Property-level Variables of Single Family Homes & Variations in Urban Forest Quantity

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1 Background & Motivations

In the past research, a number of variables have been linked to variations in urban forest quantity, some of these include:

- Urban development patterns
- Neighbourhood age
- Municipal policy
- Neighbourhood socio-economic status

So far, studies have examined:

- Street and neighbourhood-level correlates of trees
- Property-level correlates of lawn care and pesticide use but NOT trees

2 Objectives

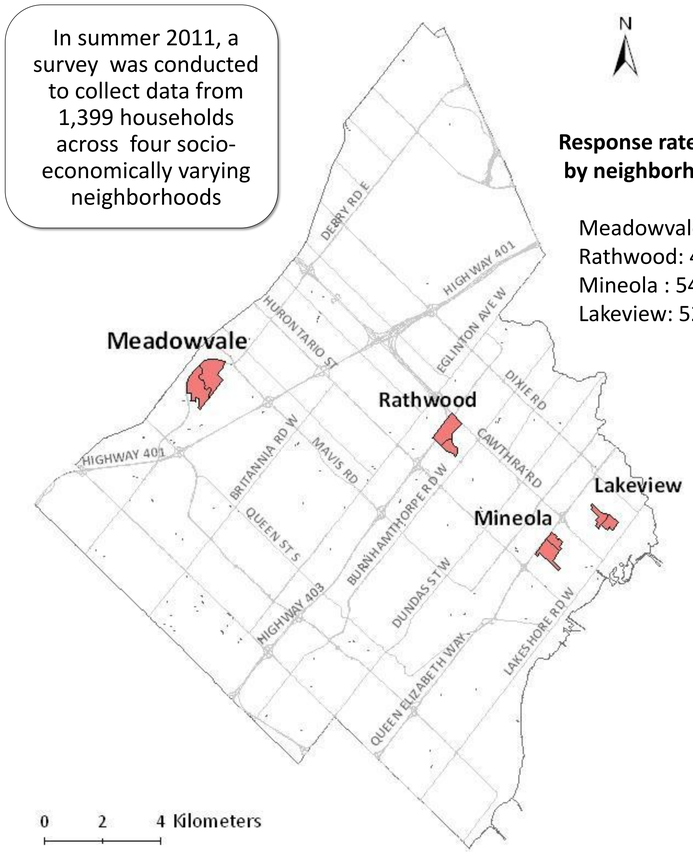
1) To map property-level **percent canopy cover** and **tree density,** and
2) To identify property and household characteristics significantly related to property-level percent canopy cover and tree density

3 Study Areas

In summer 2011, a survey was conducted to collect data from 1,399 households across four socio-economically varying neighborhoods

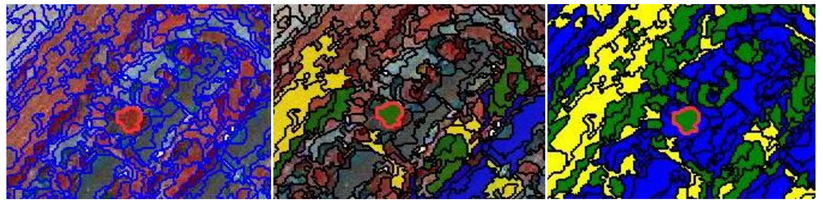
Response rate by neighborhood:

Meadowvale: 44%
Rathwood: 41%
Mineola : 54%
Lakeview: 52%



Map of the City of Mississauga showing four study neighborhoods

4 Remote Sensing Used to Identify Canopy Cover



Object-based Image Analysis (OBIA) classification technique used for delineating classes using IKONOS 1m pan-sharpened image

5 Classification Maps of Four Study Neighbourhoods

Tree Canopy
Grass
Other

Overall classification accuracies: 84-90%

Results used for percent canopy cover conditions shown below

6 Methods 1: Calculation of Property-level Tree Measures

- GIS datasets used - property boundary and building outlines
- *Total property space* was used for percent canopy cover per property
- *Available planting space* was used for tree density per property

7 Results 1

	Percent Canopy Cover (%)	Tree Density (per 1000m²)	Plantable Space(m²)
Lakeview	26	13.16	436
Meadowvale	21	18.79	382
Mineola	39	14.62	992
Rathwood	24	28.25	311
All	26	16.15	480

Table: Average tree cover values per household that returned the survey for each of the four study neighbourhood

- Mineola: highest percent canopy cover – properties are older and larger
- Meadowvale: lowest percent canopy cover– properties are younger
- Rathwood: highest tree density - most houses are townhouses that are managed by condominium boards
- Mineola and Lakeview: lowest tree density - properties are older with fewer, more mature trees

8 Methods 2: Tree measures and explanatory variables

- Multiple regression analysis employed to explore the relationship of 25 explanatory variables related to percent canopy cover and tree density variations
  - There variables encompassed aspects of neighbourhood, residents' attitudes and decision, characteristics of individual properties, and household demographics
- Analysis conducted for 5 cases: All, Lakeview, Meadowvale, Mineola and Rathwood (separately for percent canopy cover and tree density)

9 Results 2

- 3 variables were significant across most cases for percent canopy cover and tree density
  1) Amount of available planting space
  2) Number of trees removed in the past year
  3) Residents' attitudes towards trees
- A few other variables also retained in the Individual regression tests for the four study neighbourhoods

10 Discussion and Conclusion

- Regression results highlight space constraints and residents' decisions and attitudes as being significantly linked to tree measures
- Key neighbourhood-level correlates of tree cover not prominent at property-level (e.g. income, education etc.)
- Overall, residents' came across as active managers of urban forests

11 Recommendations for Future Work

- Researchers should use different tree measures (e.g. percent canopy cover and tree density) to control for various components of urban forest structure (e.g. age & number of trees)
- Divide property space by front and back yard
- Explore additional household-level explanatory variables
- Conduct a study using smaller sample size, using various urban forest measurements that account of both tree quantity and quality