City of Toronto

Toronto's Climate Risks: Understanding Vulnerability Today, Preparing for Tomorrow

Prepared by
Sustainability Solutions Group

Prepared for
City of Toronto

November 2025

Summary Report

TORONTO

Sustainability Solutions Group

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Image at the cover and back cover:
Panoramic view of cloudy Toronto with waterfront. Photo by Omar/stock.adobe.com

Acknowledgements

We would like to extend our sincere gratitude to all those who contributed to this study, including the City of Toronto staff and additional organizations and individuals whose support, expertise, and dedication were invaluable in shaping this work.

Land Acknowledgement

We respectfully acknowledge that the land we are situated on is the traditional territory of many nations, including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. Toronto is covered by Treaty 13 with the Mississaugas of the Credit and the Williams Treaties signed with multiple Mississaugas and Chippewa bands. We appreciate and respect the history and diversity of these lands and are grateful to have the opportunity to work and meet in this territory.

This risk assessment takes a Western-science-based perspective and does not include Indigenous perspectives on climate risk and resilience in the lands now known as Toronto. As we seek to restore balance in the systems that sustain us and all living beings, the information generated in this Climate Risk and Vulnerability Assessment (CCRVA) should be complemented by Indigenous knowledge of the lands and waters, and approaches that centre on reciprocity, kinship with all beings and collective prosperity.

African Ancestral Acknowledgment

We are committed to continually acting in support of and in solidarity with Black communities seeking freedom and reparative justice in light of the history and ongoing legacy of slavery that continues to impact Black communities in Canada. As part of this commitment, we acknowledge that not all people came to these lands as migrants and settlers. Specifically, we wish to acknowledge those of us who came here involuntarily, particularly those brought to these lands as a result of the transatlantic slave trade and slavery. In support of the City of Toronto's ongoing efforts to confront anti-Black racism, we pay tribute to those ancestors of African origin and descent.

We also acknowledge and support all efforts to identify and address the anti-Black racism that is still embedded in Canadian institutions through policies and practices that influence the way climate change risks and adaptation resources and supports are experienced by the African diaspora in Toronto.

General Acknowledgement

Project Advisory Group

The Advisory Group consists of Bofa Udisi (Parks and Recreation); Hazel Breton (Engineering and Construction Services); Heather Marshall (Social Development); Iris Zhang (Insurance and Risk Management); Janet Lo (Transportation Services); Jessica Harris (Toronto Emergency Management); Lisa King (City Planning); Loren Vanderlinden (Toronto Public Health); Melissa Ferreira (Insurance and Risk Management); Natalie Salkauskis (Toronto Water); and Stewart Dutfield and Teresa Bosco (Environment, Climate and Forestry).

Interdivisional Climate Resilience Team

The project team acknowledges the inputs and insights contributed by the City's Interdivisional Climate Resilience Team during the development of the risk assessment and potential actions. This group included a diverse membership from across city divisions, agencies and corporations, as well as key city partners, including the following:

City Planning

Corporate Real Estate Management

Insurance and Risk Management

Engineering and Construction Services

Environment, Climate and Forestry

Fleet Services

Financial Planning

Housing Secretariat

Indigenous Affairs Office

Municipal Licensing and Standards

Parks and Recreation

Toronto Shelter and Support Services

Social Development

Strategic Public and Employee Communications

Technology Services

Toronto Emergency Management

Toronto Paramedic Services

Toronto Public Health

Toronto Water

Transportation Services

Toronto and Region Conservation Authority

Toronto Community Housing

Toronto Fire Services

Toronto Hydro

Toronto Public Library

Toronto Transit Commission

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Disclaimer

Reasonable skill, care and diligence have been exercised to assess the information acquired during the preparation of this analysis, but no guarantees or warranties are made regarding the accuracy or completeness of this information. This document, the information it contains, the information and basis on which it relies and the associated factors are subject to changes that are beyond the control of the authors. The information provided by others is believed to be accurate but has not necessarily been verified.

This analysis includes strategic-level estimates of climate risk and vulnerability that should not be relied upon for design or other purposes without verification. The authors do not accept responsibility for the use of this analysis for any purpose other than that stated below and do not accept responsibility for any third-party use, in whole or in part, of the contents of this document. This analysis applies to the City of Toronto and cannot be applied to other jurisdictions without analysis.

This Summary Report provides a high-level synthesis of results from the City of Toronto's Climate Change Risk & Vulnerability Assessment (CCRVA). For detailed methods and full findings, please refer to the accompanying Technical Report.

Key Messages

Toronto's Climate Risks: Understanding Vulnerability Today, Preparing for Tomorrow is the City's first comprehensive assessment of climate risks across all major urban systems. Based on the latest climate data from the Toronto and Region Conservation Authority (TRCA), it combines future hazard projections with an evaluation of how these hazards interact with Toronto's population, infrastructure, municipal services and natural systems. This assessment provides a foundation for coordinated action to strengthen resilience citywide.

Key Message 1:

Toronto must plan now for intensifying impacts of extreme heat and heavy rainfall

In 2024, global average temperatures exceeded 1.5 °C above pre-industrial levels for the very first time, underscoring the intensifying impacts of human-caused climate change. While exceeding 1.5 °C in a single year does not mean that the Paris Agreement goal is no longer within reach, it has resulted in a number of changes in the Toronto area, including more frequent and severe flooding, prolonged heatwaves and hazardous smoke from distant wildfires.

The most urgent risks to Toronto stem from extreme heat and extreme precipitation, which are projected to increase in frequency and severity. Heat will intensify most rapidly, redefining how summers are experienced with every passing year. Precipitation changes will gradually turn rare storms into increasingly routine events. Wildfire smoke, once a rare hazard in Southern Ontario, is becoming a regular feature of Toronto's summers, as witnessed in 2023 and again in 2025. By contrast, risks from extreme cold and freeze-thaw cycles are expected to decline, though disruptive winter events may still occur.

While heat and precipitation require immediate attention, all major climate-related hazards pose threats, and Toronto's climate risks will continue to evolve over the coming decades. This shifting landscape of climate risk underscores the urgency of preparing now for a hotter, wetter and more volatile climate. The growing number and increasing severity of priority risks — especially those linked to heat and precipitation — demand adaptation focused on the most impacted populations and systems. At the same time, declining cold-related risks create opportunities to reallocate resources toward emerging threats.

Toronto skyline on a foggy summer day.
Photo by desertsands/stock.adobe.com

Rain storm over Toronto.
Photo by Helen Filatova/stock.adobe.com

Key Message 2:

Climate risks disrupt the systems and services that people depend on

This assessment analyzed more than 400 current and potential impacts from 11 climate hazards across Toronto's interconnected systems, drawing on extensive input from city divisions, agencies and corporations and from key partner organizations. It considered two climate scenarios and multiple time periods. The result is a citywide picture of current and future risks that can guide action. The following key themes emerged from this process.

Compounding Heat, Health and Cost Pressures

The impact of extreme heat on health is Toronto's most urgent climate threat. Older adults, low-income households, people experiencing homelessness and people living in older buildings without air conditioning face disproportionate exposure to rising temperatures and more frequent heat events, with direct effects on health. Rising summer cooling costs and broader challenges such as meeting basic needs and maintaining secure housing further compound these risks, linking health pressures with affordability challenges. At the same time, worsening wildfire seasons degrade air quality, and when smoke coincides with heat, health risks multiply, intensifying respiratory and cardiovascular impacts.

Infrastructure Disruptions and Cascading Impacts

Climate change is placing growing stress on Toronto's infrastructure. Flood-prone transit and road networks, as well as aging buildings in legacy riverine flood zones, are already vulnerable and disruptions will become more frequent and costly. The greatest concern is the failure of critical assets during extreme events. For example, a power grid failure during a severe heat wave could cut off access to cooling — and in some cases, access to water — resulting in consequences that ripple across homes, workplaces and essential services.

Emergency and Municipal Services Under Strain

Municipal services will face escalating pressure as extreme weather becomes more frequent and severe. Shelters for people experiencing homelessness already operate at or near capacity, and surges in demand during heat waves, air quality events and storms strain available space and staff. The City's outdoor workers face direct exposure to climate hazards, and as demand for their services increases, they must often divert their attention from regular duties (such as during cleanup of storm debris). In the face of increasingly volatile weather, the existing plans, processes and resources of a broad range of city divisions, agencies and corporations will face strain, increasing the need for enhanced response coordination. When demand peaks, cascading effects follow: emergency responders face overwhelming call volumes and longer response times; hospitals and community health services back up; and outreach teams are stretched precisely when conditions are most dangerous.

Degradation of Natural Areas and Habit and Tree Canopy Loss

Urban forests, green spaces, wetlands, streams and ravines provide cooling and carbon sequestration, absorb/slow down stormwater and sustain biodiversity. However, they are increasingly stressed by urbanization, storm events, heat, drought, invasive species, development and habitat degradation. Losing natural features and the tree canopy erodes Toronto's natural defenses, raising neighbourhood temperatures, increasing flood volumes, decreasing habitat and natural area functions and compounding wear on infrastructure.

Key Message 3:

Climate change will have unequal impacts on Toronto residents

Climate risks in Toronto are not experienced evenly. Climate impacts are shaped by individual factors such as older age, disability, living alone and pre-existing health conditions and by systemic inequities, including racism, ableism, poverty, isolation, precarious work, insecure housing and language barriers. These conditions limit people's ability to prepare for, withstand and recover from extreme heat, flooding, poor air quality and power disruptions, turning climate hazards into compounding health and affordability crises.

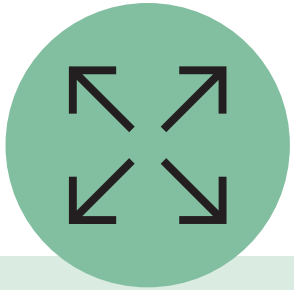
Populations most at risk include people experiencing homelessness; renters, especially in older apartment buildings without adequate cooling; lower-income households; older adults and people with disabilities; racialized communities; newcomers facing language barriers; and outdoor, shift, gig and care workers whose jobs increase their exposure to risks but who have limited benefits or paid leave. Place also matters: risks accumulate in neighbourhoods with higher social marginalization, hotter microclimates, aging buildings and limited transit access. Indigenous communities may experience climate change impacts due to colonialism and capitalism and dispossession/removal from traditional lands and ecosystems, including impacts on ceremonies, traditional lifestyle practices and the ability to exercise other cultural rights.

Equity and reconciliation must therefore guide planning, budgeting and service delivery. Closing outcome gaps requires targeting resources to residents and places with the highest combined climate and social vulnerability rather than distributing investments evenly by geography or population.

A person experiencing homelessness walking in downtown Toronto. Photo by loga25/stock.adobe.com

Key Message 4:

Toronto must scale up adaptation, leveraging progress already underway



Toronto already has many resilience measures in place to protect residents, limit damage and respond to emergencies. Adapting to a changing climate does not mean starting from scratch — the City has a strong foundation to build on, even under the most rapid and severe climate scenarios.

The task ahead is threefold:

- **Consistently and purposefully embed** climate considerations in planning, policy, operations and projects across the City.
- **Coordinate, strengthen and expand** existing initiatives and lessons learned more holistically across divisions and sectors to address root causes of heat and flooding impacts and maximize resources.
- **Close the gaps** where new actions are urgently needed.

With this approach, the City can scale up adaptation more effectively while leveraging progress already underway.

The risk assessment identified more than 80 existing actions that contribute to resilience. A key insight is that while much is underway or planned, without stronger coordination and interdivisional collaboration, efforts risk becoming ineffective, remaining siloed and falling short of their full potential. This report also highlights more than 60 potential adaptation actions the City can pursue to further strengthen resilience, including the following potential system-level actions:

- Expand the City's Carbon Budget into a broader **Climate Budget** with indicators and guidance to prioritize projects based on both emissions and resilience outcomes.
- Apply an enhanced **Resilience Lens** to capital projects and extend this lens to programs and operating budgets, ensuring climate resilience is consistently considered and prioritized in all City decisions.
- Embed resilience into **Asset Management** so climate risks and impacts are systematically integrated into asset, design, planning and decisions.
- Strengthen existing **Natural Asset Management Programs**, treating green infrastructure, including Toronto's ravines, parks, wetlands, and urban forest, as essential city infrastructure to match its critical role in climate resilience.

These approaches should be complemented with Indigenous climate solutions to ensure the continuation of Indigenous knowledge and the effective stewardship of the lands and waters that has been ongoing for millennia.

Key Message 5:

Taking a multi-system approach to climate risks is a unifying opportunity

Climate challenges do not exist in isolation. Each event cascades through interconnected systems, exposing and amplifying existing vulnerabilities. The cross-cutting nature of hazards can strain and overwhelm city systems.

At the same time, this interconnectedness offers opportunity. Climate risk touches every aspect of a dynamic city; therefore, it can serve as a unifying lens, encouraging collaboration across city divisions and economic sectors. This perspective allows Toronto to address root causes of vulnerability rather than treating symptoms in isolation.

With careful planning and coordination, resilience can move beyond reactive responses to extreme weather. It can drive solutions to some of Toronto's most pressing challenges that affect quality of life, including housing affordability, inequity, aging infrastructure and traffic congestion.

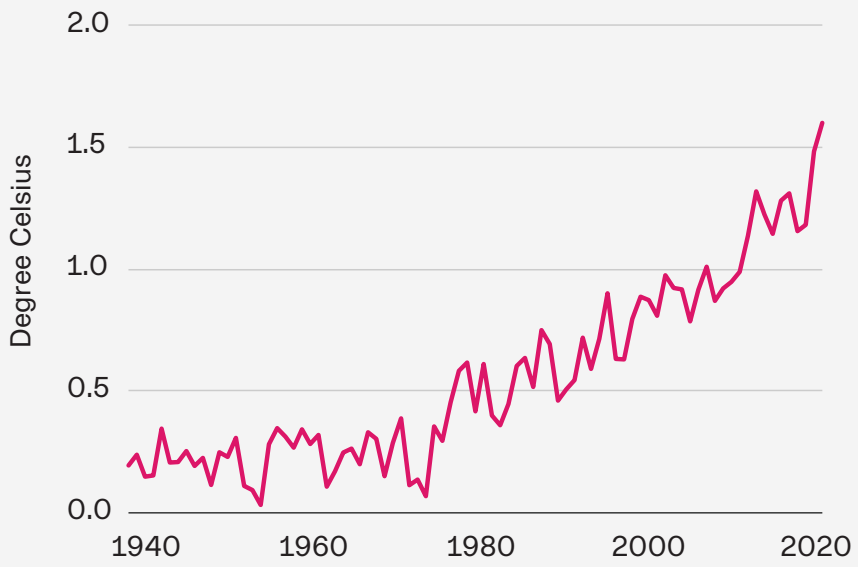
Aerial view of Toronto city.
Photo by Liran/stock.adobe.com

A Climate Turning Point

Toronto's Climate Risk Assessment comes at a pivotal moment.

In 2024, global average temperatures exceeded 1.5 °C above pre-industrial levels for the very first time,[1] highlighting the changing climate risk landscape that affects our city. While annual fluctuations remain, climate scientists project that sustained warming above 1.5 °C will occur within the next decade,[2] underscoring the urgency of adaptation planning.

Figure 1. Annual global average temperature increase relative to 1850-1900 reference level (C).



Every increment of warming drives changes to global and local climate, influencing temperature, rainfall, wind patterns, etc. While climate change affects cities around the world, each city faces a unique set of vulnerabilities and opportunities to build resilience. In Toronto, climate change means rising temperatures, more frequent and intense heat waves, heavier rainfall and other evolving hazards. These changes affect interconnected systems and intensify challenges such as health, housing, transportation and affordability, which already shape residents' daily lives.

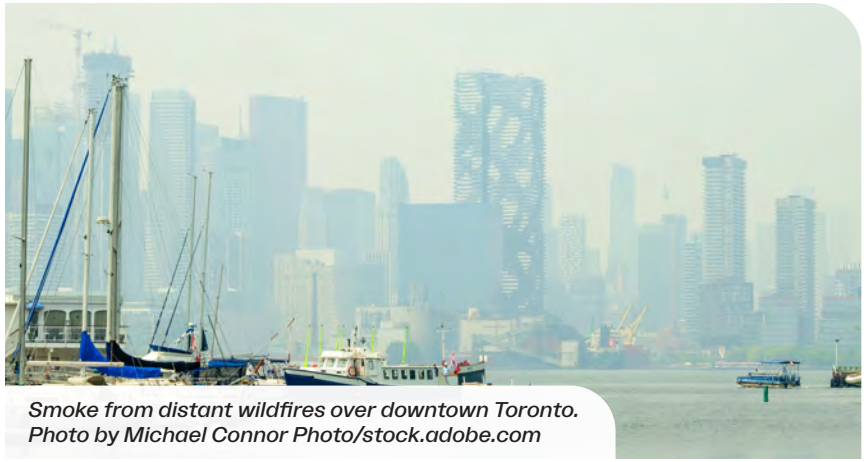
1 Copernicus: 2024 is the first year to exceed 1.5 °C above pre-industrial level," Copernicus Climate Change Service, accessed August 16, 2025, https://climate.copernicus.eu/copernicus-2024-first-year-exceed-15degc-above-pre-industrial-level.

2 Intergovernmental Panel on Climate Change, "Summary for Policymakers," in Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, ed. Core Writing Team, H. Lee and J. Romero (Geneva: IPCC, 2023), 12, https://www.ipcc.ch/report/ar6/syr/.

