ONTARIO RESOURCE CENTRE FOR CLIMATE ADAPTATION

SEASONAL OUTLOOK SPRING/SUMMER 2024

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Introduction

2023 is confirmed as the hottest year on record[i], and extreme weather is identified as a top risk to the global economy[ii]. In addition to having just experienced the warmest Canadian winter on record (5.2°C warmer than average[iii]), parts of Ontario received only 30% of average precipitation over the recent winter months[iv], resulting in moderate to severe drought conditions in many areas of the province[v]. Furthermore, warmer than average summer temperatures are anticipated throughout most of Canada[vi] and existing moderate to severe drought conditions are expected to remain across much of Ontario and worsen across the Prairie provinces[v].

It is imperative that Ontario communities are ready to respond to the anticipated near-term hazards that may transpire because of this anomalous winter. While long-term planning and action to build community resilience is necessary, communities also need to be equipped with information to prepare and respond quickly to potential near-term climate-related hazards.

Purpose of this Seasonal Outlook

This Seasonal Outlook report is intended to support municipal staff and relevant partners in the Great Lakes region and across Ontario in preparing for near-term hazards that are anticipated to have the greatest impacts on communities in the spring and summer of 2024. This is a quick reference guide to encourage conversations and immediate short-term actions to respond to acute climate threats. This report is generalized at the provincial scale, though we encourage you to adapt the information in ways that are specific to your local region and context.

This document is not intended to replace or support long-term preventative adaptation and resilience planning. We highly encourage you to do a comprehensive community-wide risk assessment that considers slow-onset and long-term climate hazards and impacts. Suggested resources and more information on long-term planning are included at the end of the document.

Important Considerations

The impacts of climate change are **not felt equally or equitably** across and within communities. In planning your actions, it is crucial to consider the varying degrees of exposure, sensitivity, and the ability of people and communities to adapt effectively. Consult your related plans and strategies (e.g., Equity, Diversity, Inclusion, and Accessibility Plan; Community Safety & Wellbeing Plan) to help identify and understand the people and communities in your region who might be at higher risk of experiencing the impacts of climate change.

Adapting and responding to climate change requires significant **collaborative effort**. Whenever possible, coordinate local and regional efforts with other stakeholders committed to this work. Consider partnering with your upper-tier municipality, neighbouring municipalities, Conservation Authority, and Public Health Unit to prepare for and respond to climate hazards, and to connect on longer-term climate adaptation work that is happening within your region.

Looking back: Winter Weather Trends (2023/24)

Temperature

In Canada, the winter of 2023-2024 was 5.2°C warmer than average[iii], breaking the previous record of 4.1°C above average in 2009-2010[vii]. While some of this anomalous warmth can be attributed to El Niño[viii], human-caused climate change also plays a considerable role.

In Ontario, December 2023 saw the strongest anomaly, with several warm waves pushing temperatures into double digits across the province. January 2024 remained warm across all regions of the province, except for a brief cold snap in the middle of the month. This trend continued through February with above-average temperatures across Ontario[iv], and some cities in the southern parts of the province experienced record-setting peak temperatures in February (e.g., Ottawa, 15.7°C; Windsor, 23°C)[ix]. Toronto in the south, and Timmins, North Bay, and Sudbury in the northeast, experienced the warmest winters on record[x].

Precipitation

Throughout the winter, regions across the province received less than average precipitation[ix]. Northern Ontario was particularly dry, with certain regions receiving 30% less snowfall than the annual seasonal average, resulting in drought-like conditions[x]. Below-normal precipitation persisted through early spring (March) in central Ontario, resulting in abnormally dry conditions in southern and central Ontario. As of April 30, 2024, moderate to severe drought conditions remain across much of northwest and northeast Ontario (see Figure 1 below.) Visit the Canadian Drought Monitor for up-to-date information on drought status across the country[v].

Great Lakes Ice Cover and Water Supply

Each of the Great Lakes experienced above-average temperatures in

December and January, setting high water temperatures (1-3°C above average) in February. These low temperatures resulted in record low ice coverage throughout the Great Lakes, marking the 3rd lowest total ice coverage on record [xi,xii] Peak ice coverage occurred at least one month ahead of seasonal norms[iv].

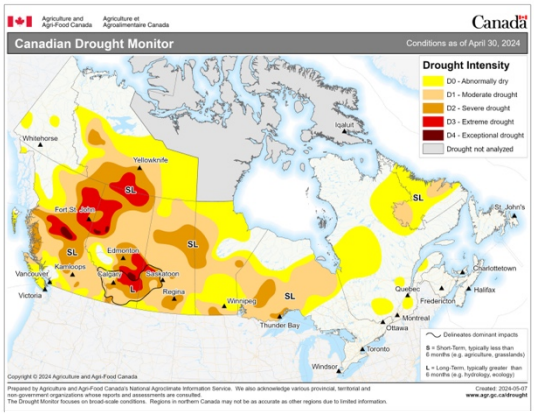

Figure 1: Canadian Drought Monitor, conditions as of April 30, 2024

Anticipated Near-Term Hazards

A warm and dry winter, combined with decreased ice cover, limited snow fall, and an early spring poses several near-term potential hazards for Ontario and the Great Lakes Region. This short-term Seasonal Outlook provides timely insights into six anticipated near-term hazards that may pose significant challenges to local communities. This brief outlook is intended to raise awareness and prompt immediate quick actions among municipal staff and relevant partners to help reduce potential impacts. Links to additional tools and resources are provided at the end of each section to support you in seeking more comprehensive information.

