

Climate Change Adaptation Planning: Natural Infrastructure for Heat

According to Canada's Changing Climate Report, commissioned by Environment and Climate Change Canada, **Canada is warming at a rate that is twice the global average.** By 2050, hot summer days in southern Canada exceeding 30°C will be four times more frequent than today.

In 2018, the World Health Organization stated that climate change was the greatest health challenge of the 21st century. **Extreme heat poses many challenges to Canadian communities**, including threats to public health due to heat-related illnesses and mortalities, additional strains on emergency services, increased demands on electricity infrastructure, and reductions in local air quality. Rapid urbanization and climate change are increasing this risk. Natural infrastructure solutions, like healthy tree cover, can help cool communities.

"Cooling Corridors: The Role of Green Infrastructure in Building Resilience to Extreme Heat" report introduces a first-of-its-kind approach to support communities in Ontario in making better decisions about tree cover investments to maximize cooling benefits. State-of-the-art modeling was applied to two neighbourhoods located in the Region of Peel, in the Greater Golden Horseshoe, Ontario and revealed significant benefits of tree cover in lowering temperatures during a heat wave in July 2018 – **increased tree cover could make it feel up to 11 °C cooler.**

KEY FINDINGS



Natural areas in the Greenbelt and its urban river valleys were cooler than neighbouring urban areas. If there were 50% more trees in the studied neighbourhoods during this heat wave, the average daily temperature could have been up to 1.3 °C cooler. If there were 80% more trees, it could have been 2 °C cooler. These are significant differences.



Increasing tree cover would have made people more comfortable during the heat wave by providing shaded areas for heat relief and reducing overall temperatures. In reforested areas it could have felt 11 °C cooler. These benefits were not only found directly under the shade of trees. Cooling benefits were seen as far as 150 m to 250 m downwind from forested areas. Even individual trees could make it feel 3 °C cooler.



We saw that increasing tree cover could have decreased heat stress. By conserving and investing in trees now we can start adapting for the future climate. We will be glad we did as heat events become more common and extreme.





RECOMMENDATIONS

Everyone in the Greater Golden Horseshoe has a role to play in protecting and increasing our natural infrastructure. This includes provincial and local governments, public health advocates, conservation authorities and individuals. Recommendations based on this research include:

- Provide education about and public access to natural areas that are cooler, like the Greenbelt and its urban river valleys
- Increase the number of large trees throughout neighbourhoods by protecting existing large trees and maintaining young ones until they grow large
- Create new pockets of forest cover where you can
- Plant and conserve trees everywhere, even individual trees make a difference
- Trees should be located to increase the shading of paved areas like parking lots, sidewalks and patios
- Plant trees on public lands like school yards, long-term care homes, other seniors' care centres and other areas where there is space for new trees and opportunity to provide cooling close to vulnerable populations
- Build partnerships for innovation and knowledge transfer including stakeholders in public health, the environment and academia

THE PROCESS TO UNDERTAKE SIMILAR STUDIES

Other urban and near urban communities across Canada might be interested in doing similar research. To do this, it is recommended that partnerships like the ones developed on this project be formed between public agencies, academics and regional environmental leaders. This project was made possible by the collaboration of the Peel Climate Change Partnership, Prof. Umberto Berardi from the BeTop Lab at Ryerson University, and the Greenbelt Foundation.

Local information about climate and the existing urban land and tree cover can be used to undertake this kind of modeling. Many urban communities in Canada have similar information available. Additional information can be obtained from freely available sources like Environment and Climate Change Canada, the United States Geological Survey and the National Aeronautics and Space Administration. This particular research project took about a year to complete.

ⁱ <https://changingclimate.ca/CCCR2019/>