Toronto's New Climate

Historical data shows Toronto has warmed by nearly 1.5 °C since 1950, with the pace accelerating in recent decades. Climate impacts once projected for mid-century are arriving decades earlier than anticipated. Extreme heat is now more frequent: by the end of summer 2025, Toronto recorded 24 days above 30 °C, more than double the historical annual average.[3]

Precipitation patterns have shifted from predictable seasonal cycles to volatile swings between drought and deluge. Over the past two decades, several areas of Toronto have experienced multiple storms exceeding the historical 100-year threshold, overwhelming infrastructure designed for past climate conditions. Recent heat waves, flooding and wildfire smoke are no longer rare — they reflect current climate realities.



Smoke from distant wildfires over downtown Toronto. Photo by Michael Connor Photo/stock.adobe.com

3 Environment and Climate Change Canada, Daily Climate Data for Toronto City (Station 31688), Government of Canada, accessed October 24, 2025, https://climate.weather.gc.ca/climate_data/daily_data_e.html?StationID=31688&Prov=ON

Toronto's Recent Climate-Related Events

Major Floods

- Several areas of Toronto have experienced storms reaching or exceeding 100-year intensity thresholds[7] in the past 20 years (2005, 2013, 2018, 2024).
- 2013: 1,400 GO Transit passengers stranded; major subway service disruption.
- 2024: Over $940 million in insured damages across Toronto and southern Ontario.[8]

Heat Waves

- Major heat waves in 2005, 2010, 2024 and 2025.

Other Extremes

- 2013 ice storm: 300,000 customers without power; extensive tree loss and tree damage.
- 2023 and 2025 wildfires: Smoke drove Toronto's daily air quality to some of the worst levels in the world.[9]

7 A "100-year storm" refers to a storm event with a 1 per cent chance of occurring in any given year at a specific location.

8 Insurance Bureau of Canada. "July Flash Floods in Toronto and Southern Ontario Caused Over $940 Million in Insured Damage." News release, September 5, 2024. https://www.ibc.ca/news-insights/news/july-flash-floods-in-toronto-and-southern-ontario-caused-over-940-million-in-insured-damage

9 Leyland Cecco, "Canada Wildfires Prompt Severe Air Quality Alerts across Country and US," The Guardian, August 4, 2025, https://www.theguardian.com/world/2025/aug/04/canada-wildfires-air-quality-alerts-us

Climate Change Scenarios

Historical observations are not sufficient to assess future risk. Decision makers need projections of how hazards may shift over planning horizons relevant to assets and services, from the next 10 to 30 years to the end of the century. The magnitude of change depends on global greenhouse gas emissions shaped by economic development, technology adoption and policy choices. Given this uncertainty, it is standard practice to evaluate a range of emissions scenarios and stress-test standards, design criteria and operating plans against multiple plausible futures.

The frequency and severity of climate hazards depend on how global emissions increase over time. For Toronto, risks were assessed under two emissions scenarios (called Shared Socioeconomic Pathways or SSPs) that are defined by the Intergovernmental Panel on Climate Change (IPCC): **SSP2-4.5, a medium emissions pathway and SSP5-8.5, a very high emissions pathway.** These scenarios were chosen because global emissions are currently tracking between them. This report focuses on SSP2-4.5 as the planning case, while SSP5-8.5 is used to stress test risk results and evaluate the robustness of adaptation actions under faster and more severe climate change. Risks were assessed for both the current climate and the 2050s to identify today's priority concerns and how the risk landscape is expected to evolve over a longer planning horizon. Although hazards are projected to intensify more quickly and severely under SSP5-8.5, priority risks and adaptation actions are consistent across both scenarios. However, under SSP5-8.5, the same risks are expected to have much more severe and widespread consequences as the century progresses, underscoring the urgency of accelerated adaptation.

Temperature and precipitation patterns will shape how Toronto's climate hazards evolve over time. Beyond driving extreme heat and heavy rainfall, they influence nearly every other hazard by creating conditions for regional wildfires and smoke, shifting winter precipitation and triggering ecosystem changes that undermine the health and resilience of natural systems.

Smoke from distant wildfires over downtown Toronto. Photo by Michael Connor Photo/stock.adobe.com

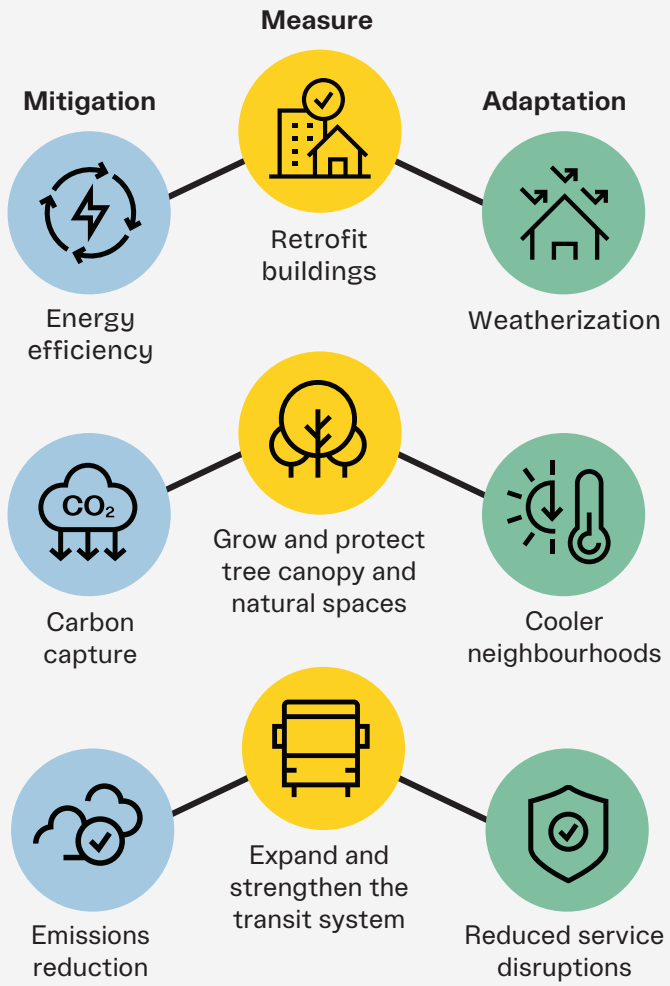
Cutting Emissions, Reducing Risk

While Toronto must prepare for a range of possible climate futures, it also plays a role in shaping the trajectory. By continuing to implement the TransformTO Net Zero Strategy, the City can cut emissions and lead by example on the global stage. Toronto has already met its 2020 target of reducing emissions 30 per cent below 1990 levels and is working toward its goal of net- zero emissions community-wide.

In addition to cutting risk at the source, many emission-reduction measures also build resilience or can be paired with adaptation actions. For example, retrofitting older buildings improves energy efficiency while making homes more resilient to extreme heat and cold. Expanding tree planting helps to reduce carbon pollution while cooling neighbourhoods and mitigating the impacts of stormwater. Expanding green spaces on public and private property reduces emissions while reducing temperatures and helping to manage rainwater, and shifting to electric vehicles cuts emissions while reducing harmful air pollutants that worsen health risks during heat and wildfire smoke events (Figure 2).

By pursuing this holistic approach, the City can address climate change on two fronts — reducing harmful emissions that cause climate change (mitigation) and taking action to reduce climate risks (adaptation) — while at the same time, delivering co-benefits that protect residents, strengthen systems and reduce future risks.

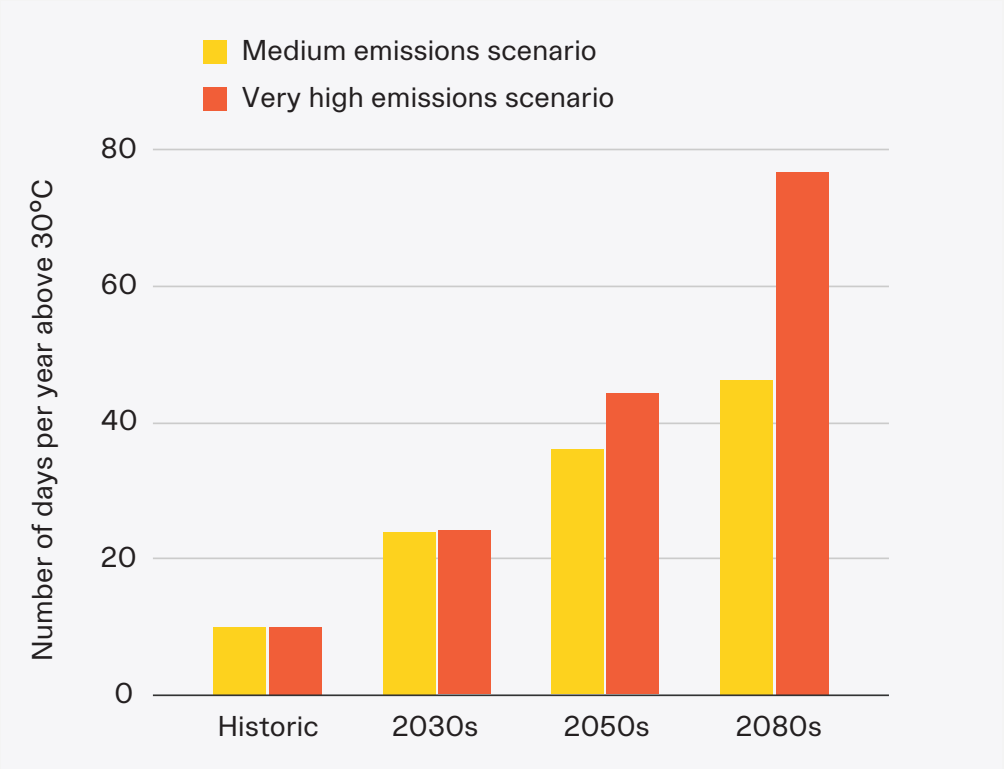
Figure 2. Shared benefits of mitigation and adaptation.



Temperature Projections

Drawing on Toronto's Current and Future Climate, a recent analysis of current and future climate projection data prepared by the Toronto and Region Conservation Authority (TRCA) for the City of Toronto, Toronto's annual average temperature is projected to rise about 3 °C above late 20th-century levels by the 2050s and 4 °C by the 2080s under a medium emissions scenario. The number of days hotter than 30 °C is expected to increase from 18 days per year now[10] to 36 per year by mid-century and 46 by the 2080s, under a medium emissions scenario. As of mid-September 2025 there were 24 days above 30 °C in Toronto. Under a very high emissions scenario, this number could reach 78 days annually by the 2080s (see Figure 3), meaning most Toronto summers would be characterized by extreme heat conditions.[11]

Figure 3. Projected days above 30 °C for the medium (SSP2-4.5) and high emissions (SSP5-8.5) climate scenarios.



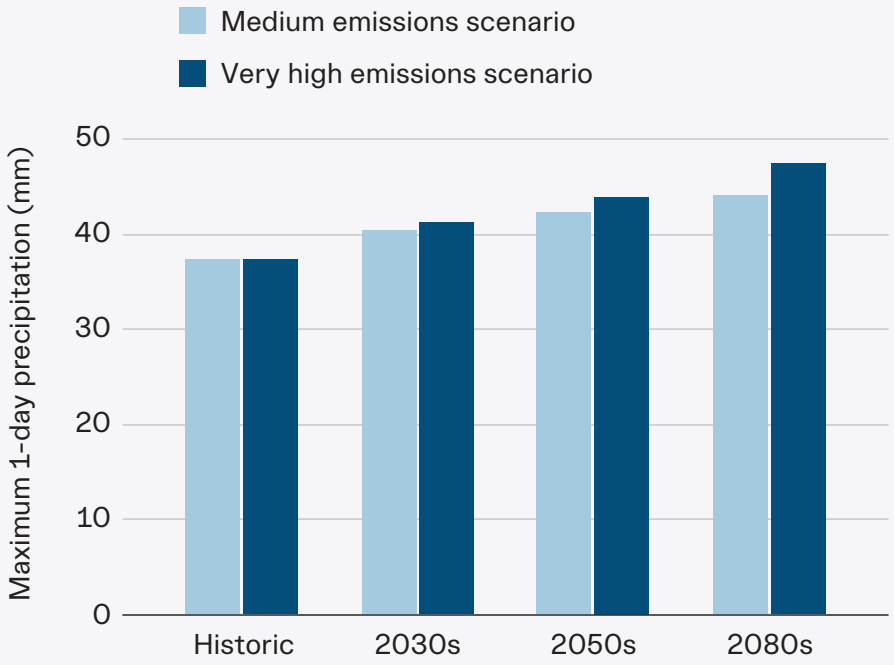
10 City of Toronto, Toronto's Climate Change Readiness, Staff Report Background File IE12.3a, June 18, 2024, https://www.toronto.ca/legdocs/mmis/2024/ie/bgrd/backgroundfile-244181.pdf

11 S. Lam, S. Demirbas Caglayan, M. Mahya, and Y. David, Toronto's Current and Future Climate (Toronto: Toronto and Region Conservation Authority [TRCA], 2024), prepared for the City of Toronto.

Precipitation Projections

The maximum amount of precipitation in one day is projected to increase by around 14 per cent by mid-century and 18 per cent by the 2080s under a medium emissions climate scenario and could climb to 27 per cent in a very high emissions scenario (see Figure 4). These increasing extreme precipitation events will pose challenges for aging and undersized stormwater systems designed for historical patterns, elevating flood risks.

Figure 4. Projected maximum 1-day precipitation (mm) for the medium (SSP2-4.5) and high (SSP5-8.5) emissions scenarios.



Heavy rain overnight in Toronto. Photo by Lance/stock.adobe.com

Climate Hazard Projections

To understand how climate is expected to change in Toronto, it is helpful to understand how the frequency and severity of relevant different climate hazards are expected to change over time. Table 1 identifies the 11 hazards included in the risk assessment and shows how each is projected to change under a medium emissions scenario. Hazards like extreme heat and extreme precipitation are increasingly likely over time, while others, such as winter storms and drought, remain constant. Very cold days and freeze-thaw cycles decrease in likelihood as temperatures rise.

Table 1. Projected changes in climate hazard likelihood for different time periods under a medium emissions scenario.

↑↑ indicates a large increase in likelihood

↑ indicates a moderate increase in likelihood

\- indicates that the likelihood of the climate hazard occurring will remain relatively similar to present conditions

↓ indicates a decrease in likelihood

Hazard	2030s	2050s	2080s
Extreme Heat and Very Hot Days	↑↑	↑↑	↑↑
Increase in Temperatures	↑	↑	↑↑
Ecosystem Changes	↑	↑	↑
Climate-Related Air Quality	-	↑	↑↑
Extreme Precipitation	-	↑	↑
Total Precipitation	-	-	↑
High Winds/Tornados	-	-	-
Drought	-	-	-
Winter/Ice Storms	-	-	-
Very Cold Days	↓	↓	↓
Freeze-Thaw cycles	↓	↓	↓

Key Findings

Toronto's Climate Risk Landscape

To understand how climate change will affect Toronto, this assessment applies a systematic approach that translates climate projections into risks. Eleven hazards were assessed: extreme heat, extreme precipitation, high winds, winter storms, climate-related air quality events, drought, ecosystem change, freeze-thaw cycles, cold days, long-term temperature rise and long-term precipitation change. Their impacts were analyzed across four overarching urban systems.

Population and Local Economy considers demographics, equity indicators, employment, key trade sectors and household affordability.

Infrastructure Systems includes electricity distribution and generation, natural gas supply, digital and telecom networks, transportation systems, and green and natural infrastructure, including landscaping, buildings and energy assets.

Municipal Services covers emergency response, public health, social services, waste management, parks and forestry, water supply, wastewater and stormwater operations.

Natural Systems and Green Spaces encompasses creeks, rivers, ravines, wetlands, urban forests, shoreline habitats and Lake Ontario's nearshore ecology.

The systems include elements within and beyond the City's direct authority. Each system is composed of interlinked subsystems shaped by vulnerability drivers that influence how they respond to climate hazards. These drivers reflect underlying socio-economic, demographic and structural factors that affect life in Toronto, such as the cost of living, shifting demographics, mobility challenges and aging infrastructure.

This assessment evaluated more than 400 climate-related risks by examining three elements: the severity of potential impacts from evolving climate hazards on key systems, the influence of vulnerability drivers on Toronto's resilience, and the effectiveness of existing and planned adaptation measures. Figure 5 provides an overview of these elements and highlights selected impacts identified through the assessment.

Figure 5. Summary of systems, vulnerability drivers, hazards and selected risks assessed.

