citizens a framework for the future." John Wise

Additionally, the *Drought Plan* emphasizes adaptive measures to be taken by all stakeholders during normal water conditions in order to prepare for future droughts. Stakeholders should:

- Plan and identify locations of alternate water available for residents during drought,
- Establish and implement water restriction by-laws during low water periods,
- Promote new developments that have a viable water supply,
- Encourage water conservation and recycling in both existing and new developments, and
- Direct new development where suitable servicing infrastructure is available.

Current Drought Management Actions

Quinte Conservation is engaging citizen scientists in monitoring rainfall through the Community Collaborative Rain, Hail and Snow Network (COCORAHNS), which provides citizens with rain gauges to gather data to supplement the limited number of Environment and Climate Change Canada weather stations. Quinte Conservation has also added 10 lake level gauges to their network that transmit data to a GEOS earth model system through NOAA satellites.

Opportunities and Challenges for Quinte Conservation to further Adapt to Drought

Quinte Conservation faces the following opportunities and challenges in continuing to support its water user groups in their adaptation to drought

- The development of the *Drought Plan* has increased interest in water issues, with more non-profit organizations wanting to get involved.
- Education about water issues and conservation is an opportunity and a challenge since it requires an ongoing effort.
- A committee composed entirely of citizens to provide input on the *Drought Plan* would be instrumental in garnering even more awareness and could solicit good local drought solutions.
- As with many rural municipalities, Quinte Conservation has finite capital and staff resources, which limits drought mitigation capabilities.



Some of the lake level gauges that have been installed in the Quinte region



Looking for more great resources?

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Need climate data to support your adaptation actions?

Visit [ClimateData.ca](https://www.climate-data.ca) to access historical and future climate data, custom analysis tools, training materials, and much more.