Communities are likely to face multiple climate hazards simultaneously. For instance, wildfire smoke events are likely to coincide with periods of extreme heat. It is imperative that municipalities work with local partners to ensure a complimentary and coordinated comprehensive response.

Reduced Water Quality

Water is an essential need for people and communities. Ontario has over 250,000 lakes, including the Great lakes, which provide drinking water to more than 70% of Ontarians and are home to over 30,000 species of fish, birds, and other living organisms[xiii].

While water takes more energy to heat up than air, the Great Lakes' annual surface water temperatures have risen by 0.02°C to 0.06°C per year since 1980[xiv]. As climate change continues to accelerate, the surface water temperatures across the Great Lakes are predicted to continue to warm[xv].

Recent warmer water and air temperatures, drier conditions, and decreased ice cover, coupled with above normal temperatures forecasted for the spring/summer seasons provide favorable conditions for nuisance and harmful algal blooms to occur in the near-term. Algal blooms can impact the taste and odour of drinking water, affect recreational opportunities, and pose threats to both aquatic ecosystem and human health[xvi]. Some algal blooms are more harmful than others – some types of blue-green algae can produce cyanotoxins that are harmful to people and animals.

Potential Impacts

Human Health & Safety Impacts: Warmer temperatures often spur an increase in water-based recreational activities, increasing human exposure to bacteria and algal blooms. Exposure to poor water quality can increase the risk of waterborne illnesses or trigger respiratory and allergic reactions, headaches, fever, or gastrointestinal issues[xvii].

Economic Impacts: Reduced water quality can disrupt economic sectors, including agriculture, outdoor-based tourism, and fishing economies. Additionally, human health impacts may lead to increased workplace absenteeism and increase strain on healthcare services.

Ecological Impacts: Algal blooms can harm local aquatic ecosystems including native fish populations. Warmer water temperatures also reduce suitable habitat for cold and cool water fish. In addition, some invasive species can thrive in warmer waters, improving their survival rates[xviii].

Impacts on the Built Environment: Accelerated bacterial and algal growth due to warmer temperatures can put additional stress on water treatment facilities and inflate treatments costs.

Actions to Consider

Report Blue-green Algae blooms to the Ministry of Environment, Conservation and Parks (MECP):

- If you suspect a blue-green algae bloom, contact the MECP. Incidents can be reported online or contact the Spills Action Centre 24 hours a day, 7 days a week:
  - Toll-free: 1-866-MOE-TIPS (663-8477)
  - Toll-free TTY: 1-855-889-5775

Public Communication and Outreach:

- Prepare messaging and materials to communicate during periods of poor water quality or contamination event.
- Connect with your local Public Health Unit and Conservation Authority to coordinate a consistent approach to communications.
- Consider developing tailored messages for rural and remote residents in your region.

Internal Municipal Responses:

- Connect with relevant staff departments (e.g., Parks & Recreation, Public Works) to review emergency response procedures in the event of a specific contamination or poor water quality.
- Ensure your Public Works department will conduct thorough inspections and perform any necessary maintenance on water treatment plants and distribution systems to ensure efficient operation and readiness to handle potential increases in contaminant loads.
- Initiate early and frequent water quality monitoring in lakes, rivers, or beaches used for recreation and drinking water sources to detect potential contaminants promptly. Collecting data on local water quality events also helps to build reliable local data for longer-term planning initiatives. Connect with your local Conservation Authority or Public Health Unit to leverage their expertise in monitoring and protecting water quality.

Additional Resources

Blue-green algae information page (Government of Ontario)
Learn about blue-green algae, its health effects, and what Ontario is doing to help reduce blue-green algal blooms.

Credit Valley Conservation Real-Time Water Quality Monitoring

This network of 59 environmental monitoring stations, strategically placed throughout the Credit River Watershed, collects vital information in real time on current environmental conditions, allowing the conservation to better understand, predict and warn about flooding, threats to water quality and low water levels. Explore your local conservation authority's website to find similar tools.

Raw Water Chemicals Map (Public Health Ontario)

The Raw Water Chemicals Map provides information from untreated water sampling programs to support risk assessments of small drinking water systems. It includes specific information on chemicals relevant to public health. Find a variety of other tools, interactive maps, calculators, and articles about water quality on their website.

Monitoring Water Quality in the Distribution System (Federation of Canadian Municipalities and National Research Council)

This document outlines the best practices for monitoring water quality in the distribution system. It is based on a review of existing literature, the responses to questionnaires sent to 11 municipalities, and input from water quality and distribution system experts from across Canada.

Provincial Water Quality Monitory Program

This map of surface water sites and data is a partnership between the Ministry of Environment, Conservation, and Parks and Conservation Authorities.

Provincial Groundwater Monitoring Program

This map of groundwater sites and data is a partnership between the Ministry of Environment, Conservation, and Parks and Conservation Authorities.

Reduced Water Quantity

Changing climatic conditions are likely to have an impact on water availability and distribution. Winter ice cover on lakes helps to minimize evaporation rates, moderate water temperatures by providing insulation, and protect shorelines by reducing wave action[xix]. The below-normal ice cover experienced across the Great Lakes this past winter[xx] is likely to negatively impact water quantity and supply through summer 2024.

Potential Impacts

Human Health & Safety Impacts: Reduced water quantity can lead to the increased concentration of contaminants, resulting in an increased risk of waterborne diseases. Water scarcity can also lead to slower moving water and stagnant water pools, providing breeding grounds for mosquitoes and increasing transmission rates of vector-borne diseases such as West Nile Virus.