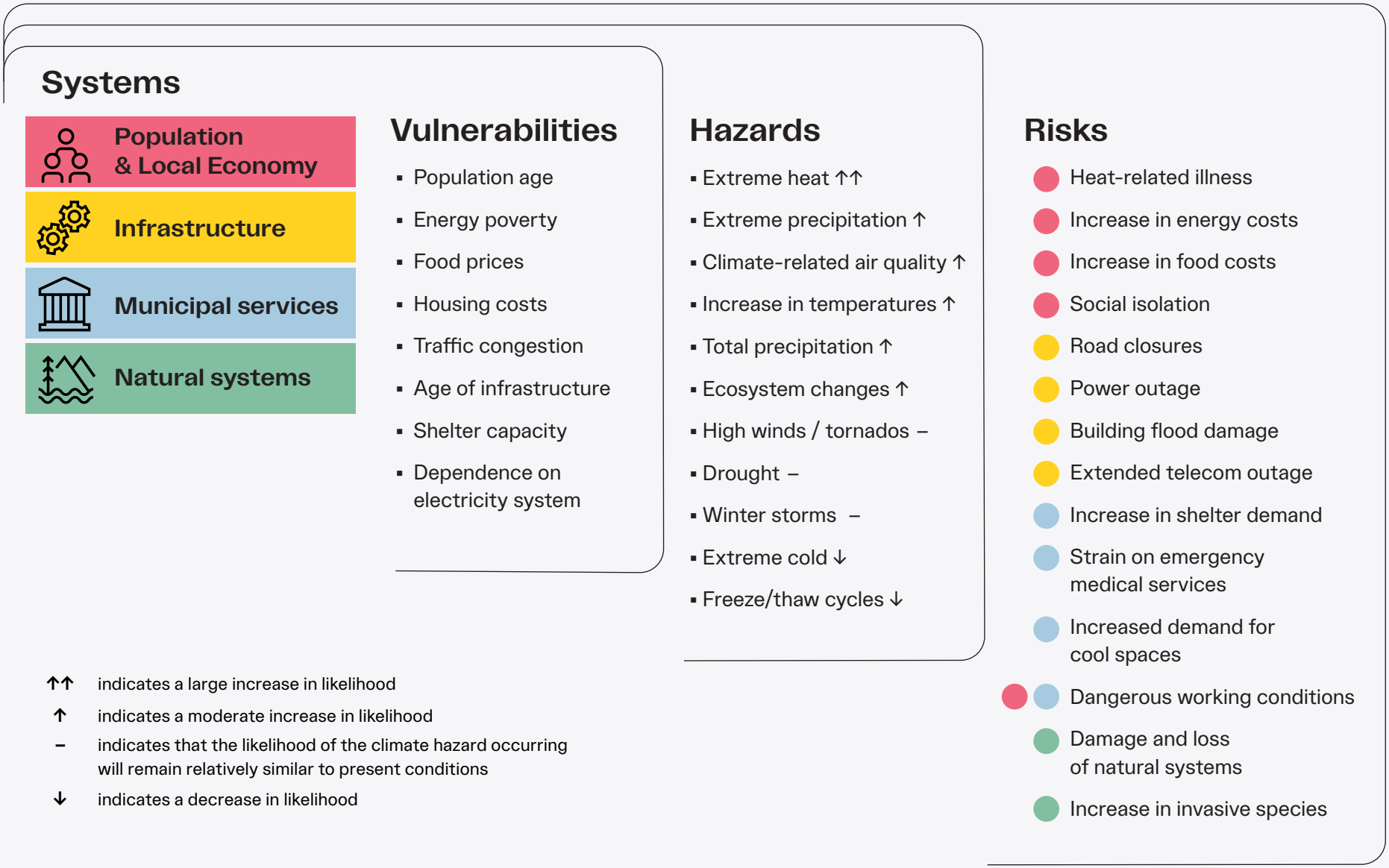
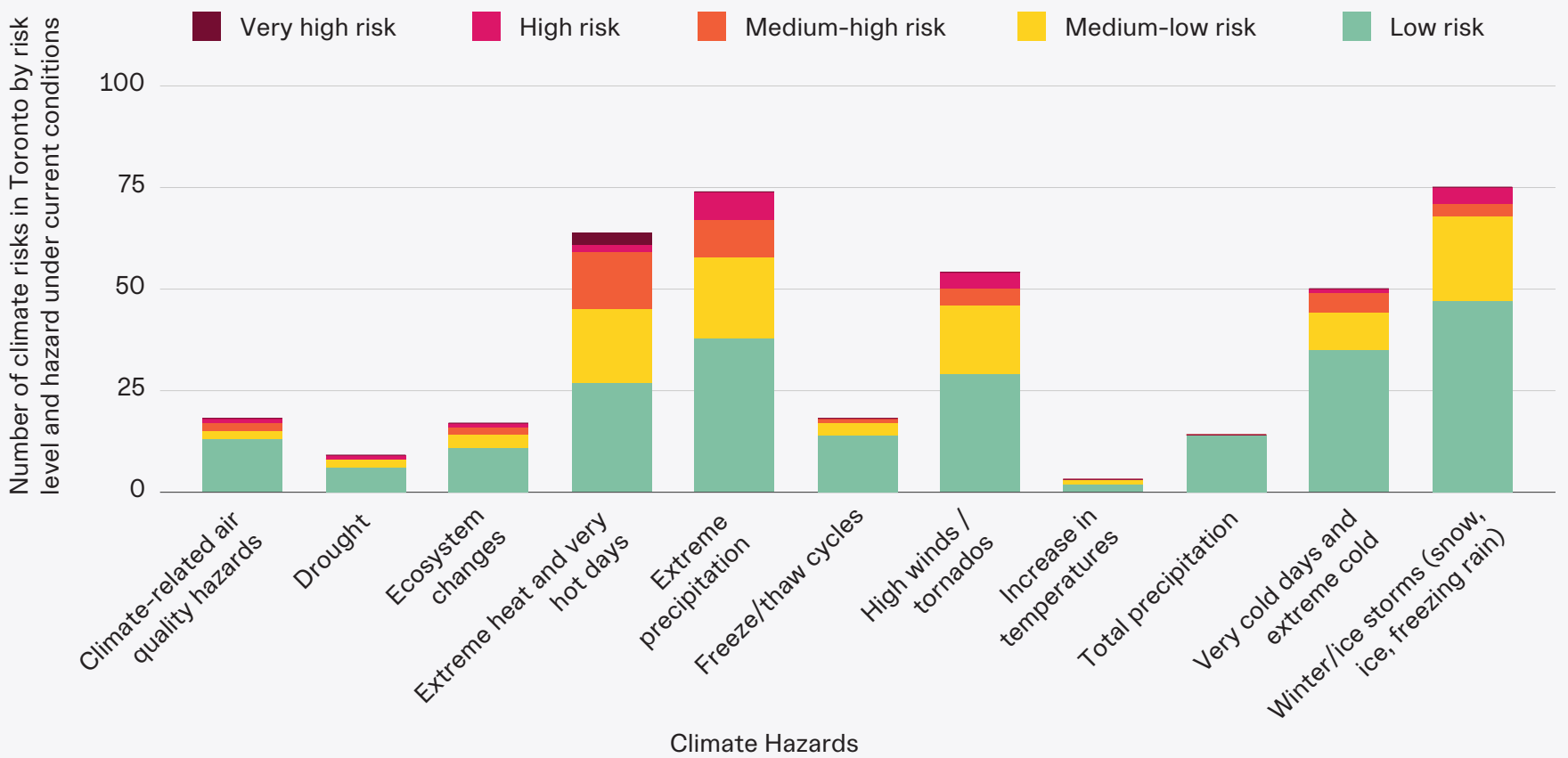


Figure 6 shows the distributions of risk scores assigned to the 400 impacts assessed. In total, 15 per cent were ranked medium-high or higher, including about 5 per cent that were ranked high or higher. This indicates that while climate hazards generate a wide range of impacts across the city, many are managed through existing resilience. Focusing on the relatively small number of priority risks allows the City to direct resources where they are needed most.

Figure 6. Risks assessed by climate hazard and risk level, current climate.



The following sections examine these priority risks and their impacts on each overarching system — population and local economy, municipal services, infrastructure, and natural systems — through the lens of vulnerability drivers and evolving hazards. They also highlight initiatives already underway to address these risks and identify opportunities for further adaptation actions to accelerate and strengthen Toronto's resilience.

City-Scale Climate Risk Modelling

The assessment conducted climate risk modelling for extreme heat and extreme precipitation to understand how these hazards affect the city spatially and how their impacts may shift over time as both the city and the hazards evolve. The results, presented as accompanying maps and graphs in the following section, reinforce the main findings of the risk assessment. These modelling outputs provide critical insight into priority risks and can support the development of targeted adaptation measures.

Sunny day in Toronto's Queen West district. Photo by Michael Connor Photo/stock.adobe.com

Population and Local Economy

Heat, Health and Well-Being

The health and well-being of Toronto's population face multiple climate threats, with extreme heat posing the most urgent risk. Given the interconnected nature of health determinants and related social factors, Indigenous Peoples and unhoused populations face disproportionately higher levels of vulnerability and inequity, shaped by distinct sensitivities and adaptive characteristics. Already a serious hazard affecting thousands of residents each year, extreme heat events are projected to become much more frequent and severe. The top priority is preventing heat-related illness and mortality, particularly among residents with limited means to cope with dangerous temperatures. This includes more than 15,000 unhoused residents,[12] as well as hundreds of thousands of people in lower-income households across Toronto who either lack access to air conditioning or cannot afford the energy costs to run it.

Heat exposure varies significantly across Toronto's neighbourhoods. The urban heat island effect, shaped by the balance of green space and built environment, creates temperature differences of several degrees between areas of the city. Neighbourhoods with abundant tree cover, parks, green spaces or proximity to water remain noticeably cooler, while areas dominated by concrete and asphalt can become dangerously hotter. This geographic inequality means that during the same heat wave, some residents face life-threatening conditions while others experience only manageable discomfort.

Figure 7 illustrates outdoor overnight temperature variations across the city during an extreme heat event.[13] Overnight temperatures are a critical measure of heat-related health risk, as the inability to cool down at night is often the primary driver of severe health outcomes during heat waves.[14] When nighttime temperatures remain above 24 °C, indoor conditions in uncooled living spaces often climb several degrees higher,[15] frequently exceeding the 26 °C threshold widely recognized as the point at which heat-related health risks begin to accelerate.[16] The downtown core exhibits the most intense heat concentration, where densely packed residential and commercial towers combined with limited green space create a pronounced heat island effect.

12 City of Toronto, "City of Toronto releases findings of 2024 Street Needs Assessment homelessness survey," News release, July 7, 2025, accessed August 30, 2025, https://www.toronto.ca/news/city-of-toronto-releases-findings-of-2024-street-needs-assessment-homelessness-survey/.

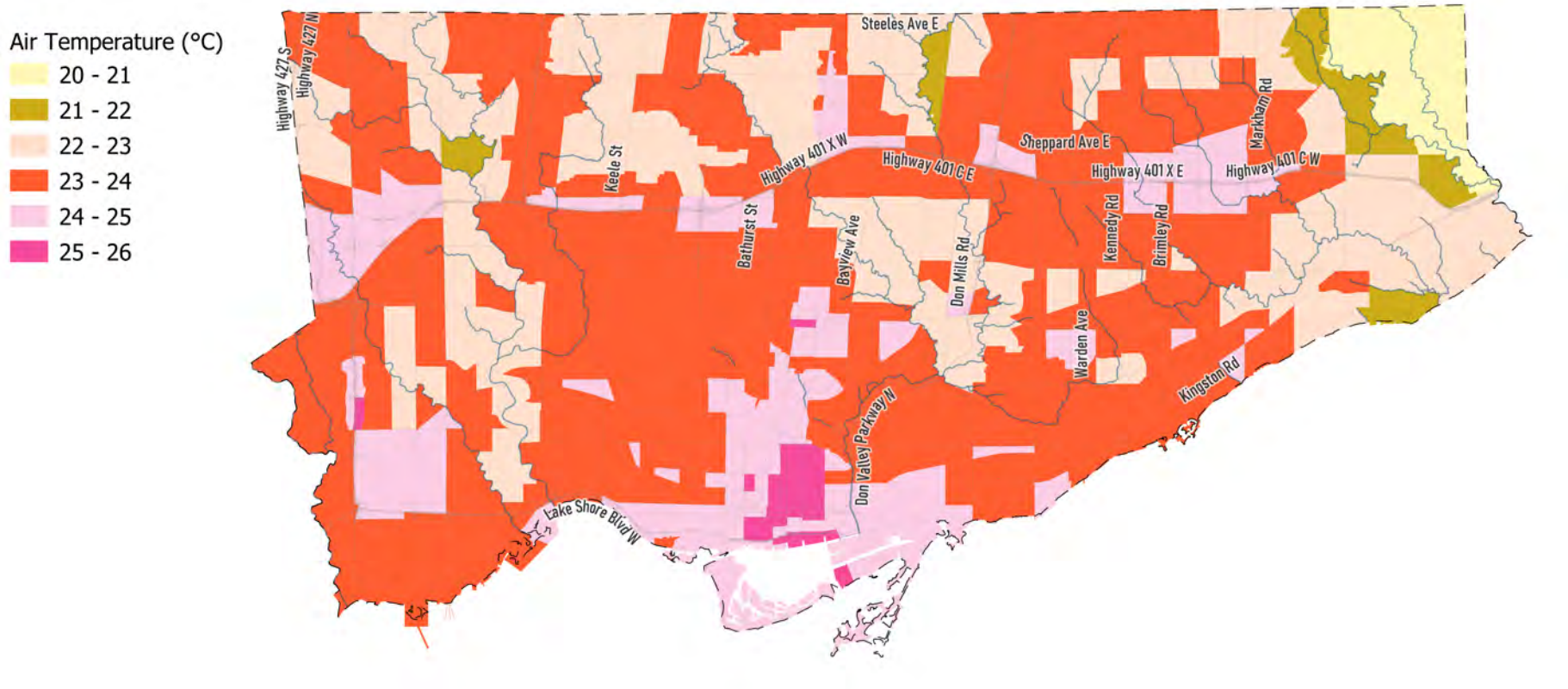
13 Temperatures occurring about once every 10 years under current climate conditions.

14 Yuqiang Zhang et al., "Night-time Heat and Human Health: A Multi-Country Analysis," The Lancet Planetary Health 6, no. 12 (December 2022): e969–e978, https://doi.org/10.1016/S2542-5196(22)00139-5

15 Arlene Oetomo, Niloofar Jalali, Paula Dornhofer Paro Costa, and Plinio Pelegrini Morita, "Indoor Temperatures in the 2018 Heat Wave in Quebec, Canada: Exploratory Study Using Ecobee Smart Thermostats," JMIR Formative Research 6, no. 5 (May 12, 2022): e34104, https://doi.org/10.2196/34104

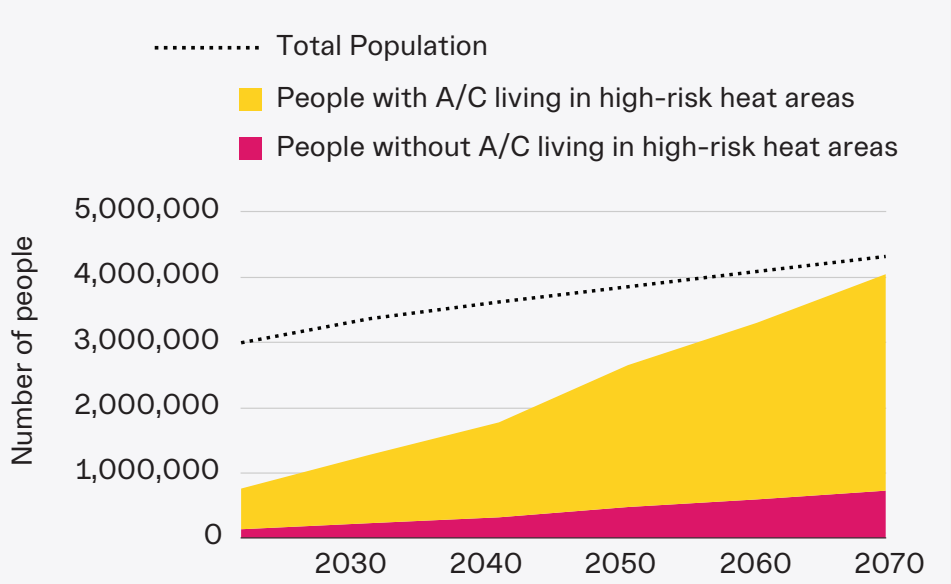
16 S. Tham, R. Thompson, O. Landeg, K. A. Murray, and T. Waite, "Indoor Temperature and Health: A Global Systematic Review," Public Health 179 (February 2020): 9–17, https://doi.org/10.1016/j.puhe.2019.09.005

Figure 7. Estimated overnight temperatures during an extreme heat event in Toronto.



As temperatures rise and extreme heat events become more frequent and severe, the number of people exposed to high-risk overnight temperatures will increase substantially. Figure 8 illustrates this progression under a medium emissions scenario, showing the share of the population exposed by decade through to 2070.[17] While large segments of the population may be exposed to high-risk conditions, individual vulnerability varies significantly depending on socio-economic factors and access to cooling.

Figure 8. Projected number of people in Toronto exposed to high-risk overnight temperatures during an extreme heat event, medium emissions scenario.[18]



17 Exposure increases due to rising temperatures and population growth.

18 The figure incorporates current estimates of air-conditioning availability. Future ownership and use are uncertain and may vary with building type, income, and energy costs. Not all residents operate available A/C systems due to electricity costs, noise, or preference for natural ventilation.

In 2015, about 500,000 Torontonians were estimated to live in apartment buildings constructed between 1945 and 1984, most without central air conditioning.[19] The actual prevalence of air conditioning across rental housing in Toronto today is unknown because citywide data are limited.[20] These buildings absorb heat during the day and release it slowly at night, preventing adequate cooling and creating dangerous conditions that persist throughout heat waves. Figure 9 illustrates the share of the population in different building types exposed to high-risk overnight temperatures.[21] Exposure is concentrated among apartment residents, who make up more than half of the population. By 2030, exposure rises sharply across more building types. By 2070, nearly all residents, regardless of dwelling type or location, are projected to face high-risk nighttime temperatures.

