

"In the Heat of the Summer"

Sun spills through your bedroom window. It's not even close to noon yet, but it's almost 30 degrees outside, and it's only going to get hotter, as summers in Montreal tend to do. Maybe you'll spend the day laying in a shaded area in one of the city's parks, or at a public pool, or maybe you'll just stay at home with your windows wide open trying to let the cross breeze wash over you as you sit in stillness, feeling useless from the heat and humidex.

Montreal has what's known as a semi-continental climate, marked by warm, humid summers, and very cold winters. Heatwaves and cold snaps have always been a part of Montreal weather, but they're starting to get hotter, longer, and more frequent. The summer of 2018 was the hottest summer on record in 146 years of meteorological observations in southern Québec. During that July, an estimated 66 people died in Montreal from heat related deaths. It was the hottest July the city had experienced in 97 years.

Extreme winter weather, and an increase in heat waves are signs of climate change. Some people refer to it as "Global Warming", and while it's true that global temperatures are rising on average, there's more to climate change than it getting warmer.

Temperatures on earth begin with warmth from the sun's rays. Around 30% of sunlight is reflected back into space by bright surfaces on earth like clouds, snow, and ice, and most of the remaining 70% is absorbed by oceans, land and the atmosphere. The areas that absorb that heat, such as rocks, air, and water, then radiate it back out in all directions. This is a natural greenhouse effect, and is actually beneficial. Without it, the Earth's average surface temperature would be closer to -18°C instead of the comfortable 15°C that we're used to.

In the last 250 years, we've become dependent on a lot of industrial activities that have artificially raised the concentration of greenhouse gasses in the atmosphere. By burning fossil fuels like coal and oil, we've increased the concentration of carbon dioxide in the atmosphere, and by removing natural environments like forests which absorb that carbon, we're lacking the balance needed to maintain earth's wellbeing. The stronger the greenhouse effect, the warmer the ocean will be, causing it to expand and sea levels to rise, as well as to partially melt glaciers and ice sheets which will also increase sea levels.

Climate change results in more extreme temperatures and weather patterns too. Some regions will become wetter and others will become dryer, and as droughts, floods, and storms become more commonplace, the increased risk of crop losses will threaten food security worldwide and by extension human livelihood. These changes can also cause new patterns of pests and diseases to emerge, affecting the wellbeing of plants, animals and humans.

False springs and early heat waves are often something like a reprieve from the deep freeze of Montreal's winters. Feeling the warmth of the sun stream onto your skin might bring something back into you that you nearly forgot existed through all those cold months. But it's important to pay attention to these changes, because they mean so much more than we might realize.

In the last 30 years, more than 400 deaths in Montréal have been attributed to heatwaves.

Heat tests your body's limits, and humidity works against your body's ability to cool itself. When you get hot, your heart rate and your skin temperature rise, then you sweat. Once it hits the air, the air will evaporate your sweat off your skin and cool you down. But, if it's humid, there's less room in the air for your sweat to evaporate into, and without that evaporation, the heat builds in your body, sometimes surpassing its capacity to cope. When your body overheats, you might experience heatstroke. This can come along with some pretty serious side effects like complications with your central nervous system, or in the worst of cases, failure of your cardiovascular and respiratory systems that could possibly lead to death.

In Montreal, heatwaves are categorized as three days in a row where temperatures stay at or above a cumulative average of 33°C during the day and don't go below 20°C at night, or when there's two consecutive nights above 25°C.

Beyond the heat and humidity that are already testing your body's limits, there's also socio-economic factors, and systemic discrimination like ableism and racism that play into an individual's ability to endure a heat wave. It's hard to ignore the reality that the ability to manage the effects of heat are dictated by a person's access to resources such as water, housing, or health care.

Montreal does have a response plan for when heat waves happen. They extend the opening hours for swimming pools, wading pools, play fountains and beaches, as well as the various air-conditioned public buildings that allow people to cool off in them. They send out firefighters, police officers and community members to go door-to-door making sure people are taking measures to reduce heat. They hand out water bottles to homeless people and encourage citizens to stay cool and hydrated. This is all helpful, but there are some gaps in their approach that leave out many of those who are most vulnerable to, and impact by heat.

After the deaths in the 2018 heat wave, there was an investigation by the public health department. It showed that, among those who died, 72% suffered from chronic diseases, 66% were 65 years of age and over, 25% had schizophrenic disorders and 18% suffered from alcohol or drug addiction. The city talked about developing a register of vulnerable populations to make sure they were supported in future heat waves, but it's quite unclear as to whether or not that has happened.

You might live in a building that has air conditioning, making heat waves a fair bit easier to endure. But it's quite likely that you don't, as only 65% of households in Montreal have central air or use a window unit. As much as you might wish you had A/C during those hot summer days, air conditioners have an enormous effect on the environment.