Social and Cultural Impacts:

Cultural Impacts: Changes in water availability and fish habitats can alter land-based recreational, traditional, and livelihood activities and interfere with the knowledge transfer of cultural and traditional practices, with cascading impacts on mental, emotional, and spiritual wellbeing.

Community Relations and Compliance Issues: Water restrictions can lead to public dissatisfaction, and compliance with water use regulations can be challenging.

Economic Impacts: Water shortages can have considerable impact on industries and businesses that rely heavily on water, including manufacturing, agriculture, forestry, hydro power generations, and tourism. This can lead to decreased production and increased costs and economic losses that affect the livelihoods of people and communities in your region.

*Agricultural disruption***:** Reduced water quantity can make less water available for crop irrigation, which may in turn lead to reduced yields, crop failure and related economic losses. Water scarcity can also lead to decreased livestock productivity and compromised animal health[xxi].

Tourism disruption: Recreational activities such as swimming, boating, and paddling may be affected due to reduced water levels. Tourism operators could experience economic losses and damage to their reputation or brand.

Ecological Impacts: Low water levels can harm local ecosystems. Aquatic plants and animals that depend on consistent water levels can be at risk, leading to loss of biodiversity and habitat degradation. Reduced water availability can also increase the risk of fires, especially in forested regions. This can pose additional threats in areas where firefighting efforts rely on local water sources.

Impacts on the Built Environment:

Water infrastructure may be stressed during drought conditions. Pumps and treatment plants may need to operate

differently to handle lower water volumes or increased concentration of pollutants. This can lead to increased maintenance costs and quicker wear and tear on equipment.

Drinking Water Supply Shortages: Reduced water levels can affect the quantity of water available for use in homes, businesses, and public facilities. These shortages can cause significant challenges for many communities, especially rural and remote communities, small towns and villages, and agricultural communities. Importantly, many Indigenous communities across Ontario face inequitable access to safe drinking water due to historic and ongoing impacts of colonization; this inequitable access can be exacerbated during periods of reduced water quantity.

Hydropower Infrastructure: The Great Lakes and other lake waters in Ontario are used to generate hydropower and to cool power plants. Reduced water levels can mean that there is less water available for hydropower production, and warmer waters can result in less effective cooling for power plants[xix].

Actions to Consider

Public Communication and Outreach:

- Work with your Communications department to prepare public awareness campaigns about potential public health concerns, increased fire risk, and/or water conservation needs (including relevant restrictions and preferred practices). This is a good opportunity to leverage the expertise of your local Public Health Unit and Conservation Authority.
- Reach out to the 'large water users' in your community or region (e.g., industrial facilities, agricultural operations) to prepare in the event that water-saving measures are required.

Internal Municipal Responses:

- Review your municipality's water shortage plan. Do you have a plan to source emergency water supplies for critical services or to set up public water distribution points, should these actions become necessary?
- If applicable, review the terms of your municipality's water license in case of any conditions that may limit your ability to withdraw water during a drought.
- Connect with your Public Works department to ensure plans are in place to optimize the operation of water treatment and distributions systems during low water seasons.
- Reach out to your Parks and Recreation department to discuss adjusting the water supply in municipal facilities such as swimming pools and splash pads during times of reduced water availability.

Additional Resources

Canadian Drought Monitor

The Canadian Drought Monitor (CDM) is Canada's official source for the monitoring and reporting of drought in Canada. From this page you can access a variety of monthly products and information about current drought conditions across the country.

Canadian Drought Outlook

The Canadian Drought Outlook is a monthly drought forecast. The map predicts if drought conditions across Canada will develop, stay the same or improve for the end of the following month.

Ontario Low Water Conditions

This interactive map shares information about present and historical Ontario low water conditions. This tool can help to provide municipalities with insight into the level of low-water response that might need to be activated in the community.

Quarterly Climate Impacts and Outlook

This brief bulletin summarizes the latest season's weather, water level conditions, and water-level related impacts over the Great Lakes. An outlook for the upcoming quarter is also provided.

Quinte Region Drought Plan

While the impacts of drought are experienced differently across watersheds, there are similar concepts to consider when developing a drought management plan. Here is one example from Quinte Region in southeastern Ontario. Remember, connect with your local Conservation Authority to discuss how drought management planning will look in your specific region.

Wildfires

Wildfires are a common occurrence across Canada, regularly devastating millions of acres of forests, and occasionally threatening entire communities[xxii]. Historically, wildfires have been most common in the far north, northwest, and northeast regions of Ontario[xx]. Under a high-emissions scenario, the annual area burned from wildfires could double by the 2040s and increase eightfold by 2100[xxiii]. Given Ontario's recent unusually warm and dry winter weather, coupled with predictions of above-average summer temperatures, there is a heightened risk of wildfires over the coming months.

The smoke produced by wildfires can travel thousands of kilometers, affecting local air quality and impacting human health in distant places. A specific section highlighting potential impacts and suggested actions related to wildfire smoke follows in this document.

Ontario's Outdoor Burning Regulations are in place between April 1st and October 31st, although fires can occur outside of this timeframe.

Potential Impacts

Human Health & Safety: In addition to the direct physical risk of injury or fatality from wildfires and health implications of wildfire smoke (discussed in the 'Wildfire Smoke' section below), wildfires can also affect the mental, emotional, and spiritual well-being of affected communities, firefighters, and emergency responders.