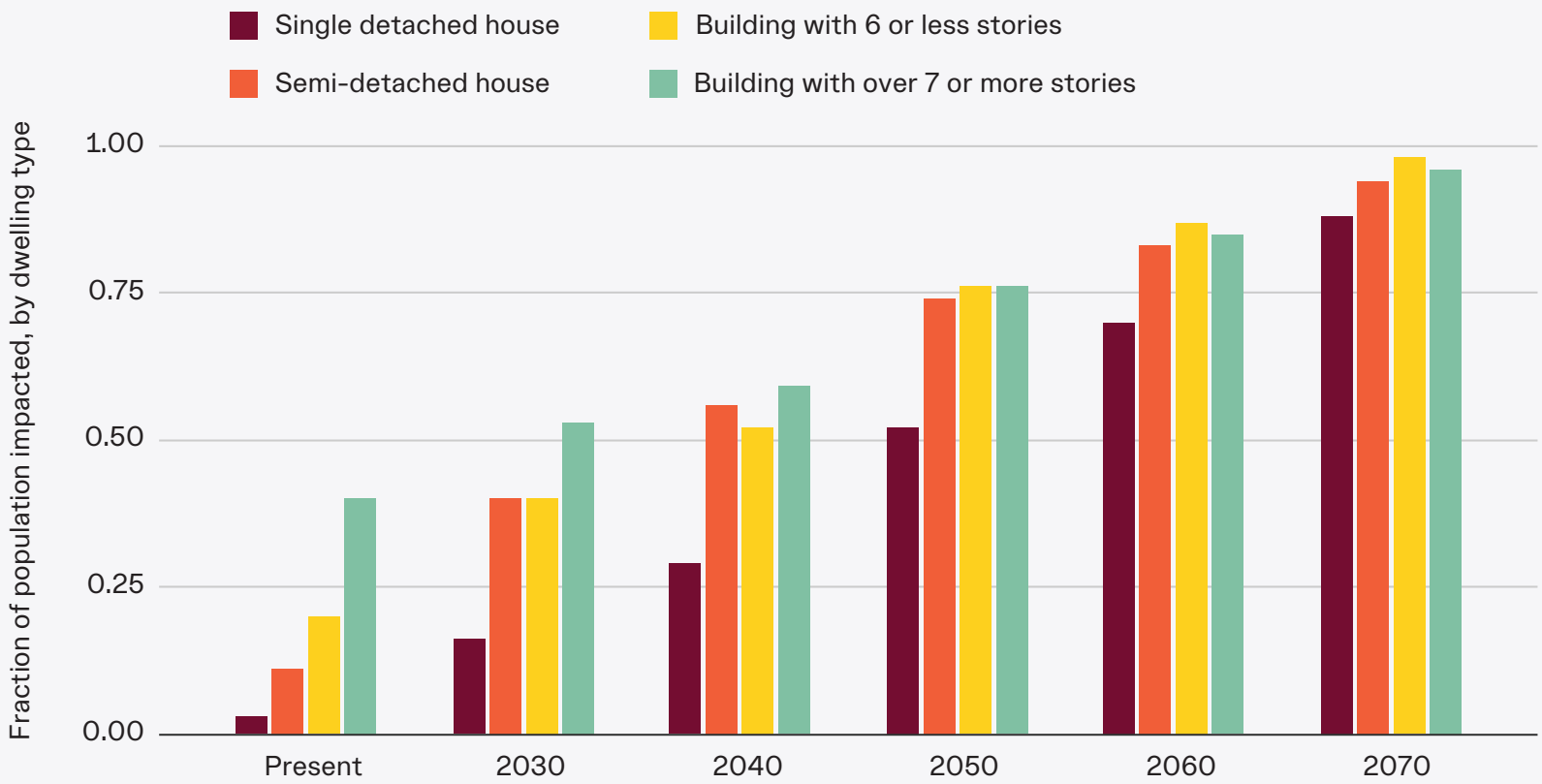
19 City of Toronto, Reducing Health Risk from Extreme Heat in Apartment Buildings, Staff Report to the Board of Health (June 11, 2015), https://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-81510.pdf.

20 RentSafeTO provides partial insight, while Statistics Canada tracks air conditioning use for the broader Toronto region (CMA).

21 For this analysis, dwelling numbers and types were projected to change in line with population growth and Toronto's development plans.

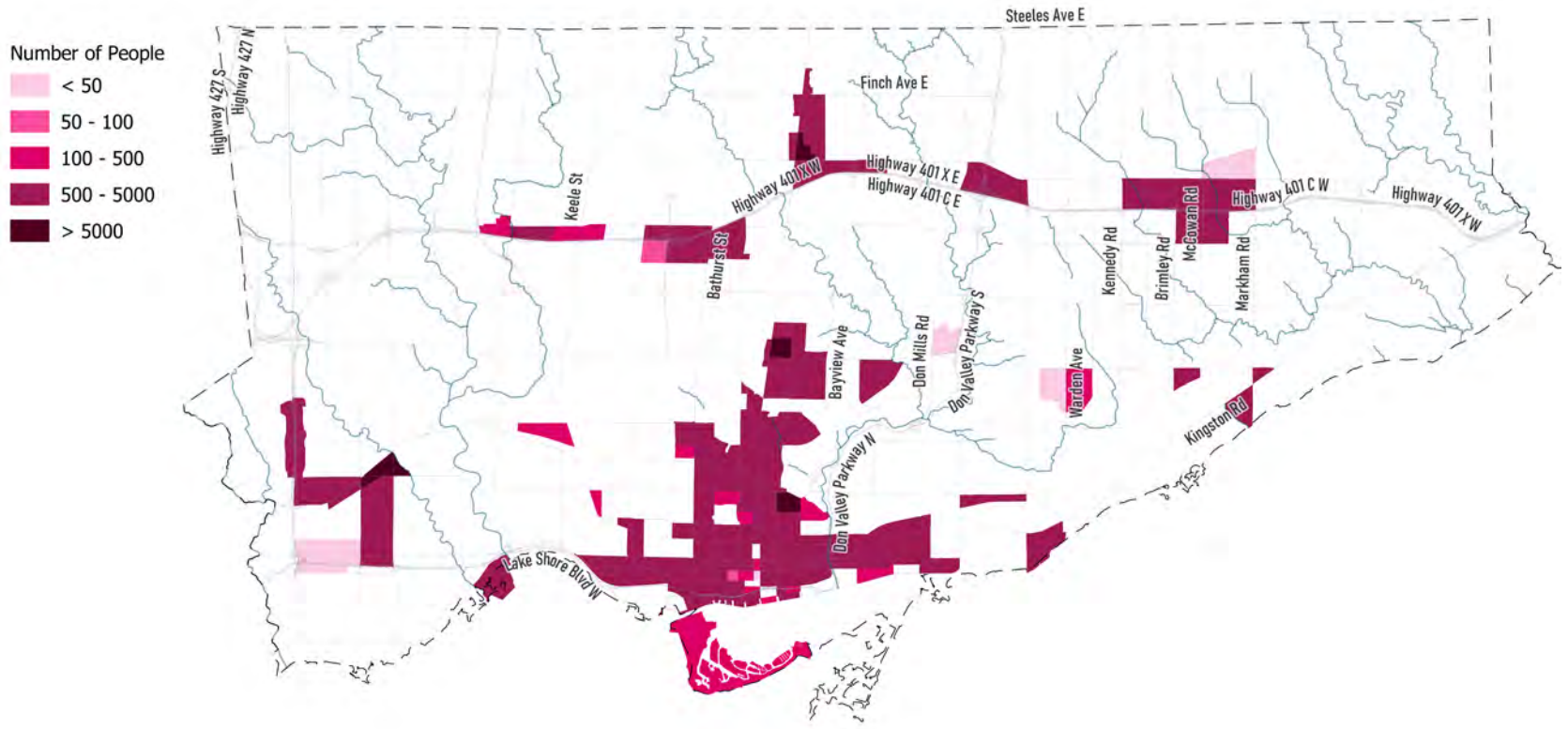
These projections also heighten cascading risks: if electricity systems cannot meet surging nighttime cooling demand, brownouts or outages could leave the majority of residents without cooling, amplifying heat-related health impacts and compounding stress on essential services.

Figure 9. Fraction of total population exposed to high-risk temperatures, by dwelling type, during an extreme heat event, medium emissions scenario.



In addition to location and building type, factors such as income and age also shape vulnerability to heat. Figure 10 shows the number of people facing disproportionate risk, identified by age and income (ages 0–4, ages 65 and over or low-income households),[22] who are exposed to elevated nighttime temperatures. Many are concentrated in the downtown core, though other areas of heightened vulnerability also emerge across the city.

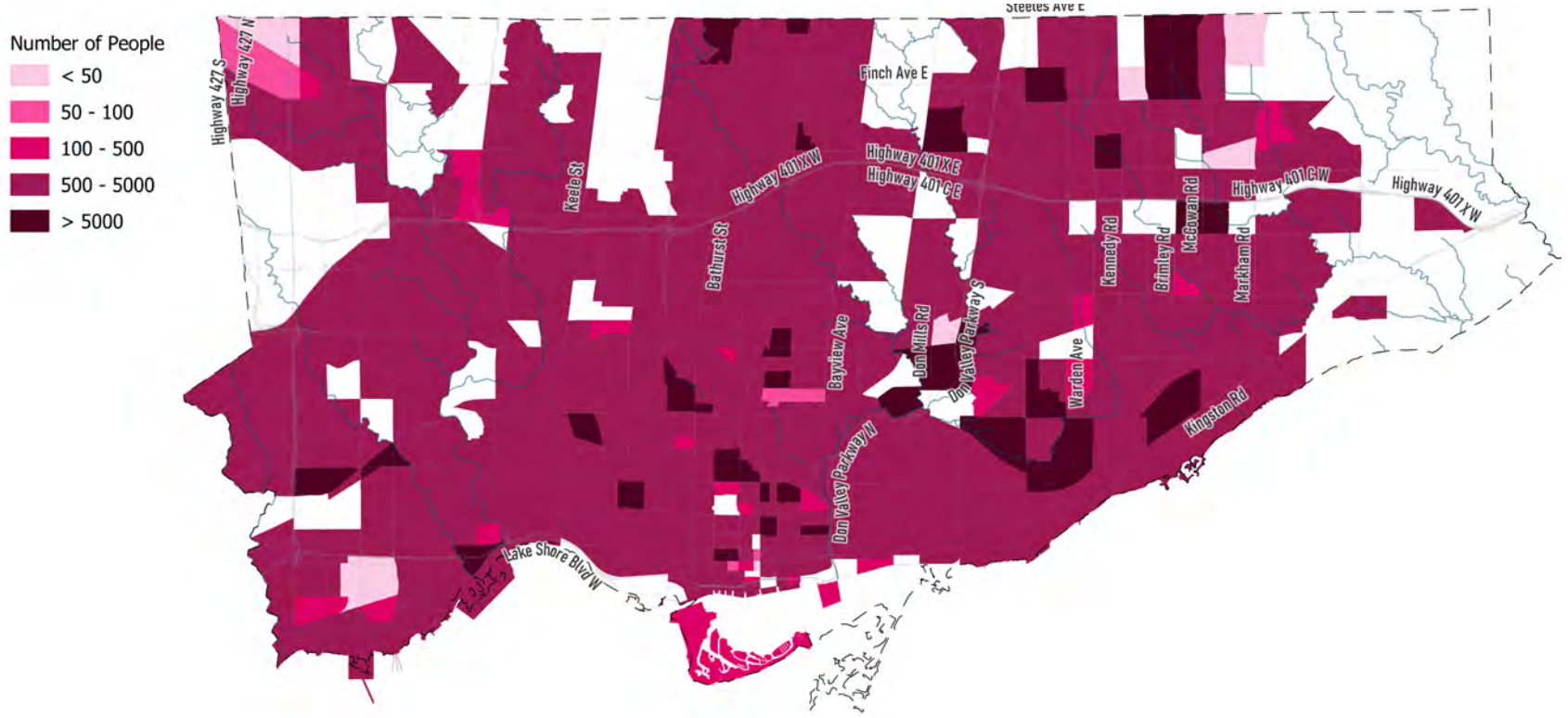
Figure 10. Priority areas where vulnerable populations (based on age and income) are exposed to the highest nighttime temperatures (over 24 °C) during an extreme heat event, current period.



22 This analysis designates low income households according to Statistic Canada's Low-income measure, after tax (LIM-AT), https://www12.statcan.gc.ca/census-recensement/2021/ref/dict/az/Definition-eng.cfm?ID=fam021

By the 2050s, under a medium emissions scenario, the number of residents facing disproportionate heat risk could rise from 180,000 to 1.3 million during an extreme heat event — a sevenfold increase.[23] Moreover, the impacts of this hazard are expected to shift from being localized, driven primarily by the urban heat island effect, to being a citywide phenomenon, as shown in Figure 11.

Figure 11. Priority areas where vulnerable populations (based on age and income) are exposed to the highest nighttime temperatures (over 24 °C) during an extreme heat event, 2050s (medium emissions scenario).



23 This projection shows the number of people facing disproportionate heat risk due to exposure to outdoor temperatures that could cause adverse health outcomes. Actual impacts will depend on the availability, reliability and affordability of cooling options.

Heat-related health impacts are compounded by poor air quality, increasingly driven by wildfires outside the city. In 2023, Canada's record wildfire season brought numerous hazardous air quality days to Toronto, prompting the City to develop a Wildfire Smoke Response Strategy. By 2025, the country was experiencing its second-worst season on record, reflecting rising risks. When smoke and extreme heat coincide, the hazards compound, driving higher rates of respiratory distress, cardiovascular strain and emergency room visits, particularly among residents with pre-existing health conditions.[24]

The City has been proactive in reducing heat risk. Policies such as the Toronto Green Roof Bylaw, the Toronto Green Standard and programs to expand the tree canopy to 40 per cent by 2050 using a tree equity approach have supported lowering outdoor temperatures by expanding green space and increasing access to shade. In addition, the City, together with its partners and regional governments, manages programs that support building retrofits and the installation or upgrading of cooling equipment to reduce indoor temperatures and provide protection during extreme heat. The City has also implemented a comprehensive Heat Relief Strategy, a multi-pronged plan to inform and protect residents when temperatures reach dangerous levels.

Potential Action:
Maximum Temperature Bylaw

The City of Toronto is exploring implementation of a maximum temperature bylaw for rental units that would limit indoor temperatures to 26 °C during hot weather. This policy would complement existing minimum temperature requirements for winter, ensuring year-round safe indoor conditions. Limiting indoor temperatures to a maximum of 26 °C is intended to protect hundreds of thousands of tenants — particularly those in older buildings without air conditioning — from life-threatening indoor heat. The development of a bylaw or other policy presents an opportunity for the City to address the health inequities revealed by the climate assessment, where renters face disproportionate heat risks compared to property owners with greater control over their living conditions.

24 Eric S. Coker et al., "The Synergistic Effects of $PM_{2.5}$ and High Temperature on Community Mortality in British Columbia," npj Clean Air 1 (2025): Article 15, published June 11, 2025, https://doi.org/10.1038/s44407-025-00014-9.

