OpenData Hackathon 2024

By: Areeba Khalid, Athar Siddiqui, and Nathan Carter

GO OPEN DATA ASSOCIATION

MISSISSAUGA

Mississauga towards climate resilience

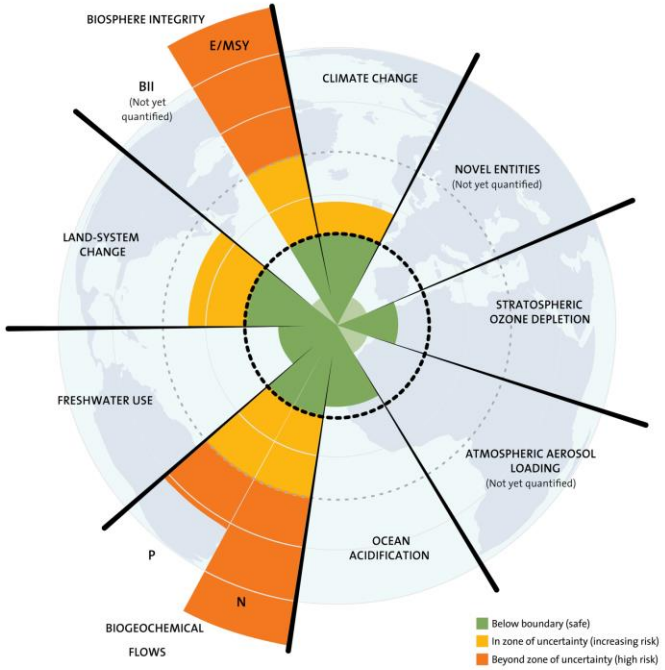
Climate mitigation and adaptation

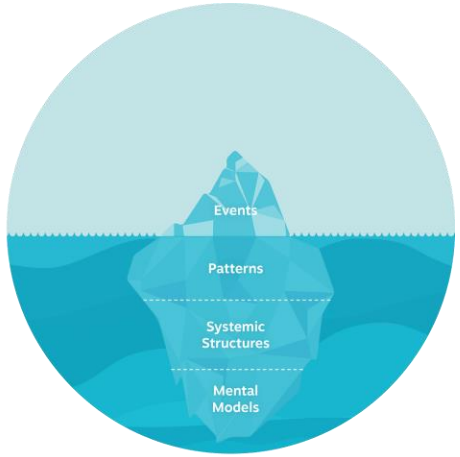
Reduce greenhouse gas emissions 40% by 2030 below 1990 levels

Increase resilience and the capacity of the city to withstand and respond to current and future climate events

Open data for future cities

Systems thinking approach + Planetary boundaries





Implementing systems thinking

Key Questions

How extreme weather impacts stormwater flow and quality?

What are the primary contributors to urban flooding?

How are these issues interconnected with heat islands, biodiversity loss, and equity?

Proposed solutions

Blue Roofs: Areas with high runoff and limited existing stormwater systems.
White Roofs: Areas with high UHI and solar exposure, where cooling is a priority.
Green Roofs: Areas needing stormwater infiltration, biodiversity enhancement, or improved air quality.