Evacuations and displacements resulting from wildfires can result in acute, long-term, and cascading mental and emotional health concerns.

Social Impacts: During wildfire events, many municipalities may experience a strain on community services as they prepare to move/host evacuees and work to ensure plans for cleaner air spaces, adequate accommodations, recreational opportunities, and social and health services are in place.

Economic Impacts: On a broad scale, local economies in general can suffer from wildfires due to the temporary closure of businesses, potential job losses, and decreased consumer spending. The tourism sector specifically often faces significant losses, especially in areas reliant on natural areas. As wildfires become more frequent, insurance premiums are likely to rise and some high-risk areas may find it difficult to secure insurance. This puts additional financial strain on homeowners and businesses.

Ecological Impacts: While fire is a natural and necessary process, wildfires can also cause considerable ecosystem damage. Loss of vegetation can lead to increased risk of erosion and decreased water quality. Additionally, wildfires can damage traditional lands that Indigenous communities rely on for cultural practices and livelihoods. These lands often have spiritual significance and are used for traditional activities.

Impacts on the Built Environment: Wildfire events can cause destruction to built infrastructure such as homes, institutions, road networks, telecommunication towers and power lines. This damage can lead to a disruption of critical services such as power outages and communication services, which may further complicate evacuation and emergency services. Additionally, wildfires may lead to increased water for firefighting.

Actions to Consider

Public Communication and Outreach:

- Collaborate with your Fire and Emergency Services department on outreach and engagement efforts to inform residents about wildfire risks and prevention strategies.
- Reach out to your local Red Cross branch to leverage their expertise in communicating and promoting emergency preparedness. Explore opportunities to partner with Red Cross and local organizations to host an emergency preparedness workshop in your community.
- Host information sessions for volunteers such as construction workers, water haulers, and heavy equipment operators who wish to lend a hand if the season becomes difficult.

Internal Municipal Responses:

- Review and update (as needed) any evacuation and recovery plans, especially for priority interface neighborhood areas. Consider conducting simulations or drills to ensure community members and response teams understand the procedures.
- Ensure that information about emergency shelter locations is up to date and ready to be widely communicated if necessary.
- Engage with your Public Health Unit and other local partners to implement Clean Air Spaces in your community. If evacuations are not necessary, nearby fires may result in high levels of wildfire smoke and poor air quality.
- Maintain a contact list of Emergency Management employees, Chief Administrative Officers, Fire Chiefs, and other relevant staff and partners and ensure that it is up-to-date and easy to access in the event of an emergency.
- Connect with your Parks and Recreation department to ensure that high-risk activities, such as vegetation management, pile burning, and harvesting do not occur during high/extreme fire danger times.
- Reach out to By-Law Officers in your community to ensure that resources are in place to enforce any fire-related bylaws.
- Specify traffic or roadway guidelines for access and egress of emergency vehicles and residents in case of an emergency.
- Connect with your Fire and Emergency Services department to review any standards for the use of the municipal water supply for firefighting purposes.

Additional Resources

FireSmart Wildfire Exposure Assessment (FireSmart)

This guide explains how to complete a Wildfire Exposure Assessment, and is geared toward audiences at both the individual and municipal/organizational level.

Government of Ontario Interactive Fire Map

This interactive map shows real time updates of active fires, current fire danger across the province, and restricted fire zones in effect.

Canadian Wildland Fire Information (Government of Canada)

The Canadian Wildland Fire Information System (CWFIS) creates daily fire weather and fire behavior maps year-round and hot spot maps throughout the forest fire season (generally May to September). This resource provides a national perspective on fire activity.

Enhancing Community Resilience as Wildfire Risk Increases (Canadian Institute for Climate Choices)

In addition to providing prompts for longer-term considerations and actions, page 9 provides a clear list of Firesmart advice for homeowners in wildfire-prone areas. This list could be helpful in preparing communications with local residents in your region.

How to Protect Urban Lives, Health, and Property (C40 Cities)

This short article provides quick insights into developing a municipal wildfire response strategy.

Best Practices for Creating a Community Wildfire Protection Plan

This publication uses case studies to identify promising practices for community wildfire protection plan development and implementation. While using U.S. examples, these communities represent much of the social and ecological diversity found across North America in the Wildland Urban Interface (where human development meets forested areas) and may be useful to Ontario users.

Wildfire Smoke

Wildfire smoke is a dense mixture of air pollutants known to be harmful to health. Even at very low levels, this smoke can impact human health. Fine particles (PM2.5) pose the greatest concern to health. It can enter deep into our lungs and bloodstream, causing a range of negative health impacts.[xxiv] With an anticipated increase in frequency and intensity of wildfires across the country, air pollution levels can significantly increase. Even in areas with no local wildfires, the impacts of wildfire smoke can be felt from wildfire events in nearby provinces or regions many kilometers away, depending on wind and weather conditions.

Potential Impacts

Human Health and Safety: Wildfire smoke can lead to a range of acute symptoms. It is also associated with respiratory and cardiovascular illness, premature death, increase in some infections, adverse prenatal and birth outcomes, and adverse mental health. Wildfire smoke events can lead to an increase in demand for health care services.

Some people are at higher risk of experiencing health impacts from wildfire smoke, including infants and young children, people who are pregnant, people living with chronic health conditions (e.g., heart or lung conditions, diabetes, cancer), people living in situations of lower-economic status or limited resources (e.g., low income, underhoused), people who smoke, and people who spend a lot of time outdoors or who enjoy strenuous outdoor exercise.

