City Neighbourhoods are Ecosystems in the Urban Forest

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Introduction

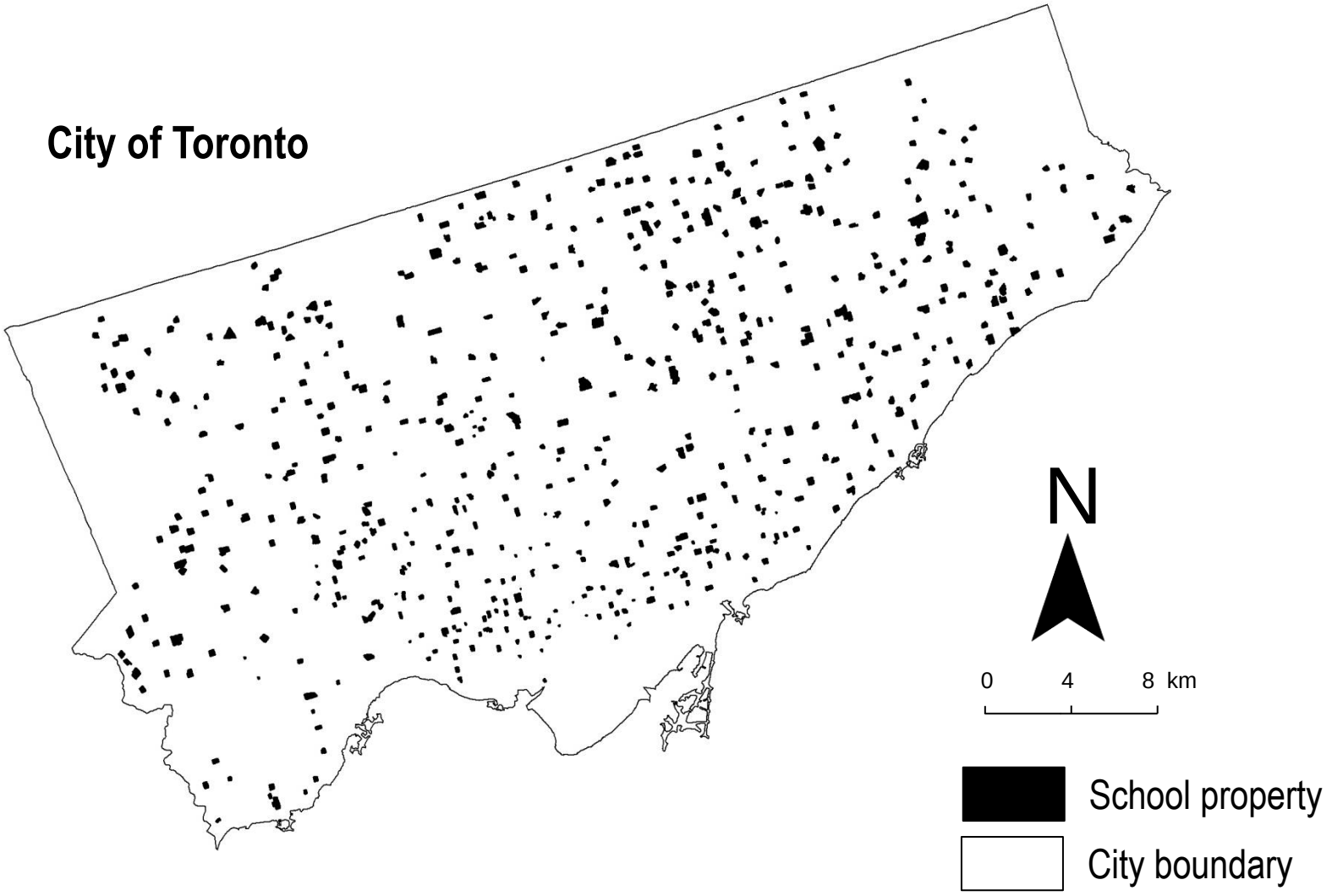
- Cities and their populations are growing
- Importance of ecosystem services in cities → urban forests
- How to maximize and manage sustainably?