Because of the population density in cities, there's usually a number of units running in proximity to each other, all pumping hot air outside simultaneously, sometimes stressing the electrical grid to the point of blackouts, and causing the demand for electricity to rise.

Across Canada, 67% of electricity comes from renewables, and 99% of the electricity that's produced in Quebec comes from renewable sources, 97% of which is from hydroelectricity, a type of energy derived from the power of water in motion, like a strong river or a waterfall. While hydroelectricity is a renewable resource, it's important to remember that with an increase in heat waves can come an increase in droughts, making it harder to generate that hydroelectric power.

During the hottest days in Montreal, you might see alley cats hiding in the shadows of stairs and bushes, or parents drinking sweating beers while lazily pointing their green garden hose at their kids who are squealing in excitement and relief. You'll also likely see people clustered in nearly every shady bit of every green space available, trying to find respite from the heat of the sun. This can sometimes look nearly comical, like how in old cartoons, characters try to stealthily hide behind narrow trees, or other small objects they're obviously visible behind.

Consciously or subconsciously, people gravitate to parks in the summer because they're significantly cooler than most of the neighbourhoods on the island. This is because expansive greenspaces are largely spared by what is known as the "Urban Heat Island Effect".

This is something that happens in cities, when natural land cover is replaced with dense concentrations of pavement and buildings, both of which have a high thermal capacity to absorb and retain heat, which is later released slowly over time. Having fewer reflective surfaces plays a part too. Just think of how all that dark pavement and those parking lots suck up the sun's rays, and emit warmth long after night has come.

If you look at a heat map of Montreal, you'll very quickly see that parks are some of the coolest parts of the city. Trees, plants, and bodies of water all contribute to cooling the air by creating shade, transpiring water from plant leaves, and evaporating surface water. This explains why the middle of a park in Montreal is so much cooler than your friend's backyard in the middle of Little Italy. Sometimes even up to ~12 degrees cooler.

The "Urban Heat Island Effect" is strongest in areas with lower tree cover, these areas are generally ones where there's a lower income per capita and more tall structures to support a higher population density. In Montreal, that's the Central and Eastern parts of the island. Parc Extension, otherwise known as Parc Ex, is one of the neighbourhoods that experiences the strongest impacts of the "Urban Heat Island Effect".

Parc Ex is one of Montreal's and Canada's lowest income neighbourhoods with a population density that rivals Manhattans. The area is home to one of the highest populations of immigrants and racialized people in the city, and while certain parts of that cultural diversity are celebrated, the community is also subject to systemic and environmental racism.

At the most Western part of the neighbourhood, there is a street called Acadie boulevard. Here you'll find a fence that delineates Parc Ex from the Town of Mont Royal (also known as TMR), one of the wealthiest neighbourhoods in the city. In addition to being a main artery in the north of the island, Acadie boulevard also functions as a heat border, dividing the hot concrete covered neighbourhood of Parc Ex from the cool, tree lined streets of TMR.

As is the case with Acadie Boulevard, heat borders tend to follow the demographic lines that separate the lowest income and most vulnerable to heat from the most affluent and air-conditioned. During that heatwave in July of 2018, not one of the 66 people who died were in TMR, but three of them were in the first dozen blocks of Parc-Ex.

No heat wave response that Montreal puts in place is going to change the conditions that have led to such stark differences in how communities experience heat borders, the "Urban Heat Island Effect" and

other impacts of climate change. In order to combat these impacts, global emissions need to be reduced, and we need change at the local level as well. There needs to be change made to how we live in and how we build cities, and we need to start making that change now.

When you walk around the city, imagine what other ways it could be built. What does a heat proofed city even look like?

It might involve reducing the number of dark surfaces that absorb the sun. Some of those roofs could have gardens, but maybe we could start by painting some of them white to reflect the sun? It's one very cost-effective way to combat these issues. We'll need more regulations to balance green space expansion and reduce urban sprawl. We'll also need to have more climate sensitive designs and materials incorporated into new buildings, as well as passive cooling and good airflow.

And the changes we make? They need to be considered through environmental perspectives, as well as through economic, health, social and racial perspectives. What could our cities be, if they were designed to care for the specific needs of the communities who live in them? And what about if those designs were made in consultation with those communities?

Greening measures are helpful, but they need to happen in neighbourhoods that are in highest need, the ones that disproportionately experience the effects of climate change. If more funding and resources and greenspaces were allocated to areas that have been historically underserved or overlooked by these measures, we could move toward equitable neighbourhoods.

In what other ways could we transform our cities to care for our current moment and for the health and wellbeing of all of our futures? If we put change in place now to strategically reduce warmth by even small amounts, we'll be much better off in the long run.