Social Health: During wildfire smoke events, residents are often encouraged to avoid going outside. This can disrupt regular coping strategies including outdoor exercise, spending time in nature, and social gatherings. Access to safe and appropriate cleaner air spaces is often required.

Economic Impacts: Heavy smoke can reduce visibility on roads, creating hazardous conditions for nearby businesses. Industries such as tourism, agriculture, timber, and construction, which rely on forest products, may be particularly affected by disruptions in transportation and operations. The impacts of wildfire smoke on human health can result in increased absenteeism and reduce employee productivity.

Ecological Impacts: Wildfire smoke can degrade air quality over large areas, leading to poor visibility, haze, and the formation of smog. This can have implications for outdoor activities, transportation, and overall quality of life. Smoke can block sunlight thus affecting photosynthesis, stunting plant growth and reducing agricultural yields. Water quality and aquatic ecosystems can be affected, and biodiversity generally can suffer negative consequences from wildfire smoke.

Impacts on the Built Environment: The smoke from wildfires can impact powerlines by degrading transmission leading to disruption in electricity supply, which would otherwise be needed at hospitals, shelters, and/or other health care centers. Wildfire smoke can also impact indoor air quality and influence the needs of HVAC systems (e.g., filters need to be changed more frequently).

Actions to Consider

Public Communication and Outreach:

- Prepare messaging and materials to communicate health risks and protective actions during a wildfire smoke event. Work with your Public Health Unit to identify priority populations and effective strategies for communicating with these audiences.
- Contact your local health unit to learn about their existing or upcoming poor air quality notifications system.
- Consider engaging the Fire and Emergency Services department in public engagement opportunities to promote fire safety and wildfire smoke education and preparedness.
- Consider collaborating with regional or provincial agencies to access monitoring data, developing protocols and releasing consistent messaging or alerts for residents.
- Provide real-time information to residents on air quality and advisories based on pollutant levels through social media platforms like twitter, Instagram or Facebook. Build off existing notification systems in communities (e.g., radio, news, community bulletin).
- Establish lines of communication by connecting with community contacts or Indigenous leaders to act as liaisons between Emergency Management Organizations (EMOs) and the community.

Internal Municipal Responses:

- Maintain an awareness of air quality conditions and alerts in your region.
- Connect with your Public Works department to ensure air vents and HVAC systems in municipal and public buildings are clean to reduce indoor smoke and improve air quality.
- Identify and designate cleaner air spaces and cooling centers, where residents can seek relief from smoke-related heat and poor air quality (e.g., libraries, museums, shopping malls, theaters and sports areas). Coordinate transportation services in these areas for people who may be at higher risk of being impacted by smoke events. Ensure you communicate clearly about the locations, hours of service, and transportation options to access these centers.
- Consider providing portable air purifiers to schools and public buildings/facilities.
- Use the AQHI, alerts, and public health guidance to make decisions about cancelling or rescheduling community or cultural events and outdoor staff activities during an event of reduced air quality. Ensure summer staff receive training on policies and procedures related to poor air quality events.
- Talk with your Public Works, Parks and Recreation, and Transit departments to modify duties or schedules for outdoor workers during poor air quality events.
- Talk with your Public Works department about increased street lighting during smoke events when visibility is reduced.

Additional Resources

Ontario Air Quality Health Index (Government of Canada)

This Government of Canada resource provides local conditions, forecasts, wildfire smoke, health risks, pollutants, weather, educational tool kits and publications. You can check local air quality conditions to determine whether it's safe to be outdoors.

Wildfire smoke 101: How to prepare for wildfire smoke (Government of Canada)

Government of Canada provides information for the public to develop plans and take actions to protect themselves and their family before wildfire season starts. This resource can support public-facing communication efforts.

FireWork

FireWork is an air quality prediction system that indicates how smoke from wildfires is expected to move across North America over the next 72 hours. The smoke forecast maps show how the air quality in your community may be affected by wildfire smoke.

Wildfire Smoke Response Strategy (Toronto Public Health)

Many health units have developed a Wildfire Smoke Response Strategy. This one, created by Toronto Public Health in response to a wildfire smoke event in 2023 is one example of a Wildfire Smoke Response Strategy containing a response plan and direction on when to activate each level of response. Consider creating a similar framework for your specific community to ensure you have a comprehensive plan to respond to wildfire smoke events.

Wildfire Smoke, Air Quality and Your Health: Health Effects of Wildfire Smoke (Government of Canada)

This webpage provides a quick overview of pollutants in wildfire smoke, symptoms and health effects of wildfire smoke exposure, and highlights populations most at risk of experiencing the health impacts of wildfire smoke exposure.

Guidance for Cleaner Air Spaces during Wildfire Smoke Events (Government of Canada)

This resource is intended to support local communities in creating and/or managing cleaner air spaces for wildfire smoke events. Both detailed guidance and a simplified checklist are provided.

Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events (ASHRAE)

This planning framework is intended for building managers of most commercial buildings, schools, multi-unit residential buildings, and similar buildings that use air handling units to provide HVAC for occupied areas. In addition to basic information, this resource provides a framework for creating and implementing a Smoke Readiness Plan.

Wildfire Smoke 101: Using an air purifier to filter wildfire smoke (Government of Canada)

This webpage and 2-page info sheet provide guidance on how to select, use, and optimize an air purifier to protect indoor air quality during a wildfire smoke event.