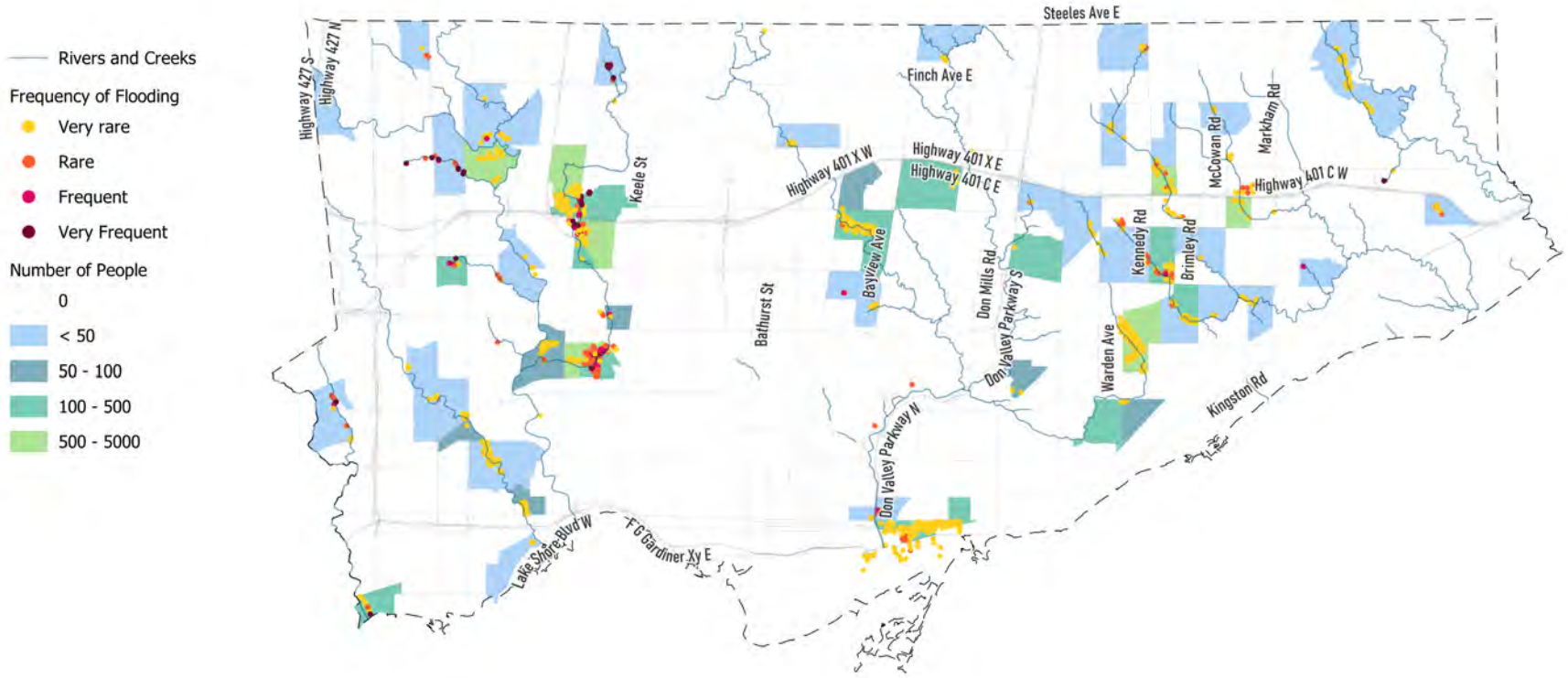
Disruption and Isolation

Flooding, winter storms and high winds create road closures and hazardous travel conditions, worsening congestion across Toronto's transportation network and disrupting mobility for everyone. Residents experiencing unstable housing are highly vulnerable to extreme precipitation events, particularly those living in ravine encampments where sudden storms can destroy belongings and cause severe disruption. Beyond their threats to personal safety and the economic costs they incur, these events isolate residents, affect mental health and cut off access to critical services, especially for those who are medically dependent. Missed appointments, delayed emergency response and disrupted caregiving can quickly become life-threatening. Figure 12 highlights vulnerable populations (identified by age, income or knowledge of an official language) facing disproportionate riverine flood risk.[25]

Major winter snow fall in Toronto's Beaches neighborhood. Photo by Michael Connor Photo/stock.adobe.com

25 Flooding that occurs when a river, stream or creek exceeds its channel capacity and overflows onto the adjoining floodplain, typically after prolonged or heavy upstream rain or snowmelt.

Figure 12. Populations facing disproportionate riverine flood risk (due to age, income, or knowledge of an official language), current.[26]



26 Population impact estimated by SSG based on TRCA riverine flood modelling data. The mapping data underlying the models was current at the time of analysis. Recognizing that projects and associated construction in the Portlands area are ongoing at this time, the flood risk in this area is expected to continue to evolve.

Although climate data under a medium emissions scenario do not project a significant increase in the likelihood of winter storms or high-wind events, they do show a marked rise in the frequency and severity of storm events overall. This will mean more frequent flooding and greater disruption across the city, putting increasing strain on measures designed to keep residents safe.

Potential Action:
Pluvial Flood Data and Analysis

Pluvial flooding or urban flooding occurs when rainfall overwhelms drainage systems and pools in streets and low-lying areas, representing a significant and growing risk as extreme precipitation intensifies. Pluvial flooding could not be modelled spatially for this project, as appropriate data was not available. However, the risks associated with overland flooding in Toronto are understood to mirror those of riverine flooding and would add to the impacts already described. Pluvial flood data collection and analysis would help inform and support city divisions, agencies and corporations (DACs) in their work on capital programming (such as for transportation, public transit and green streets), emergency management and operational programs. Such work would help improve the ability of the city DACs to understand flood risk, plan appropriate remediations/mitigations and prepare for disruptions. This type of analysis can take many forms and can be completed at many degrees of complexity and granularity. It will be important for the City to assess what it needs to ensure the work proceeds efficiently and effectively.

Toronto Islands Flooded.
Photo by Muskoka/stock.adobe.com

Increased Cost of Living

Climate hazards affect affordability through acute financial shocks and chronic pressure on everyday expenses. Households face immediate costs when flooding, winter storms or high winds damage property, creating financial strain, emergencies and rising insurance premiums. These pressures are compounded by rising housing costs, as above-guideline rent increases and second mortgages are often taken on to cover repairs and retrofits.

Local industries and businesses face mounting climate pressures that ripple through the economy. On extreme heat days, outdoor workers' productivity can fall by as much as 60 per cent.[27] Risks due to heat-related illnesses can force work stoppages, directly reducing worker incomes and adding financial strain. At the same time, project delays and added safety measures drive up construction costs, further inflating home prices in an already challenging housing market. With Toronto needing to build 285,000 homes by 2031,[28] climate impacts on construction threaten to deepen the housing crisis.

Climate change is driving up food costs, a trend that will intensify as impacts worsen. Toronto imports most of its food from outside the Greater Golden Horseshoe,[29] so it is highly vulnerable to climate impacts on agriculture across regional, national and global supply chains. Droughts, floods and other extreme weather in food-producing regions quickly translate into higher grocery prices for Toronto residents.

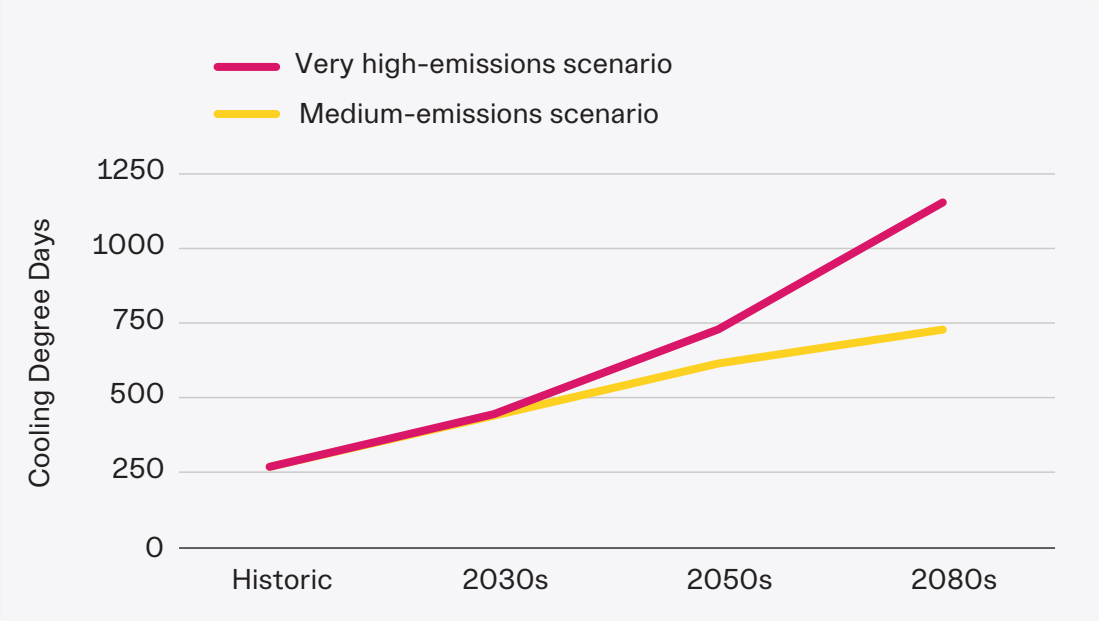
27 Han, S., Dong, L., Weng, Y., & Xiang, J. (2024). Heat exposure and productivity loss among construction workers: A meta-analysis. BMC Public Health, 24, Article 3252. https://doi.org/10.1186/s12889-024-20744-x

28 City of Toronto, "Toronto City Council Approves Housing Pledge to Facilitate 285,000 New Homes by 2031," News Release, May 10, 2023, City of Toronto, accessed August 17, 2025.

29 City of Toronto. (2018). Resilient food systems, resilient cities: A vulnerability assessment of Toronto's food system. https://www.toronto.ca/legdocs/mmis/2018/hl/bgrd/backgroundfile-118076.pdf

While heating costs are projected to decrease, summer cooling demands will surge. With cooling degree days[30] projected to more than double by 2050 under a medium emissions scenario[31] (Figure 13), many low-income households face untenable choices, either enduring dangerous indoor heat or cutting essentials like food and medication to pay for housing and utilities. Rising demand for cooling and higher summer bills will deepen these harms.

Figure 13. Cooling Degree Days projection, medium emissions and very high emissions scenario[30].



Potential Action:
Integrated Network of Climate Resilience Hubs

Community infrastructure will play a growing role in supporting residents during financial and health shocks. Toronto has piloted the Keele Community Hub, a resilience hub equipped with cooling, backup power and essential services during extreme weather. Expanding this into a citywide network would ensure residents — particularly those with fewer resources — have safe, reliable places to turn when disruptions occur. Hubs could also enhance food security through refrigerated storage, meal programs and emergency distribution.

30 Cooling degree days (CDDs) give an indication of the amount of space cooling (i.e., air conditioning) that may be required to maintain comfortable conditions in a building during warmer months. When the daily average temperature is hotter than the threshold temperature, CDDs are accumulated. Threshold values may vary, but 18 °C is commonly used in Canada. Larger CDD values indicate a greater need for air conditioning.

31 S. Lam, S. Demirbas Caglayan, M. Mahya, and Y. David, Toronto's Current and Future Climate (Toronto: Toronto and Region Conservation Authority [TRCA], 2024), prepared for the City of Toronto.

Infrastructure

The Importance of a Reliable Power Grid

The electricity system underpins every aspect of modern urban life, making power grid vulnerabilities consequential. Like many municipalities, Toronto faces multiple climate hazards that can strain grid capacity and reliability. When daily highs exceed 40 °C or daily averages top 30 C, demand spikes, while transformers and lines lose efficiency. Wind, ice and freezing rain also threaten overhead systems: gusts >90 km/h can exceed design limits; ~15 mm of ice accumulation can bring down tree limbs onto lines and ≥25 mm can compromise structures.[32]

For example, in September 2017, a faulty transformer caught fire during a heat wave, cutting power to more than 1,000 East York customers. Elevators stalled, traffic lights went dark and some outages lingered into the next day in Forest Hill despite Toronto Hydro rerouting supply that night. Failures were linked to extreme heat.[33]

Power lines in Toronto's Queen St. West neighborhood. Photo by Michael Connor Photo/stock.adobe.com

32 Toronto Hydro-Electric System Limited, Climate Change Vulnerability Assessment (Ottawa: Natural Resources Canada, 2015), https://natural-resources.canada.ca/sites/nrcan/files/energy/energy-resources/Toronto_Hyrdo-Electric_System_Limited-Climate-Change-Vulnerability-Assessment.pdf.

33 Ahmed-Zaki Hagar, "Thousands in East York without power during heat wave," The Toronto Observer, September 28, 2017, https://torontoobserver.ca/2017/09/28/thousands-in-east-york-without-power-during-heat-wave/ (accessed August 28, 2025).

As temperatures rise and heat waves become more frequent, Torontonians will depend more on air conditioning and fans to stay safe indoors. This reliance becomes a serious vulnerability when the power grid fails. Outages during heat events can quickly turn air-conditioned homes into heat traps, cutting off cooling when it is needed most. Prolonged blackouts can also trigger cascading failures, undermining shelters, designated cool spaces and emergency services.[34]

Toronto Hydro conducted a system-wide vulnerability assessment in 2015, identifying these extreme weather-related system vulnerabilities that require planning. In 2022, this study was updated to identify whether any further work was required to update its adaptation measures. Under its 2025-2029 investment plan, Toronto Hydro plans to spend more than $5 billion to expand, modernize and sustain the local electricity grid to serve the current and future electricity needs of Toronto's homes and businesses.

The City of Toronto is improving resilience to power outages during heat waves through the Toronto Green Standard (TGS), which requires new buildings to meet higher energy performance levels. High-performance building envelopes slow the rate at which outdoor heat enters or leaks from homes and businesses, providing a critical buffer of hours to days before indoor temperatures reach dangerous levels when cooling systems are offline.

Today, nearly 96 per cent of new residential buildings meet TGS requirements, strengthening resilience while also cutting greenhouse gas emissions and reducing demand on the grid.[35] However, challenges remain for the large portion of existing buildings that were constructed prior to TGS implementation.

Potential Action:
Prioritized Grid Resilience Improvements

Engage with Toronto Hydro to prioritize neighbourhoods for grid resilience improvements and inform Toronto Hydro of any planned demand increases to support capacity investment planning and demand response programming.

34 Independent Electricity System Operator (IESO). (2024, October). Electricity demand in Ontario to grow by 75 per cent by 2050. Retrieved from https://www.ieso.ca/Corporate-IESO/Media/News-Releases/2024/10/Electricity-Demand-in-Ontario-to-Grow-by-75-per-cent-by-2050

35 Isaac Callan, "Court Battle with City of Toronto Could Undermine Building Standards Meant to Make Homes More Resilient to Climate Change, Sustainable," The Pointer, January 25, 2025, https://thepointer.com/article/2025-01-25/court-battle-with-city-of-toronto-could-undermine-building-standards-meant-to-make-homes-more-resilient-to-climate-change-sustainable

Disrupted Mobility

Mobility is foundational to the functioning of a city, as it supports economic activity, access to services, social connections and overall quality of life. Toronto has an extensive road network that includes 5,600 km of roads; 900 bridges and culverts; 7,400 km of sidewalks; and 817 km of bikeways.[36] Worsening congestion and aging infrastructure make Toronto vulnerable to disruption from climate hazards.[37]

Road infrastructure faces multiple climate threats, with flooding among the most frequent and disruptive. In July 2024, nearly 100 mm of rain fell on Toronto within a few hours, overwhelming stormwater systems and exposing the vulnerability of the city's transportation network.[38]

July 2024 storm:

- **Major roads:** The Don Valley Parkway and other key corridors were submerged, stranding vehicles and closing routes for hours.
- **Transit service:** Network-wide disruptions, including flooding at 15 of 23 affected subway stations and trains bypassing Union; streetcars delayed and rerouted at recurring low points; and buses facing diversions with 75 shuttles deployed.[39] GO rail also saw delays and rerouting as key corridors flooded.
- **Traffic management:** Power outages knocked out traffic signals across the city, intensifying congestion and slowing both personal vehicles and buses.
- **Air travel:** The pedestrian tunnel to Billy Bishop Airport flooded, disrupting airport access and causing flight delays and cancellations.

36 City of Toronto. (2025). State of Good Repair Backlog and Funding Challenges. Retrieved from https://www.toronto.ca/legdocs/mmis/2025/bu/bgrd/backgroundfile-251986.pdf

37 The Globe and Mail. (2024). Toronto Traffic Getting Worse: A Growing Crisis. Retrieved from https://www.theglobeandmail.com/canada/article-toronto-traffic-getting-worse/

38 Reuters, "Torrential Rains Flood Toronto, Causing Power Outages, Traffic Disruption," Reuters, July 16, 2024, https://www.reuters.com/world/americas/torrential-rains-flood-toronto-causing-power-outages-traffic-disruption-2024-07-16

39 Toronto Transit Commission, "Extreme Precipitation Planning," report to the TTC Board, April 16, 2025, Background File 254424, https://www.toronto.ca/legdocs/mmis/2025/ttc/bgrd/backgroundfile-254424.pdf

Extreme heat already damages road infrastructure by softening and buckling asphalt, creating hazardous conditions and traffic delays. These impacts will intensify as extreme heat days increase, and maintenance crews repairing the damage will face greater exposure to dangerous temperatures.

Toronto has made significant progress on cycling infrastructure in recent years, improving overall mobility while providing co-benefits that address climate-related risks. Since 2016, the City has added more than 160 km of new bikeways, expanding the network by 22 per cent. In 2024, Bike Share Toronto recorded 6.9 million trips — more than double the 2020 total and a new record for annual ridership.[40]

Increasing bike ridership strengthens resilience in multiple ways. It reduces pressure on road infrastructure by lowering car volumes, eases congestion by encouraging shorter local trips and provides redundancy when other transportation modes are disrupted. Cycling also cuts greenhouse gas emissions, reduces air pollution and offers residents a low-cost transportation option as affordability concerns rise.