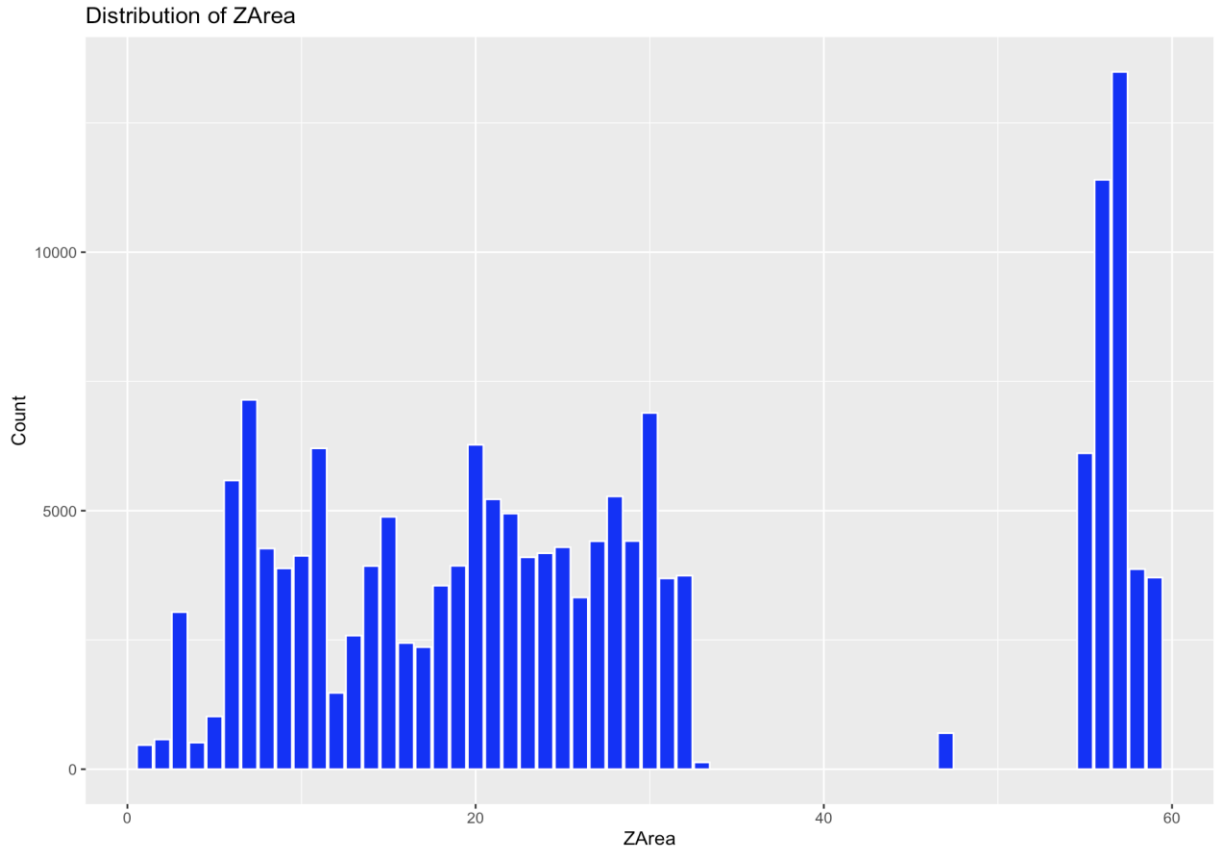
Criterion	Blue Roof	White Roof	Green Roof
Heat Island Effect	Mitigates moderately by storing water, cooling surfaces.	Reflects sunlight effectively, reducing urban heat island effect.	Significantly mitigates by cooling through evapotranspiration and shading.
Carbon Emissions	Limited reduction by reducing energy use for cooling.	Reduces emissions by improving energy efficiency and lowering cooling demand.	Absorbs CO_2 through vegetation and reduces energy demand for cooling/heating.
Ecosystem Services	Minimal ecosystem benefits, primarily focuses on water storage.	Limited; does not provide ecosystem services.	Provides substantial services, including habitat creation, air purification, and temperature regulation.
Storm Water System	Excels in retaining and slowly releasing stormwater, reducing runoff.	No significant impact on stormwater management.	Excellent at absorbing rainwater, reducing runoff, and improving water quality.
Biodiversity	Minimal biodiversity benefits, may attract some water-dwelling species.	No biodiversity impact.	Significant; supports plant and animal habitats, particularly in urban areas.
Energy Efficiency	Enhances cooling efficiency by storing water for evaporation.	Improves energy efficiency by reducing cooling needs.	Provides excellent insulation, reducing both cooling and heating energy demands.
Groundwater Table	Can contribute slightly by releasing retained water slowly into the ground.	No significant impact on groundwater recharge.	Helps recharge groundwater indirectly by reducing runoff.
Cost	Moderate; requires specialized drainage systems.	Low; cost-effective and easy to install.	High; involves structural reinforcement, plant maintenance, and irrigation.