Understanding Air Quality Health Index Messages (Government of Canada)

This webpage provides health messages for the general public and priority populations during each of the AQHI Health Risk Categories.

Vector-Borne Disease

Vector-borne diseases (VBDs) are transmitted by arthropod vectors such as mosquitos or black legged ticks that can transmit infectious pathogens between hosts[xxv]. Warmer winters allow vectors to withstand harsh conditions and continue seasonal development cycles. Given the recent warm winter conditions[iv] and anticipated above-normal temperatures for spring and the upcoming summer[xxvi], the likelihood of vector-borne diseases in regions across Ontario may be elevated.

Potential Impacts

Human Health and Safety: Increased incidence of West Nile Virus, and Lyme Disease and other tick-borne diseases can be anticipated following a warm winter. Pets can also contract vector-borne diseases.

Economic Impacts: Higher incidence of vector-borne disease can lead to increased worker absenteeism and increase the demand on health services.

Ecological Impacts: As climatic changes occur over time, the habitat range of species carrying vector-borne diseases (e.g., mosquitoes and black-legged ticks) continue to expand northward in Ontario.

Actions to Consider

Public Communications and Outreach:

- Connect with your local Public Health Unit to coordinate communication and engagement efforts for different audiences on preventive measures and consistent awareness campaigns. Consider engaging other relevant partners in these communications (e.g., Ontario Parks, local golf courses or garden centres, tourism operators, etc.)

Internal Municipal Responses:

- Talk with your Parks and Recreation department about posting messaging about personal protective measures and Lyme disease signage in outdoor recreation areas. Many public health units have signage available.
- Connect with your local Public Works department and Parks and Recreation department to ensure standing water is emptied from municipal catch basins, etc. on a regular basis.
- Review key information (e.g., personal preventative actions, early signs and symptoms) with municipal outdoor workers. Contact your local Public Health Unit to identify key messages and communication strategies.
- Connect with your local Public Health Unit for up-to-date surveillance information of Vector-borne diseases in your region.

Additional Resources

Ontario Lyme Disease Map 2023 Estimated Risk Areas (Public Health Ontario)

This map identifies areas with high risk of Lyme Disease based on active tick surveillance. However, this is not a comprehensive map and ticks are found in many areas not represented on the map. Talk with your local Public Health Unit for up-to-date local information.

West Nile Virus Preparedness and Prevention Plan (Ontario Ministry of Health)

This document provides expertise and methods for controlling mosquitoes and preventing of mosquito-borne diseases in Ontario. Check out pp. 19-20 for additional ideas of municipal-level actions to support source reduction (eliminating larval development sites).

Tick-borne diseases (Ontario Ministry of Health)

Helpful tips, resources, and information from the Ontario Ministry of Health on Lyme Disease, including how to avoid bites from blacklegged ticks. This resource may be helpful for preparing public-facing communications.

eTick

eTick is a citizen science, passive tick surveillance project in Ontario that invites the public to participate in tick monitoring. By uploading a photo of a tick found on people or pets, individuals can receive professional help to correctly identify tick species and thus evaluate their need to contact a health care provider about possible transmission of Lyme Disease. Many Public Health Units in Ontario no longer provide tick identification services, but rather refer residents to eTick.

Lyme Disease: Symptoms and Treatment (Government of Canada)

This page leads to information about the symptoms and treatment of Lyme Disease, surveillance, and prevention and risks. Links to awareness resources and information for health professionals are also provided.

West Nile Virus (Government of Canada)

This landing page provides links to information on the causes, symptoms, risks, prevention, treatment, and surveillance for West Nile virus.

Extreme Heat

Extreme heat occurs when temperatures are much hotter and/or humid than regional average for the season. By the 2080s, southwest, central, and eastern Ontario could see over 60 days of extreme heat annually, while the northeast and northwestern regions may face more than 35 extreme heat days per year[xx]. During hot outdoor temperatures, indoor temperatures also become increasingly dangerous. This year, warmer winter temperatures have triggered an earlier start to spring, which is predicted to be mild with above-average temperatures. The seasonal forecast for Canada suggests a similar pattern for summer, with a high likelihood of above-average temperatures across most of Ontario.

Potential Impacts

Human Health & Safety: Extreme heat can have negative impacts on human, social, and cultural health and wellbeing.

Human Health: Extreme heat can worsen existing health conditions, including mental health conditions, and cause increase incidence of heat-related illness and mortality. These impacts occur more frequently in infants and young children, people who are pregnant, people who live with mental illness (e.g., schizophrenia) or cognitive impairment (e.g., dementia), populations living with a substance use disorder, people who live alone or are socially isolated, people who exercise in the heat, populations with existing chronic conditions, people living in situations of lower low economic status or limited resources (e.g., underhoused), people who work in the heat. During extreme heat events, there is often an increased strain on ambulance and emergency room services. High temperatures can also lead to an increase in food borne illnesses.

Social Health: Incidence of violence and intimate partner violence[xxvii], criminal activity[xxviii], and substance use may increase during heat waves and times of warmer night temperatures, leading to an increased demand for emergency response and healthcare services.

Cultural Health: Increased frequency of extreme heat events has the potential to fracture human relationships with the outdoors, disrupt land-based learning and economies, and the transmission of Indigenous and cultural knowledge where nature serves as an intergenerational learning tool.

Economic disruption: Heat-related impacts such as drought can disrupt businesses, agriculture, and tourism. In addition, heat stress can temporarily reduce worker productivity.