What shapes an urban forest ecosystem?

THE GLOBE AND MAIL

"Parent wants city oaks torn down to protect kids with nut allergies"
Barton, 2012

What shapes an urban forest ecosystem?



Introduction

- Cities are complex, heterogeneous, and adaptive systems → Social-ecological systems

- Lack of understanding on how to define urban forest ecosystems

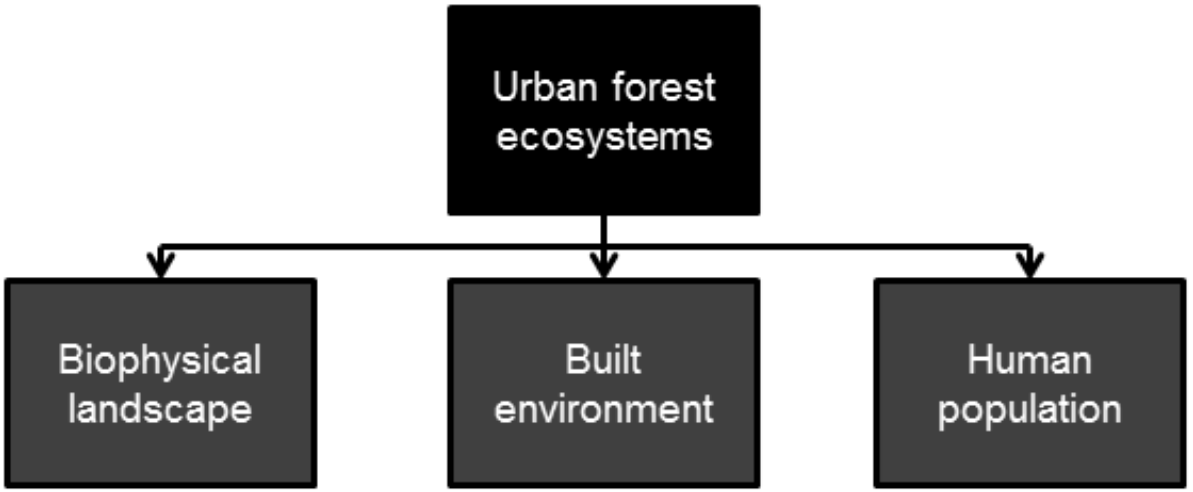
Ecosystem Classification