Potential Action:

Targeted Flood Remediation on Vulnerable Roadways

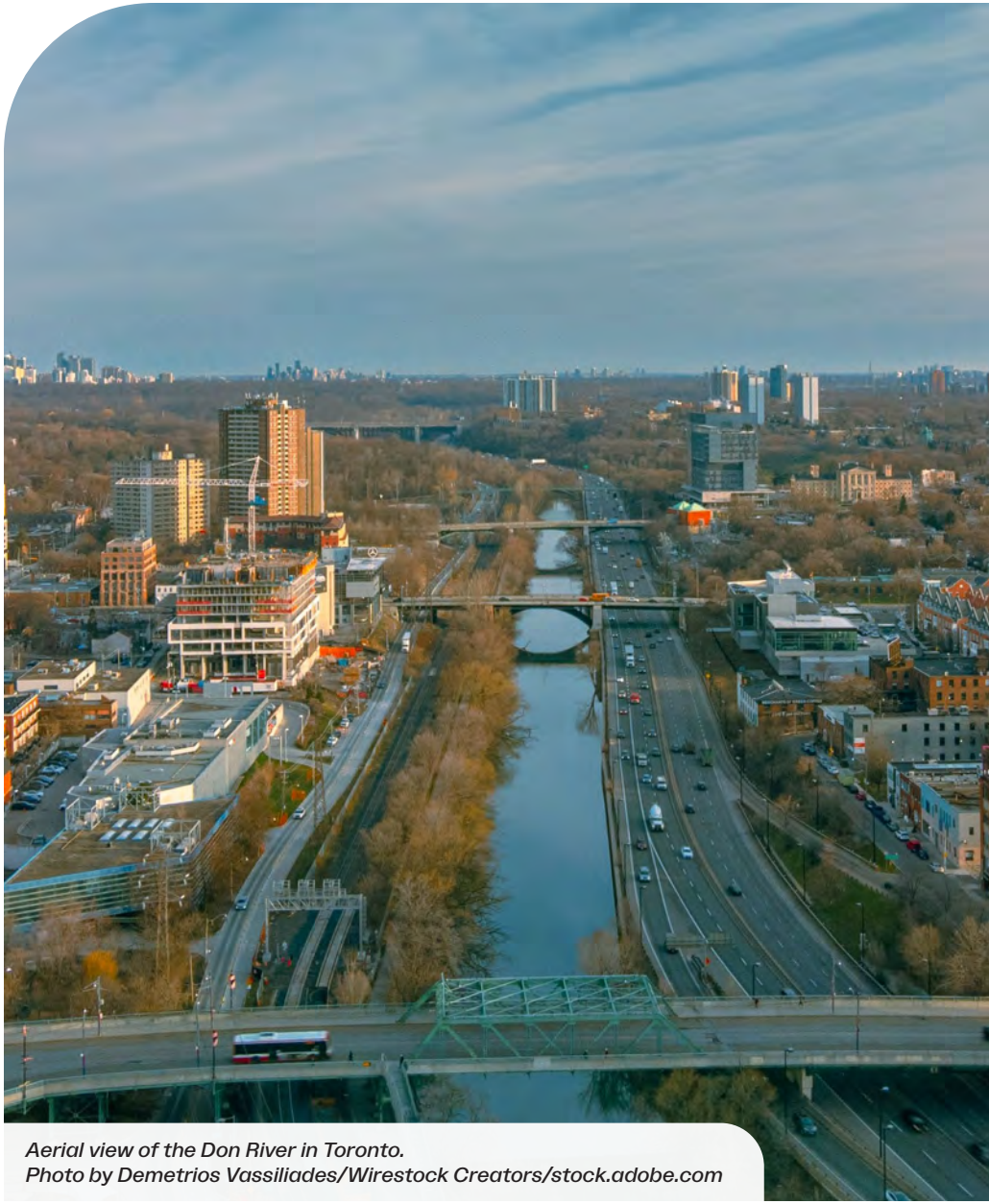
Prioritizing key corridors and their flood risk preparedness would ensure critical transportation remains operational during intense storms. Depending on the assessment of priority areas, solutions may involve upgrading infrastructure such as catchbasins, culverts, bridges and embankments or installing green infrastructure such as additional street trees or permeable pavement to absorb water; creating bioswales that capture runoff, re-routing waterflows to prevent flooding/ponding; and building underground storage tanks to hold excess stormwater. Strategic interventions on priority roadway segments would prevent or reduce street flooding that could disrupt or strand residents and delay emergency and public transit vehicles.

40 City of Toronto. 2024 Toronto Cycling Year in Review. April 2025. https://www.toronto.ca/wp-content/uploads/2025/04/9599-2024-Toronto-Cycling-Year-in-Review-FINAL.pdf.

Flooded Buildings

Toronto has approximately 500,000 buildings covering more than 150 million square metres. Over half of these buildings were built before 1960, and many lack modern insulation, ventilation and flood protection, leaving them especially vulnerable to climate hazards such as heat stress, water damage and structural deterioration. The July 15-16, 2024, floods caused over $940 million in insured damages in Toronto and Southern Ontario,[41] with water infiltration destroying basement apartments, damaging commercial inventory and knocking out critical mechanical systems.

Figure 14 shows the annual average loss (AAL)[42] for buildings across the city, including structural damage, ruined contents such as furniture and electronics and disruptions from business closures and residential evacuations. Fewer than 1 per cent of residential, commercial and industrial buildings are in riverine flood-prone areas, underscoring that riverine flooding is highly location specific and that targeted action in a few key areas could eliminate much of the risk. Average annualized damages from riverine flooding are estimated at $20 million under current climate conditions, rising to $36 million in a future climate with increased rainfall.

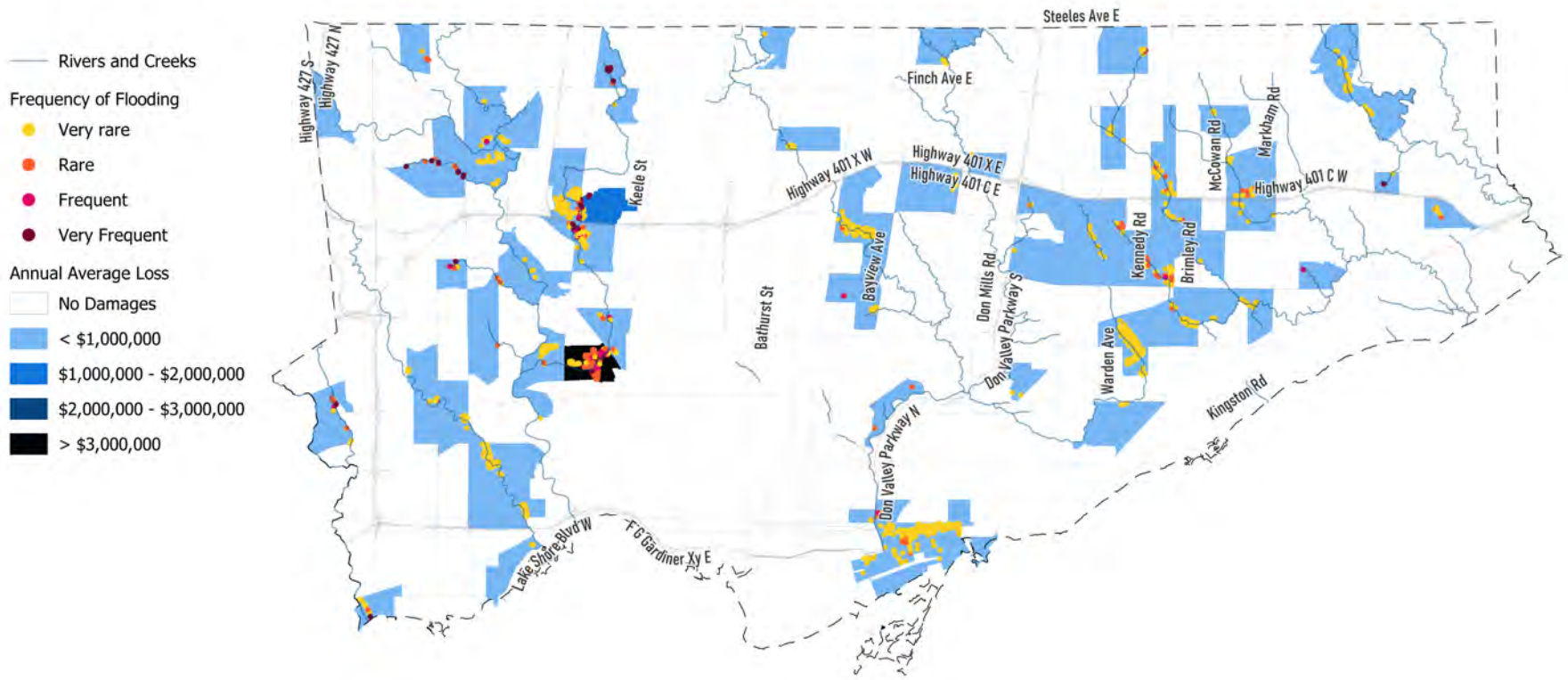


Aerial view of the Don River in Toronto.
Photo by Demetrios Vassiliades/Wirestock Creators/stock.adobe.com

41 Insurance Bureau of Canada, "July Flash Floods in Toronto and Southern Ontario Caused over $940 Million in Insured Damage," August 19, 2024, https://www.ibc.ca/news-insights/news/july-flash-floods-in-toronto-and-southern-ontario-caused-over-940-million-in-insured-damage.

42 Average Annualized Loss (AAL) is a risk metric, widely used in insurance and disaster management, that estimates the average yearly financial losses from unpredictable hazards like floods, wildfires and earthquakes by combining the full range of possible events, from frequent minor ones to rare catastrophic ones, into a single annualized value.

Figure 14. Current average yearly losses for riverine flooding across Toronto.[43,44]



43 Average yearly losses estimated by SSG based on TRCA riverine flood modelling data.

44 Hydraulic modelling return periods were grouped into four categories, based on how often a person with an average lifespan of 85 years might experience a flood of that magnitude: Nuisance (often), Frequent (several times), Rare (once or twice), Very Rare (once or never).

Toronto has largely limited riverine flood risk to existing buildings by directing new development outside floodplains. The City and TRCA work together to implement the provincial natural hazard framework: under the Conservation Authorities Act and Ontario Regulation 41/24, TRCA maps natural hazards and sensitive features, while the City uses its planning tools to guide development. These maps show where special permits are needed, helping ensure buildings and infrastructure are not placed in flood-prone or environmentally sensitive areas.

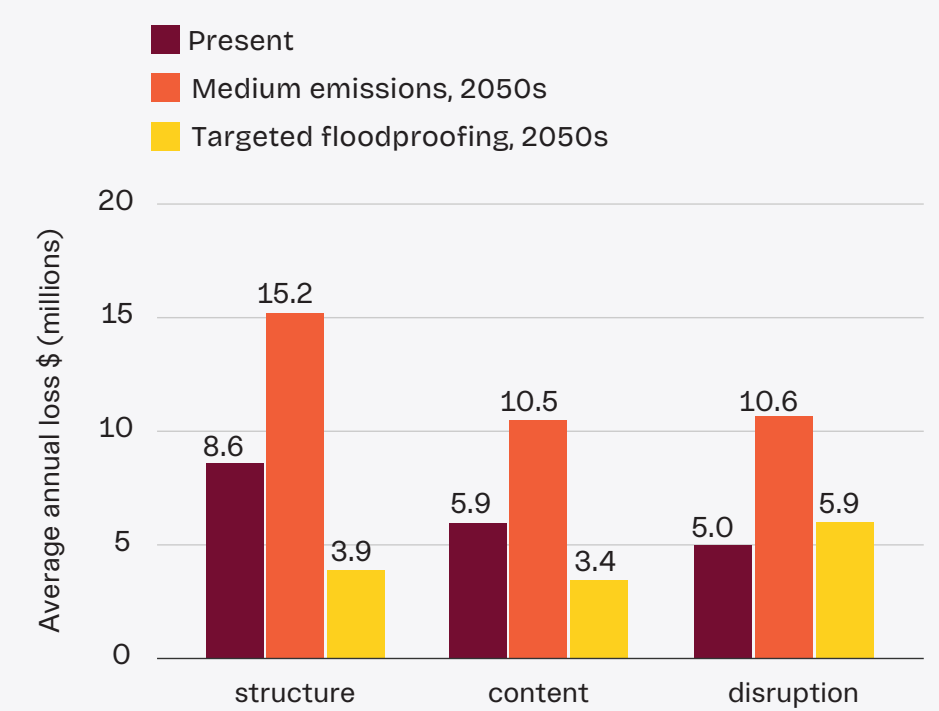
Since these rules were introduced, thousands of buildings across Toronto and the surrounding region have been constructed outside high-risk flood zones, potentially avoiding billions of dollars in damages. Unlike major flood disasters where destruction is visible and widely reported, the success of this regulation is largely invisible: entire neighbourhoods were never built in harm's way. Avoided damages are seldom recognized, yet this regulation stands as one of the most effective and enduring risk-reduction strategies in the city's history.

Kensington Market neighbourhood in Toronto. Photo by Yehoshua Halevi/stock.adobe.com

Potential Action:
Expand Education Campaigns for Flood-Proofing

Many property owners are unaware of the flood risk at their location, and those who are aware often find flood-proofing difficult to navigate. Targeted education and outreach in neighbourhoods with the highest losses would help owners take practical steps to reduce damage and disruption during floods. Figure 15 compares estimated Average Annual Loss (AAL) under current conditions with a future scenario that includes targeted flood-proofing. Applying measures to just 10 per cent of buildings with the highest riverine flood damages reduces total losses by more than 30 per cent, demonstrating that much of Toronto's riverine flood risk is concentrated in a relatively small number of properties.[47]

Figure 15. Average annual loss[48] from riverine flooding under current conditions and under a medium emissions scenario in the 2050s, shown with and without targeted flood-proofing measures.



47 While overland flooding losses could not be calculated, they would add to the totals shown for riverine flooding, and education could also be extended to areas outside the riverine flood plains based on historical flooding data.

48 Average annual losses estimated by SSG based on TRCA riverine flood modelling data.

Municipal Services

Shelter Demand Surges

Toronto's shelter system already faces high baseline demand, and climate change will intensify this pressure. Heat waves, severe storms and winter extremes trigger sudden surges as people seek relief from dangerous conditions. Although the number of very cold days is projected to decline, reducing some winter demand, rising summer temperatures will increase shelter needs and strain the ability to keep clients and staff safe and cool. At the same time, homelessness has nearly doubled, from about 7,300 people in April 2021 to 15,400 in fall 2024, further increasing demand on the system.[49]

The City is expanding shelter capacity for people experiencing homelessness and improving data to plan ahead. Since 2021, Toronto has increased shelter capacity by 60 per cent and provides more beds per capita than any other Canadian city. Up to 20 new smaller, purpose-built sites are planned between 2024 and 2033, adding an estimated 1,600 permanent spaces.[50]

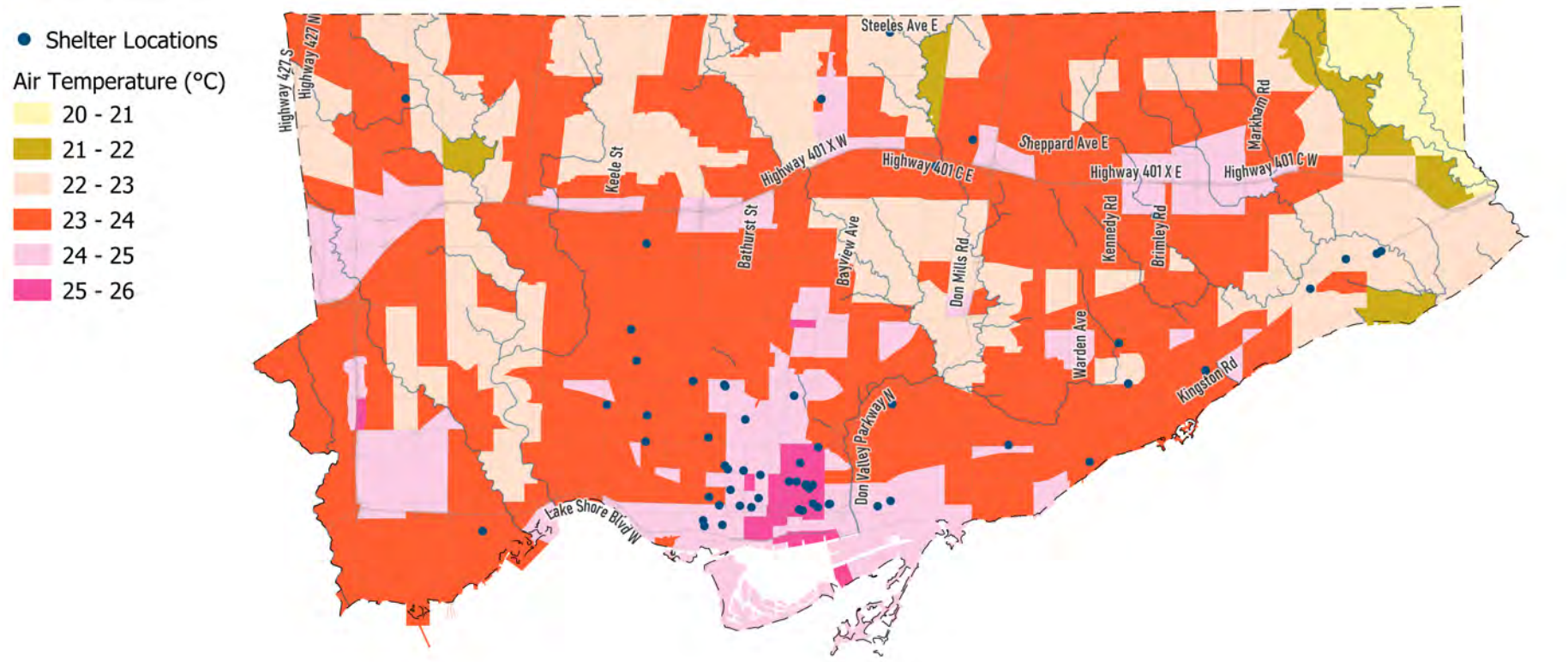
Figure 16 maps shelter locations against the urban heat island index. Most shelters are located in high urban heat island (UHI) areas, exposing facilities to elevated thermal stress. Clients and staff must travel and queue in hotter microclimates, and any grid or HVAC failure can quickly push indoor temperatures beyond safe thresholds. During demand surges, lineups have formed outside sites in some of the city's hottest areas. In 2023, for example, asylum seekers camped for days outside 129 Peter Street when a significant increase in newcomers coincided with limited capacity.[51]

49 City of Toronto, "City of Toronto releases findings of 2024 Street Needs Assessment homelessness survey," News release, July 7, 2025, accessed August 30, 2025, https://www.toronto.ca/news/city-of-toronto-releases-findings-of-2024-street-needs-assessment-homelessness-survey/.