Impacts on the Built Environment: Increased demand for electricity can strain electric power grids, causing more power outages and service disruptions. Increased water usage during extreme heat events can increase the demand on water and wastewater treatment facilities. There is often an increased demand for indoor and air-conditioned spaces (e.g., recreation centres, pools) and shaded or cooled outdoor areas (e.g., splash pads, trees)

Ecosystem disruption: An increased number of extreme heat events can

stress forest ecosystems and dry out soil and wetlands. This can lead to the die-back of tree canopy and changes the spread of diseases and pests. Extreme heat can also exacerbate drought conditions, lead to reduced water availability, which may increase the likelihood of wildfires, and affect aquatic ecosystems and dependent species.

Actions to Consider

Public Communication and Outreach:

- Collaborate with community health partners such as your public health unit, health care facilities, community organizations, emergency management and municipal public safety to deliver consistent messaging about the health risks of heatwaves and best practices for staying cool and hydrated.
- Involve partners like school boards, community centres, senior homes, faith communities and others to ensure messaging and support reaches underserved populations.

Internal Municipal Responses:

- Connect with your Facilities department, Social Services department, and local community agencies to establish and promote accessible cooling spaces. Cooling spaces are spaces normally accessible to the public, during normal business hours, where people can find relief from the heat. Ensure cooling spaces are easily accessible to populations who are at higher risk of experiencing the impacts of extreme heat (e.g., consider locating in neighbourhoods where risk is increased, provide transportation support).
- Coordinate with Emergency Services and local hospital emergency rooms to prepare for a potential increase in demand for emergency services.
- Enhance accessibility to community swimming pools and splash pads by extending operating hours and/or reducing admission costs.
- Engage with relevant municipal departments and business associations to discuss potential modifications to goods, services, infrastructure, and outdoor working conditions affected by high temperatures. For example, consider rescheduling garbage collection or urban forestry staff to work during cooler hours.
- Collaborate with your Parks and Urban Planning department to increase access to drinking water by installing public drinking fountains around trails, green spaces, and other communal centres.
- Work with your Community Safety and Wellbeing team to promote neighbourhood connection programs, whereby neighbours check on and support each other during heat waves or other extreme weather events.

Additional Resources

Heat Alert and Response Systems (HARS)
(Public Health Ontario)
This document provides contextual information on HARS and examples of actions that can be considered during heat events.

Managing Heat Stress at Work
(Government of Ontario)
This resource lists reasonable precautions for protecting your workers from heat stress.

Extreme Heat Events: Overview (Government of Canada)
This webpage provides links to information on the health risks of extreme heat, populations at increased risk of experiencing the impacts of extreme heat, and suggested individual actions to help mitigate the impacts of extreme heat.

Water Sector Incident Action Checklist – Extreme Heat (US Environmental Protection Agency)
Geared toward water and wastewater utilities, this resource provides a checklist of actions to prepare for, respond to, and recover from extreme heat. Most suggested actions are relevant to an Ontario context.

Environment Canada Heat Alerts
Environment and Climate Change Canada (ECCC) provides heat warning alerts for various parts of Canada.

Communicating the Health Risks of Extreme Heat Events: Toolkit for Public Health and Emergency Management Officials (Health Canada)
This toolkit provides scientifically backed heat health messages for public-facing communications, including checklists and templates for fact sheets and media releases. Special considerations for rural regions are also outlined.

Health Checks During Extreme Heat Events (National Collaborating Centre for Environmental Health)
A five-page guide for doing in-person or remote health checks during extreme heat events. Available for download in 5 languages.

Conclusion

While climate change is a global phenomenon, impacts are felt locally. Each community is unique and may be at different stages of long-term resilience planning and climate adaptation action.

The Ontario Resource Centre for Climate Adaptation (ORCCA) is your dedicated partner in climate adaptation in Ontario and the Great Lakes region. Our mission is to equip users with information and support communities to effectively prepare for and adapt to a changing climate.

In addition to running programs to support municipalities and other users to build climate resilience, our services include a Support Desk and an online Resource Library Whether you need help finding relevant data, understanding their significance, or guidance on integrating climate information into your decision-making and actions, we've got you covered! Contact us with your questions and we'll work to get you connected with the right resources and help you develop actionable strategies.

Resources for Long-Term Planning

Are you interested in building a more climate resilient community in the long-term? The following resources can support long-term planning and adaptation efforts. If you don't see what you're looking for, contact the Ontario Resource Centre for Climate Adaptation (ORCCA) Support Desk for assistance!

Understanding Climate Risks and Impacts

- Climate Data Portals supported by the Canadian Centre for Climate Services (CCCS)
- Ontario Provincial Climate Change Impact Assessment
- Canada in a Changing Climate reports
- Climate Change in the Great Lakes Basin
- Guidance on Good Practices in Climate Change Risk Assessment

Preparing for Climate Impacts

- Irreversible Extreme Heat: Protecting Canadians And Communities From A Lethal Future
- Mapping the Vulnerability and Exposure to Extreme Heat Waves of Populations Living in Housing in Canadian Communities
- Wildfire-Ready: Practical Guidance to Strengthen the Resilience of Canadian Homes and Communities
- Wildfires in Canada: Toolkit for Public Health Authorities
- Municipal Flood Risk Check-Up
- A Harmonized Heat Warning and Information System for Ontario (HWIS)