Graph depicting the Building Footprint

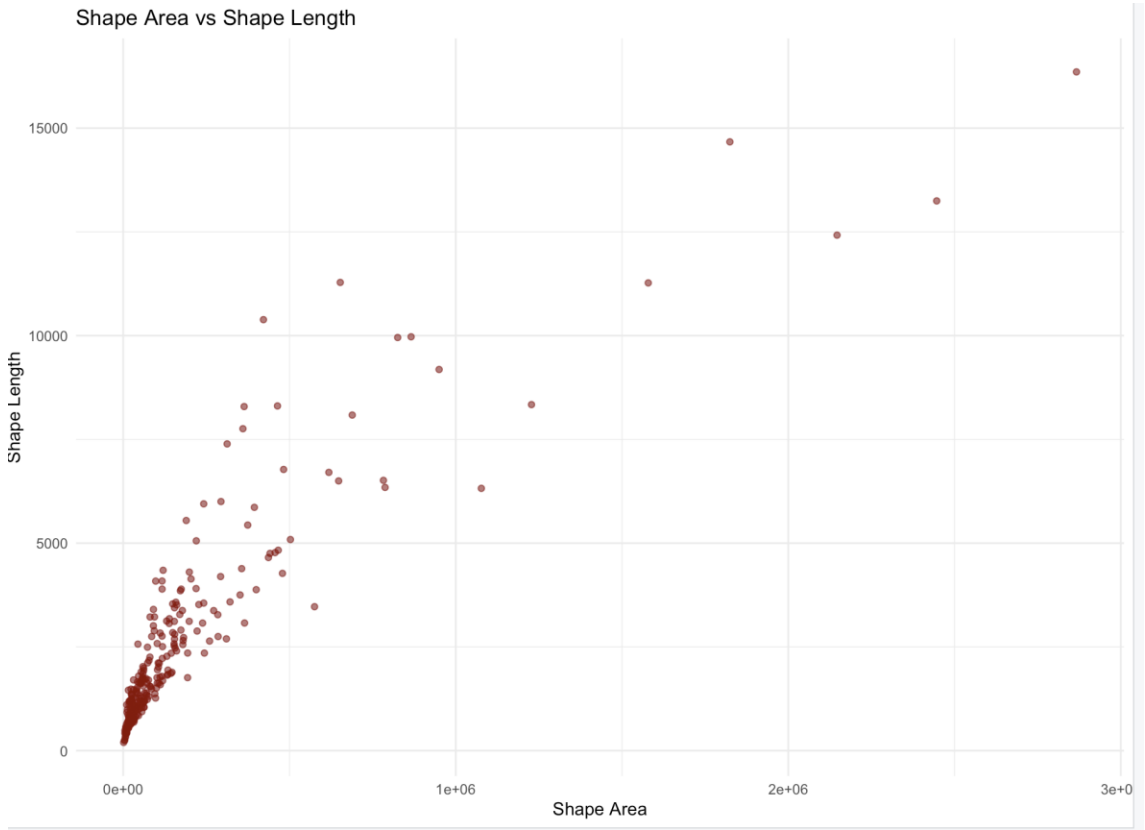
- 'count' represents the number of buildings
- 'ZArea' represents different areas in Mississauga, numbered from 1-60
- This graph shows that approximately areas 55-58 contains the buildings with the highest footprint

Because of the high building density in this area, the best way to modify nearby rooftops is to utilize Green rooftops, helping with biodiversity and CO2 Regulation. Churchill Meadows and Meadowvale.