50 City of Toronto. Shelter, Support and Housing Administration Report. EC Committee Background File, 2025. https://www.toronto.ca/legdocs/mmis/2025/ec/bgrd/backgroundfile-257203.pdf

51 Michael Ranger, "'It's an emergency': Officials meet to address refugees stuck sleeping on downtown sidewalk," CityNews, July 14, 2023, accessed August 30, 2025, https://toronto.citynews.ca/2023/07/14/toronto-refugees-shelter-asylum-seekers-peter-street/.

Figure 16. Shelter locations and estimated overnight temperatures during high-heat periods.[52]



52 Shelter locations on the map include both City-operated and non-City-operated facilities.

Potential Action:

Invest in and Embed Climate Risk Into Shelter Operations and Surge Capacity Plans for People Experiencing Homelessness[54]

More frequent and severe heat waves and intense precipitation will increase baseline shelter demand by people experiencing homelessness and create larger, more frequent peak surges. The City should further invest in and embed climate risk into shelter operations and surge planning by defining triggers, overflow sites and staffing needs. A planned approach will shorten activation time, reduce turnaways and better protect unhoused residents during extreme weather events.

Tents used as emergency shelter in downtown Toronto. Photo by Elton/stock.adobe.com

54 Shelters in this context refer to Toronto Shelter and Support Services (TSSS) supported shelters for people experiencing homelessness, not Emergency Reception Centres.

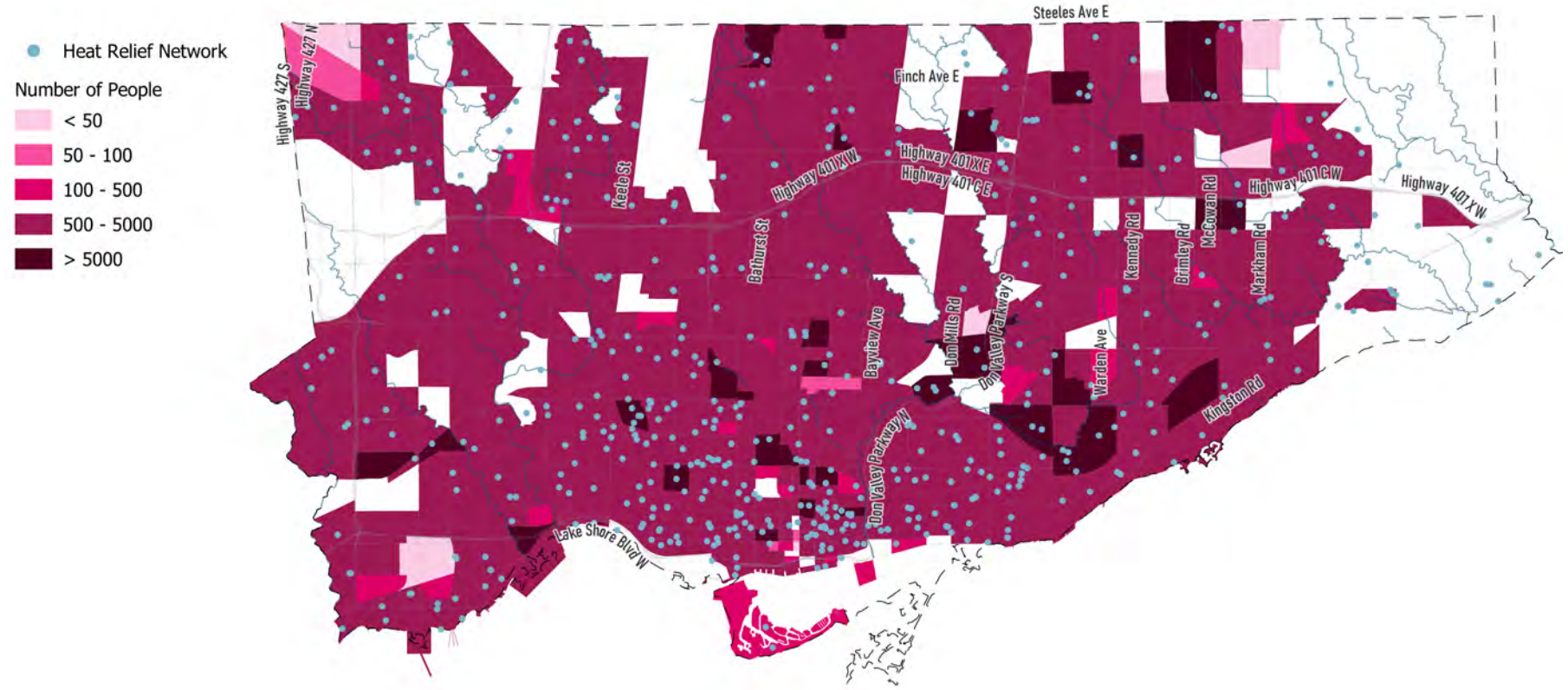
Growing Demand for Cool Spaces

Rising temperatures will increase demand for the City's Heat Relief Network, a collection of more than 500 publicly accessible facilities that provide air conditioning, respite from heat and other forms of cooling. The network operates throughout the summer, including days when no official heat warning has been issued by Environment and Climate Change Canada (ECCC). Cool spaces include public libraries, civic centres, community centres, swimming pools, splash and play pads, wading pools, drop-in centres, malls and YMCA facilities.

Figure 17 maps Heat Relief Network locations against populations facing disproportionate heat risk, based on age and income, in areas where nighttime temperatures exceed 24 °C during a 1-in-10-year heat event in the 2050s under a medium emissions scenario. The number of residents at high risk is projected to rise sharply, from 180,000 today to 1.3 million, and to spread across the city. While the network already covers most higher-risk areas, it will face growing demand as extreme heat becomes more frequent and severe, making continued expansion, targeted siting and service improvements essential.

Water play areas in Toronto.
Photo by Sam D'Cruz/stock.adobe.com

Figure 17. Current Heat Relief Network cooling locations and populations facing disproportionate heat risk (due to age and income) in areas with nighttime temperatures over 24 °C during a 10-year heat event in the 2050s, medium emissions scenario.



Potential Action:

Strengthen and Expand the Heat Relief Network

As the Heat Relief Strategy is reviewed each year, the City can expand and refine Heat Relief Network locations, prioritizing sites accessible to populations at higher risk. These include neighbourhoods with intense urban heat islands, limited tree canopy, aging high-rise buildings and higher proportions of seniors, low-income households or residents experiencing homelessness. Extended hours, reliable cooling equipment and clear wayfinding will be essential. Partnerships with community organizations, libraries and shelters for people experiencing homelessness can further strengthen outreach and ensure residents know where to go before and during heat events.

Aerial view of Toronto's Chinatown. Photo by 4kclips/stock.adobe.com

Municipal Workers on the Front Lines

Toronto's emergency responders face sharp surges in demand during climate extremes. For example, heat waves drive spikes in EMS calls related to heat illness, cardiovascular emergencies and mental health crises occurring at the same time.[55,56] During extreme precipitation events, emergency services are quickly overwhelmed by water rescues, flooded building evacuations and traffic incidents. In July 2024, Toronto Fire Services responded to nearly 1,700 calls during a record-breaking rainfall, straining the city's emergency response capacity.[57]

The City's 6,000 outdoor workers[58] face direct exposure to climate hazards, yet demand for their services spikes when conditions are most dangerous. They clear storm debris, investigate and address storm-damaged trees, repair flood damage, conduct street outreach and maintain cool spaces. Toronto Hydro workers also mobilize during emergencies to remove hazardous limbs, clear streets and restore power. A single extreme weather event can trigger weeks of cleanup and repair, displacing staff from their regular duties.

55 Timothy J. Dolney and Scott C. Sheridan, "The Relationship between Extreme Heat and Ambulance Response Calls for the City of Toronto, Ontario, Canada," Environmental Research 101, no. 1 (May 2006): 94–103, https://doi.org/10.1016/j.envres.2005.08.008. Accessed August 30, 2025.

56 Xiang Wang, Eric Lavigne, Hélène Ouellette-Kuntz, and Bingshu E. Chen, "Acute Impacts of Extreme Temperature Exposure on Emergency Room Admissions Related to Mental and Behavior Disorders in Toronto, Canada," Journal of Affective Disorders 155 (February 2014): 154–61, https://doi.org/10.1016/j.jad.2013.10.042. Accessed August 30, 2025.

57 Canadian Firefighter. (2024). Toronto Fire Service processed nearly 1,700 calls in response to daily rain record. https://www.cdnfirefighter.com/toronto-fire-service-processed-nearly-1700-calls-in-response-to-daily-rain-record/

58 CUPE. (2024). City of Toronto outside workers ratify new contract. https://cupe.ca/city-toronto-outside-workers-ratify-new-contract

Emergency Management and Business Continuity for the City

The City is required under statute to have an emergency management program in place, including an emergency plan. The City's Emergency Response Plan sets out how the City coordinates its response across city divisions, agencies and corporations; limits the consequences of disruption; and streamlines how information is analyzed and shared to inform decision-making.

The City's corporate Business Continuity Management program ensures that a level of planning is in place across all city divisions to continue or resume the City's critical services within reasonable timeframes in the event of disruption, including severe weather. A rise in severe and volatile weather, from precipitation and flooding to heat and high winds, will place increasing demands on these programs.

Potential Action:

Municipal Building Portfolio Overheating Screening and Prioritization

The City can assess and rank municipal buildings in its corporate asset portfolio by risk of overheating, performance and occupant needs to guide upgrades that strengthen resilience to extreme heat. Priority should be given to critical facilities such as fire halls, EMS stations, and civic and community centres (that often serve as sites for heat stress refuge), and shelters for people experiencing homelessness to ensure they remain safe and functional during climate extremes. Targeted upgrades will reduce service disruptions, protect staff health and maintain continuity of emergency response when demand is greatest.

Natural Environment

Damage and Loss of Natural Systems

Climate events place significant stress on Toronto's natural systems, including urban trees and forests, parks and green spaces, ravines, wetlands and other forms of green infrastructure. This results in the degradation of these features and the loss of the ecological services they provide.

Toronto's urban forest is valued at over $7 billion and provides $55 million in annual ecosystem services.[59] The City plans to expand the canopy cover from an estimated 31 per cent (based on the 2018 Tree Canopy Study) to 40 per cent by 2050, but extreme weather poses a serious threat to this goal. For example, the 2013 ice storm wiped out decades of growth in a single night, leaving Toronto's trees badly damaged, with widespread limb and whole tree failures across the city.[60] High winds can uproot or snap mature trees, creating safety hazards and costly cleanup. Prolonged heat waves and drought weaken trees, leaving them more vulnerable to storm damage, wind, pests and disease. Together, these hazards threaten canopy growth targets and the long-term health and resilience of Toronto's urban forest.

Toronto's skyline from Don Valley Brick Works Park. Photo by Aitor/stock.adobe.com

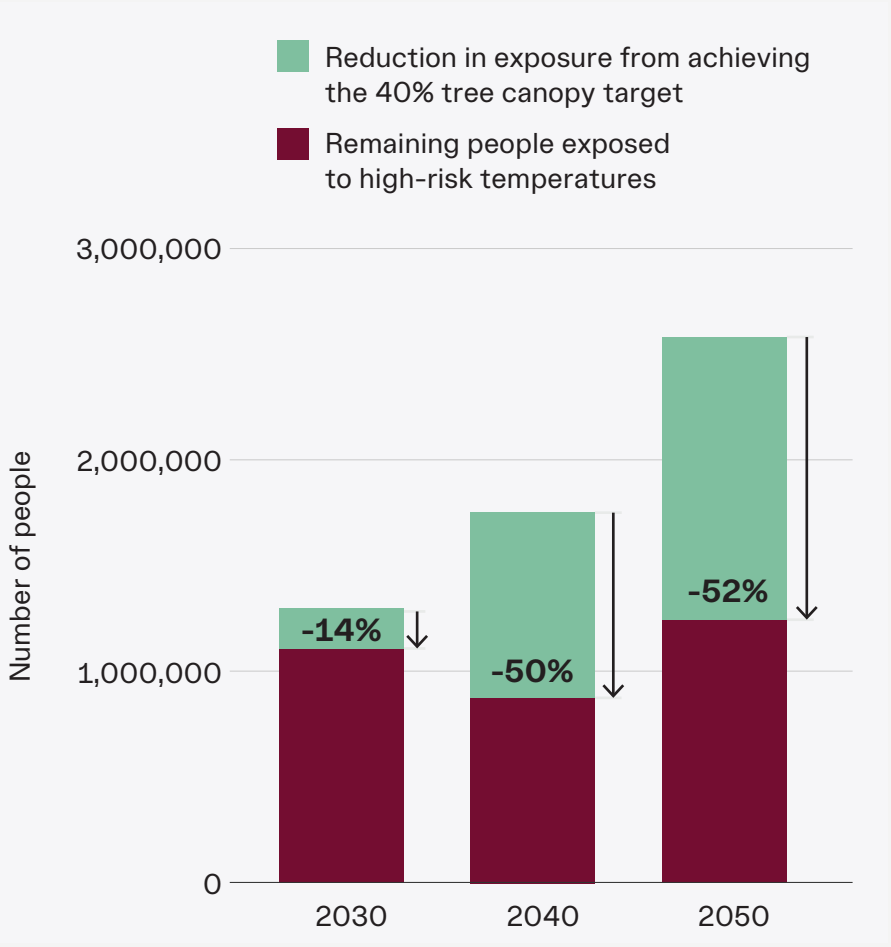
59 City of Toronto. 2018 .2018 Tree Canopy Study- Technical Report. Attachment 2. https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-173563.pdf (Full Tree Canopy Study: City of Toronto (Revised October 2021).

60 City of Toronto. December 2013 Ice Storm: Impacts, Responses and Opportunities. Staff Report to Government Management Committee, 2014. https://www.toronto.ca/legdocs/mmis/2014/gm/bgrd/backgroundfile-71426.pdf

The consequences of natural system loss cascade through the city. Fewer trees, green spaces and permeable surfaces mean less cooling in heat-vulnerable neighbourhoods, reduced stormwater absorption in flood-prone areas, poorer air quality, diminished wildlife habitat and reduced biodiversity. Green spaces such as ravines face similar pressures: extreme heat kills vegetation and intense rain causes erosion, undermining their resilience and limiting the benefits they provide to residents during climate extremes. Urban development and impermeable surfaces further constrain opportunities to expand trees and green spaces, and these pressures are especially acute in equity-seeking neighbourhoods.

Protecting and expanding the urban tree canopy and green spaces can significantly reduce heat risk. Figure 18 shows the potential cooling benefits of new trees as the City moves toward its 40 per cent canopy target, which will require planting and protecting trees. The cooling effect was modelled across 650 areas of the city to 2050.[61] Achieving this target could cut population exposure to high-risk outdoor temperatures by half, keeping future heat exposure at levels similar to today despite projected increases in temperature. This could substantially reduce the risk of heat-related illness, death and disruption in a future with more frequent and severe heat events. Expanding the canopy would also provide co-benefits including reduced energy costs, improved health, reduced stormwater runoff, increased carbon sequestration and enhanced well-being.

Figure 18. Potential reduction in the number of people exposed to high-risk temperatures from tree-canopy-related actions during an extreme heat event under a medium emissions scenario. The relative (%) reduction compared to a scenario where no action is taken is shown for reference.



61 Tree canopy increase was allocated geographically based on current canopy from land cover data (uniform increase across the city).

Potential Action:

Strengthened Natural Asset Management Program

Strengthening existing natural asset management programs would treat green infrastructure and stream corridors as essential city infrastructure. The program would bolster the importance of planning for natural assets, including Toronto's ravines, wetlands, and urban forest; building on work done to date; and integrating the value of natural assets into asset management and capital budgeting. Dedicated funding combined with an increased recognition in grey infrastructure planning would enhance and increase green infrastructure assets to match its critical role in climate resilience.

A Beautiful Day in High Park, Toronto. Photo by Emmanuel/stock.adobe.com

Invasive Species on the Rise

Climate change is accelerating the spread of invasive species across Toronto's natural areas, threatening biodiversity and ecosystem resilience. Warming temperatures and extended growing seasons give invasive species crucial advantages.

TRCA identifies and works with the City of Toronto to manage key invasive species of concern threatening Toronto: European buckthorn, dog-strangling vine, garlic mustard, wild parsnip, Japanese knotweed, and phragmites among plants; emerald ash borer; and pathogens of concern such as oak wilt.[62] These species are increasingly able to thrive and outcompete native plants as a warming climate lengthens the growing season and warmer winters reduce typical die-off mortality.