Creating and Implementing a Climate Adaptation Plan

- Climate Adaptation Maturity Scale
- Getting Started: Entry Points into Adaptation
- Governance, Accountability, and Implementation – Calgary's Adaptation and Resilience Implementation
- Climate Caucus Handbooks
- BARC Program
- Equity and Climate Synergies Resource Hub
- Climate Change and Adaptation in the Great Lakes

Advancing Adaptation Case Studies: 11 Case Studies from the Advancing Adaptation Implementation Cohort

Adaptation & Resilience: Protecting the vitality, diversity, and livability of our communities

Building Resilient Infrastructure

Climate Change and Infrastructure Risk – the PIEVC Protocol [An Infrastructure Resilience Professional (IRP) Course]

Climate Change & Green Infrastructure Course - Asset Management Ontario

First Nations Infrastructure Resilience Toolkit

Towards Low Carbon Communities: Creating Municipal Green Development Standards (An implementation toolkit for municipal staff)

Financing Climate Initiatives

Financing Resilient Infrastructure – Getting Ready to Finance Toolkit

Country-wide Municipal Grants List: Climate Caucus

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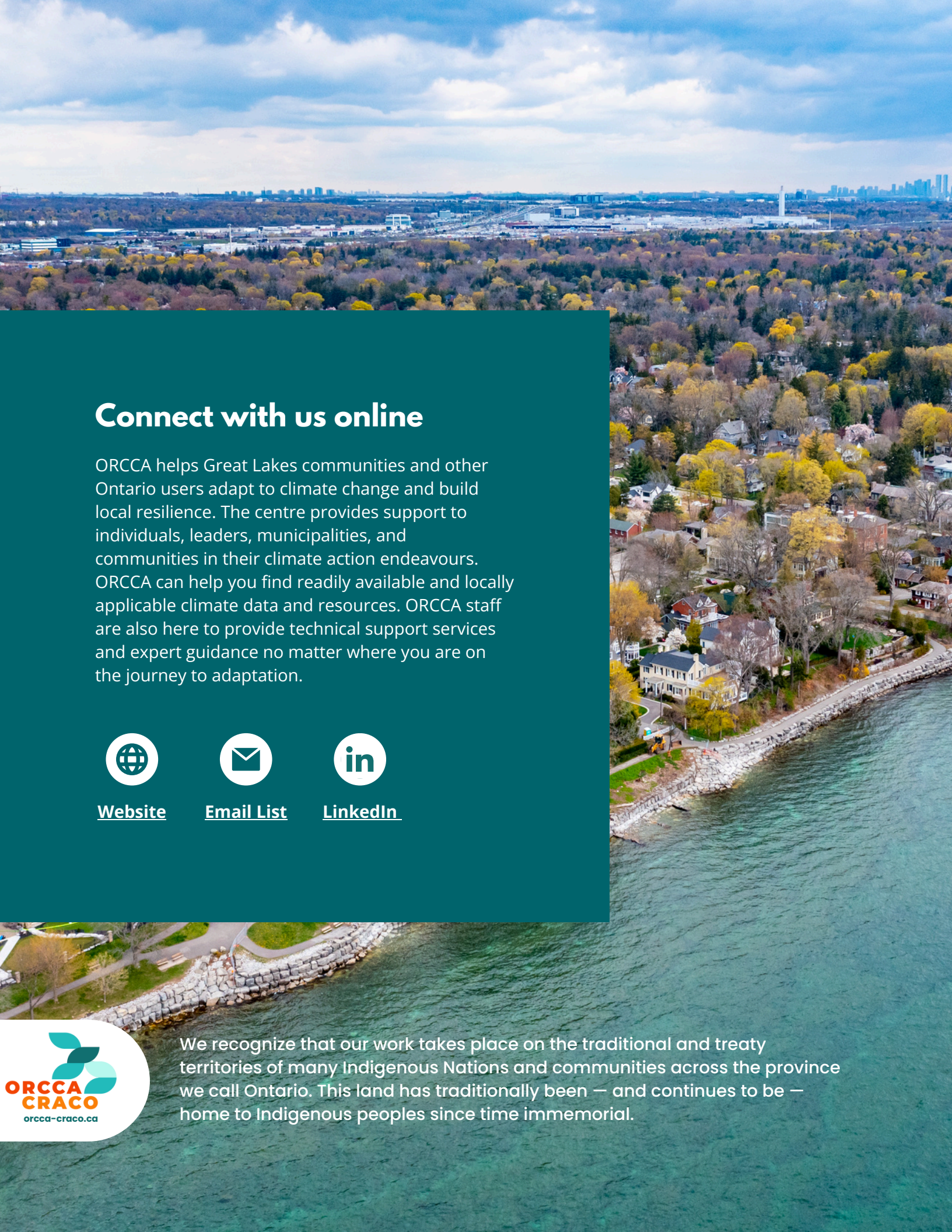

Connect with us online

ORCCA helps Great Lakes communities and other Ontario users adapt to climate change and build local resilience. The centre provides support to individuals, leaders, municipalities, and communities in their climate action endeavours. ORCCA can help you find readily available and locally applicable climate data and resources. ORCCA staff are also here to provide technical support services and expert guidance no matter where you are on the journey to adaptation.

Website **Email List** **LinkedIn**

ORCCA CRACO
orcca-craco.ca

We recognize that our work takes place on the traditional and treaty territories of many Indigenous Nations and communities across the province we call Ontario. This land has traditionally been — and continues to be — home to Indigenous peoples since time immemorial.