Mississauga Rooftop Placement Map



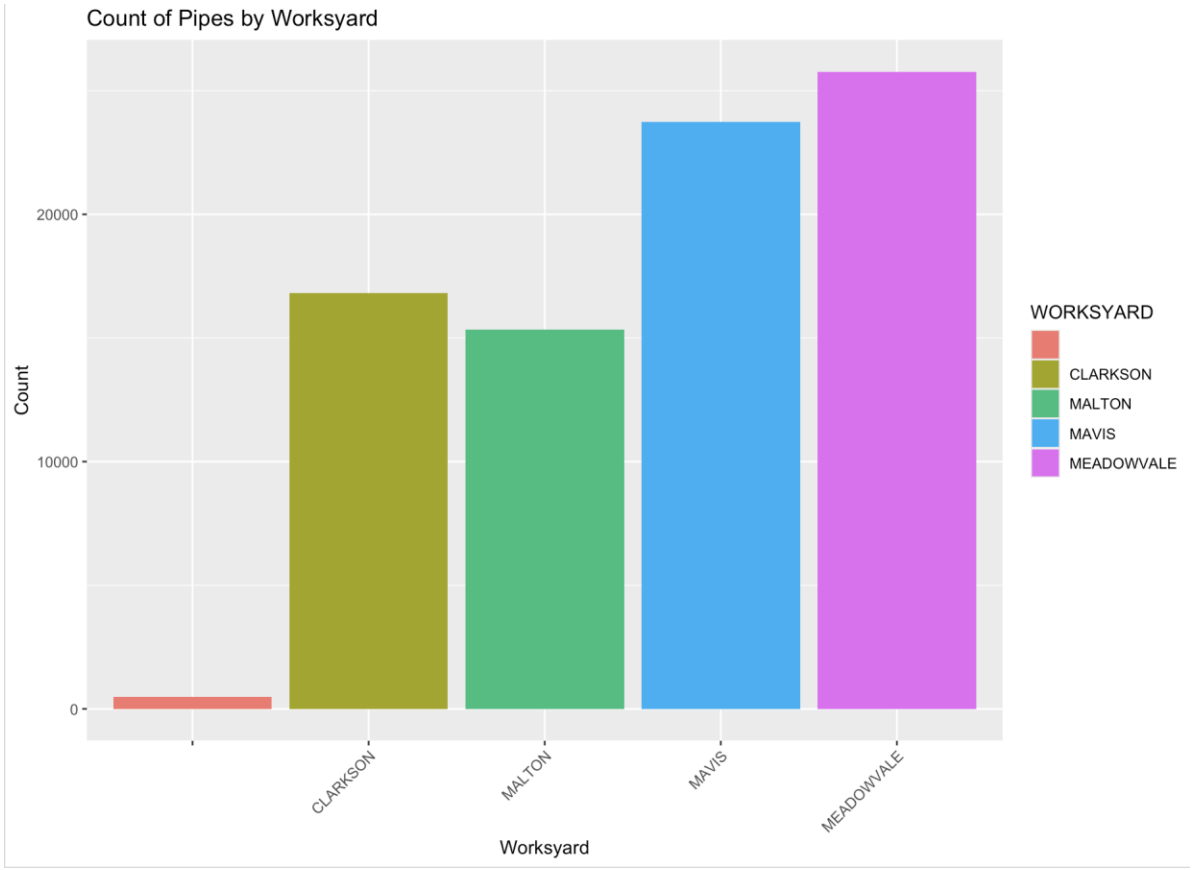
Graph depicting natural areas within the City including woodlands, wetlands, creeks and streams.



Areas high in pre-existing natural wildlife do not need the benefits of green roofs as much as other areas. So it is better to install white and blue roofs to be more cost effective in these areas. Wolfedale Creek.

Mississauaga Rooftop Placement Map

Graph depicting where in Mississauga Storm Sewer Network Pipes are located



Since the Meadowvale area has the most robust stormwater drainage system, it is best to focus blue roof systems in areas like Malton which have significantly less infrastructure.

Technical Demonstration Link

https://n8lc.github.io/Mississauga_Hackathon/

Conclusion

- This project turns the data given by Open Data into an actionable plan that the city can take to efficiently combat climate change. By Utilizing the tools we have created, city planners have a better understanding of the best places to utilize the emerging technologies we see today.

Sources

- https://data.mississauga.ca/datasets/63c22b97380546058f2b92ee0dca9d4b_0/explore?location=43.608477%2C-79.674377%2C9.91
- https://data.mississauga.ca/datasets/ad38d1b8cd1c462d9e918c25ca2819d5_0/explore
- https://data.mississauga.ca/datasets/8aff41843ec44a74a309148d28e1b989_0/explore?location=43.609429%2C-79.673070%2C9.92

Thank You!

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