When extreme weather damages native plant communities through drought, flooding or storms, invasive species quickly colonize disturbed areas. Their aggressive growth prevents native species from re-establishing and can permanently alter ecosystem composition. Invasive non-native forest pests (both insects and diseases) have the potential to cause significant damage to the natural environment and the economy, subsequently causing indirect harm to human health.[63]

European buckthorn, an invasive plant in Canada. Photo by Denny/stock.adobe.com

Potential Action:

Funding the Monitoring of Natural Area Management

Expanding monitoring for natural area management and emerging pests and pathogens would provide early warning of threats to Toronto's natural systems. This could include regular surveys at sentinel sites, tracking species moving northward and encouraging citizen reporting of unusual damage. Early detection enables rapid response before populations become established, helping to prevent the next emerald-ash-borer–scale disaster.

62 Toronto and Region Conservation Authority (TRCA). "Invasive Species - Toronto and Region Conservation Authority (TRCA)," May 17, 2024. https://trca.ca/conservation/environmental-monitoring/invasive-species/.

63 City of Toronto. Sustaining and Expanding the Urban Forest: Toronto's Strategic Forest Management Plan. 2013. https://www.toronto.ca/wp-content/uploads/2017/11/9969-forest-healthcare-plan.pdf

What's Next?

This assessment evaluated hundreds of climate-related impacts and identified Toronto's priority risk themes, along with key potential actions for each. The **Potential Actions Table** following this section presents over 60 options for the City to consider as it adapts to climate-related risks. These actions are not yet funded, and they are not prescriptive; rather, they offer a menu of recommendations to address the City's highest-priority risks and should be further assessed for feasibility, cost, timing and opportunities for coordinated implementation.

The assessment provides a holistic, high-level view of how climate risks cut across interconnected city systems. While this citywide perspective is critical, each division, agency and external partner will need to undertake more detailed analysis to understand the risks to their specific assets, programs and services.

Moving from assessment to action will require strong governance and deliberate collaboration. The City will need to maintain and strengthen relationships with a wide range of external agencies and community organizations. Building resilience cannot be achieved in silos; it must be coordinated across institutional boundaries and supported by shared data, open communication and joint planning.

A holistic picture of climate resilience requires Indigenous knowledge and leadership. Indigenous worldviews have guided stewardship of lands and waters from time immemorial, emphasizing the interconnectedness of people, lands and waters that centre reciprocity, kinship with all beings and collective prosperity. The City needs to honour this knowledge and work alongside the community to make space for Indigenous climate leadership while addressing systemic barriers that currently limit the empowerment and implementation of these perspectives and solutions. Supporting Indigenous-led climate work in Toronto through partnerships, resourcing and knowledge-sharing will be essential to building resilience that respects this place's history and responsibilities.

The next phase involves embedding resilience into how the City plans, invests, designs and delivers services. This means mainstreaming climate considerations into budgets, asset management and capital planning, while advancing near-term measures that address the highest risks. To ensure this work remains relevant as conditions evolve, the City should develop a comprehensive climate adaptation plan that builds on this risk assessment. This plan should include commitments to regular reporting and updates, clear accountabilities and resourcing for short-, medium-, and long-term actions. By coordinating across divisions and with external partners and authorities, Toronto can ensure adaptation actions are cost-effective, equitable and designed to protect residents, infrastructure and ecosystems in a rapidly changing climate.

Potential Actions Table

The following table lists potential actions for the City to consider as it adapts to climate-related risks. Actions are organized into overarching categories: one for system-level actions and others for the hazards they address.
A preliminary prioritization was based on the risk level of the underlying hazard and the extent to which the action reduces that risk. As a next step, the City can build on this categorization and prioritization by adding considerations such as required resources, divisional responsibility and timelines for completion, and revising the prioritization accordingly.

The following details are provided for each potential action:

- **Action Category:** Coordination and Convening; Data, Monitoring, Evaluation and Research; Community Education; Outreach and Equity; Policy and Regulation.
- **System Category:** Population and Local Economy, Municipal Services, Infrastructure Systems, Natural Environment.
- **Climate Hazard Addressed:** Indicates which climate hazards are addressed by the initiative.
- **City Role:** Indicates whether the City would lead, collaborate on or advocate for the initiative.
- **Priority:** Indicates the importance of the action, relative to other actions, in building resilience to climate hazards (Very High, High, Medium, Low).

Toronto's Centre Island public park.
Photo by Michael Connor Photo/stock.adobe.com

System-Level Actions

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City Role	Priority
S1	Develop a comprehensive climate adaptation plan that builds on this risk assessment and includes a commitment to regular reporting and updates, with clear accountabilities and resourcing for short-, medium-, and long-term actions.	Data, monitoring, evaluation & research	All	All	Lead	**Very High**
S2	Use a resilience lens for capital projects	Coordination & convening	All	All	Lead	**Very High**
S3	Use a resilience lens for program and operating budgets	Coordination & convening	All	All	Lead	**Very High**
S4	Enhance the City's current carbon budget approach to add indicators and guidance enabling prioritization of projects based on resilience	Coordination & convening	All	All	Lead	**Very High**
S5	Appropriately resource emergency management and business continuity management citywide	Coordination & convening	All	All	Lead	**Very High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City Role	Priority
S6	Enhance City's Asset Management Program to more explicitly embed consideration of climate risk and impacts into the AM planning process and provide guidance on the treatment of green infrastructure as it relates to climate change, as part of the development of AM frameworks.	Coordination & convening	Municipal Services	All	Lead	**Very High**
S7	Strengthen the natural asset management program	Coordination & convening	Natural Environment	All	Lead	**High**
S8	Continue to explore the establishment of resilience hubs	Community education, outreach & equity	Population & Local Economy	All	Lead	**High**
S9	Embed climate risk reduction into existing community resilience processes	Community education, outreach & equity	Population & Local Economy	All	Lead	**High**
S10	Establish citywide resilience KPIs & dashboard (annual)	Data, monitoring, evaluation & research	All	All	Lead	**Medium**
S11	Establish processes to tag and track extreme weather-related expenses across departments	Data, monitoring, evaluation & research	Municipal Services	All	Lead	**Medium**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City Role	Priority
S12	Create and disseminate extreme-weather preparedness toolkits and resources for businesses, community groups, neighbourhoods and other organizations	Community education, outreach & equity	Population & Local Economy	All	Lead	**Medium**
S13	Create a rapid community-relief fund	Community education, outreach & equity	Population & Local Economy	All	Lead	**Medium**

All Hazards

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
A1	Engage with Toronto Hydro to prioritize neighbourhoods for grid resilience improvements and inform Toronto Hydro of any planned demand increases to support capacity investment planning and demand response programming	Coordination & convening	Infrastructure	All	Collaborate	**Very High**
A2	Reduce state of good repair backlog to extend pavement life, decrease the frequency of repairs and lessen environmental impacts	Coordination & convening	Infrastructure	All	Lead	**High**
A3	Collaborate with Metrolinx on an updated Climate Adaptation Plan	Coordination & convening	Infrastructure	All	Collaborate	**High**
A4	Perform capital planning to evaluate equipping additional municipal buildings with backup generators	Data, monitoring, evaluation & research	Municipal Services	All	Lead	**High**
A5	Source additional resources for protecting private trees	Coordination & convening	Natural Environment	All	Lead	**High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
A6	Evaluate the need for additional shelter capacity for people experiencing homelessness during extreme weather events	Data, monitoring, evaluation & research	Population & Local Economy	All	Lead	**High**
A7	Maintain and share up-to-date information on availability of spaces within the City's shelter system for people experiencing homelessness with all partners and the public	Data, monitoring, evaluation & research	Population & Local Economy	All	Lead	**High**
A8	Develop shelter surge capacity plans for people experiencing homelessness64	Community education, outreach & equity	Population & Local Economy	All	Lead	**High**
A9	Minimize barriers to access to encourage shelter use by people experiencing homelessness in extreme weather	Community education, outreach & equity	Population & Local Economy	All	Lead	**High**
A10	Expand selective pruning and thinning programs to reduce storm damage and power outage risks	Coordination & convening	Natural Environment	All	Lead	**High**

64 Shelters in this context refer to TSSS-supported shelters for people experiencing homelessness, not Emergency Reception Centres.

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
A11	Create and expand habitat buffers to protect the Natural Heritage system, strengthen biodiversity and reduce climate hazard risks	Policy & regulation	Natural Environment	All	Lead	**High**
A12	Increase monitoring for emerging pests and pathogens	Data, monitoring, evaluation & research	Natural Environment	All	Lead	**Medium**
A13	Explore development and implementation of consistent/ minimum standards for primary care and mental health services in shelters for people experiencing homelessness	Policy & regulation	Population & Local Economy	All	Lead	**Medium**
A14	Create and expand integration of food hubs	Coordination & convening	Population & Local Economy	All	Lead	**Medium**
A15	Support local food producers growing food in Toronto	Policy & regulation	Population & Local Economy	All	Lead	**Medium**
A16	Consistently implement increased rollout of grief and loss programming for shelter clientele	Community education, outreach & equity	Population & Local Economy	All	Lead	**Medium**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
A17	Advocate to/partner with provincial health system partners for enhanced support measures for medically dependent residents during emergencies	Coordination & convening	Population & Local Economy	All	Advocate	**Medium**
A18	Take steps to enhance mapping of encampments and high-risk locations	Data, monitoring, evaluation & research	Population & Local Economy	All	Lead	**Medium**
A19	Continue to enhance the City's coordinated response between encampment staff and TRCA Warning System	Coordination & convening	Population & Local Economy	All	Lead	**Medium**
A20	Expand partnerships with food rescue organizations and local businesses to recover near-expiring food and redistribute it	Community education, outreach & equity	Population & Local Economy	All	Collaborate	**Medium**

Extreme Heat

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
H1	Evaluate the City's coordinated heat planning to ensure it addresses immediate needs and long-term measures across multiple planning timeframes	Coordination & convening	Population & Local Economy	Extreme heat	Lead	**Very High**
H2	Continue to evolve the Heat Relief Network with a focus on neighbourhoods and populations at greater risk	Coordination & convening	Population & Local Economy	Extreme heat, Climate-related air quality	Lead	**Very High**
H3	Leverage existing spaces and programs for targeted cool spaces in addition to the public Heat Relief Network	Coordination & convening	Population & Local Economy	Extreme heat, Climate-related air quality	Lead	**Very High**
H4	Establish maximum indoor temperature policy for all leased residential dwellings	Policy & regulation	Population & Local Economy	Extreme heat	Lead	**Very High**
H5	Develop a citywide analysis to map neighbourhood green/cool surfaces baseline and recommend potential targets	Data, monitoring, evaluation & research	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**Very High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
H6	Develop strategic cooling plans for priority neighbourhoods (building on Green Streets priority areas) that coordinate, prioritize, and monitor green space expansion and green infrastructure through capital programs, incentive programs (eco-roofs, green infrastructure, depaving), land-use planning approvals, identifying and addressing barriers to achieving targets, and community engagement	Data, monitoring, evaluation & research	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**Very High**
H7	Enhance development and oversight of heat management and adaptation solutions	Coordination & convening	All	Extreme heat	Lead	**High**
H8	Promote heatwave resilience planning for City-owned and private-sector data centres	Coordination & convening	Infrastructure	Extreme heat	Collaborate	**High**
H9	Prioritize municipal building portfolio overheating screening	Data, monitoring, evaluation & research	Municipal Services	Extreme heat	Lead	**High**
H10	Expand air conditioner distribution program focused on additional heat-vulnerable populations	Community education, outreach & equity	Population & Local Economy	Extreme heat, Climate-related air quality	Lead	**High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
H11	Create a cool surfaces procurement policy – direct identification of options	Policy & regulation	Infrastructure	Extreme heat	Lead	**High**
H12	Coordinate land-use planning policy, guidelines and standards to prioritize urban heat mitigation (e.g.,. addressing barriers to tree planting through development)	Policy & regulation	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**High**
H13	Review current landscape, green roof and tree-planting requirements to determine potential impacts of extreme heat and make recommendation to adapt requirements, design and maintenance standards	Data, monitoring, evaluation & research	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**High**
H14	Develop a public realm design for heat: heat reduction strategy for high pedestrian volume areas to ensure feasibility of walking within neighbourhoods during extreme heat events	Data, monitoring, evaluation & research	Population & Local Economy	Extreme heat	Lead	**High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
H15	Develop and update public realm design standards to reduce urban heat and support climate resilience, integrating expanded green space that also contributes to lower carbon emissions	Policy & regulation	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**High**
H16	Develop an action campaign to keep backyards green/depave TO - responding to concerns that neighbourhood green space, particularly in backyards are declining both growing space for trees and landscape open space	Community education, outreach & equity	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**High**
H17	Assess the barriers to expanding green space/green infrastructure implementation and identify solutions or prioritizations in heat priority areas	Data, monitoring, evaluation & research	Population & Local Economy	Extreme heat, Extreme Precipitation	Lead	**Medium**
H18	Update transportation system assets inventory and review industry standards and specifications for any changes to temperate range limits	Data, monitoring, evaluation & research	Infrastructure	Extreme heat	Lead	**Medium**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
H19	Improve heat-related public education, outreach and engagement strategies to reach vulnerable populations	Community education, outreach & equity	Population & Local Economy	Extreme heat	Lead	**Medium**
H20	Advocate for updated provincial workplace heat-safety standards	Policy & regulation	Population & Local Economy	Extreme heat	Advocate	**Medium**
H21	Coordinate and communicate an energy-savings and retrofit building envelope improvement program	Coordination & convening	Population & Local Economy	Extreme heat, Extreme cold	Lead	**Medium**
H22	Expand or replace the heat-pump initiative to reach wider population	Coordination & convening	Population & Local Economy	Extreme heat, Extreme cold, Climate-related air quality	Lead	**Medium**
H23	Upgrade HVAC systems in schools, daycares and other facilities	Coordination & convening	Infrastructure	Heat, Extreme Cold, Climate-related air quality	Lead, Advocate	**Medium**

Extreme Precipitation

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
P1	Collect and analyze pluvial flood data (for capital programming, operations and emergency preparedness planning)	Data, monitoring, evaluation & research	All	Extreme precipitation	Lead	**Very High**
P2	Develop additional flood risk remediation and flood reduction projects to address flooding in the transportation network/at the facility level	Coordination & convening	Infrastructure	Extreme precipitation	Lead	**High**
P3	Enhance road drainage and stormwater management through targeted improvements to increase flow conveyances and install green infrastructure	Coordination & convening	Infrastructure	Extreme precipitation	Lead	**High**
P4	Proactively inspect and strengthen road infrastructure to mitigate flood risk	Data, monitoring, evaluation & research	Infrastructure	Extreme precipitation	Lead	**High**
P5	Perform building renovations to increase flood-proofing	Coordination & convening	Infrastructure	Extreme precipitation	Lead	**High**
P6	Acquire emergency backup generators for flood-prone transit stations and operations centres	Coordination & convening	Infrastructure	Extreme precipitation	Lead	**High**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
P7	Expand education campaigns for flood-proofing	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**High**
P8	Undertake or expedite retrofits and flood-proofing of existing shelter facilities for people experiencing homelessness	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**High**
P9	Incorporate existing and proposed greenspaces to enhance large-scale flow conveyance systems to address fluvial and pluvial flooding	Coordination & convening	Infrastructure	Extreme precipitation	Lead	**High**
P10	Coordinate long-term strategies to permanently relocate individuals and assets from high-flood-risk areas	Policy & regulation	Infrastructure	Extreme precipitation	Lead	**Medium**
P11	Increase education and community monitoring of standing water (risk of water-borne diseases)	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**Medium**
P12	Ensure flooding is incorporated in inclement weather planning and responses for city shelters and outreach responses	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**Medium**

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
P13	Continue to enhance the City's coordinated response between encampment staff and TRCA Warning System	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**Medium**
P14	Advocate for/partner with provincial supports and systems like the Assistive Devices Program to expand coverage/client base	Policy & regulation	Population & Local Economy	Extreme precipitation	Advocate	**Medium**
P15	Establish virtual check-ins, check-in lines, more supports to recognize and address flood-related mental health impacts (e.g. trauma)	Community education, outreach & equity	Population & Local Economy	Extreme precipitation	Lead	**Medium**
P16	Improve real-time customer communications	Coordination & convening	Population & Local Economy	Extreme precipitation	Collaborate	**Medium**
P17	Develop criteria to assess levels of service for stormwater infrastructure (e.g. sewers/ponds/ streams/Green Infrastructure/ overland flow systems)	Data, monitoring, evaluation & research	Infrastructure	Extreme precipitation	Lead	**Medium**

Other Hazards

ID	Action	Action Category	Systems Category	Climate Hazard Addressed	City role	Priority
O1	Add air filtration requirements to Toronto Green Standards and City-initiated development	Policy & regulation	Infrastructure	Climate-related air quality	Lead	**High**
O2	Open extended-hours centres with air filtration	Coordination & convening	Municipal Services	Climate-related air quality	Lead	**High**
O3	Develop wind-resilient building standards	Policy & regulation	Infrastructure	High wind and tornados	Lead	**High**
O4	Expand frozen pipe education initiatives	Community education, outreach & equity	Infrastructure	Very cold days, winter storms	Lead	**High**
O6	Review and update Transportation Services' Major Snow Event Response Plan	Data, monitoring, evaluation & research	Infrastructure	Winter storms	Lead	**Medium**
O7	Develop a data-driven approach to prioritize snow and ice clearing for vulnerable residents and to support equity needs	Data, monitoring, evaluation & research	Population & Local Economy	Winter storms	Lead	**Medium**

TORONTO

Sustainability
Solutions Group