- Identification and location of key ecological processes

- Existing classifications fall short for urban forests

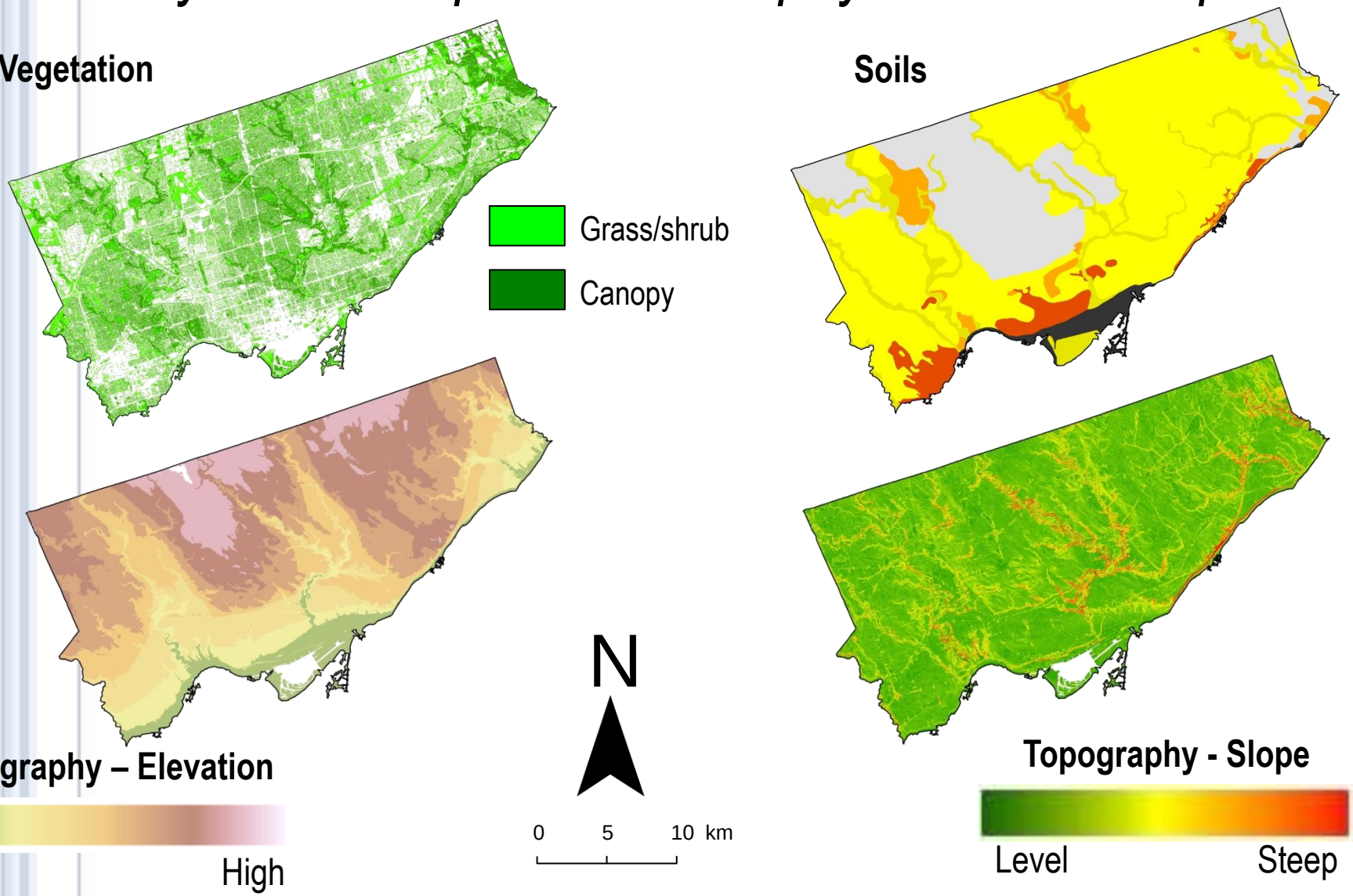
- **Objective:** Develop and test integrative framework of urban forest ecosystem classification

Ecosystem Classification Framework



Ecosystem Classification

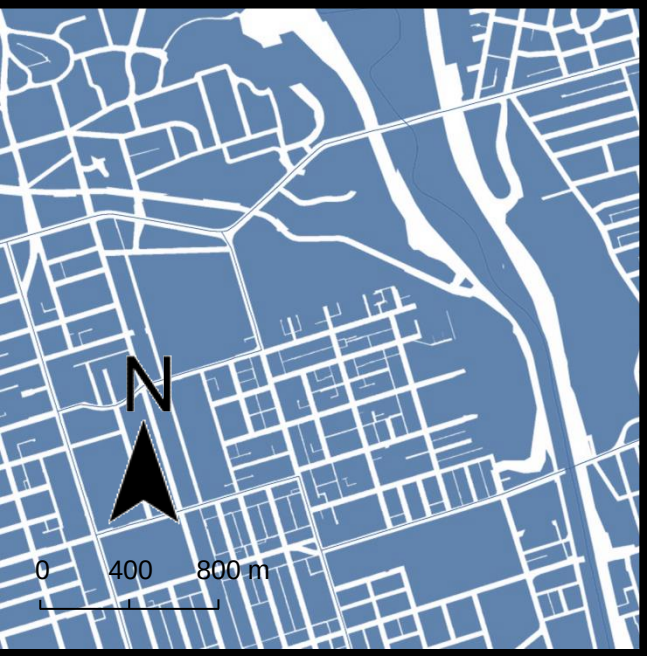
1. Ecosystem Components - Biophysical Landscape



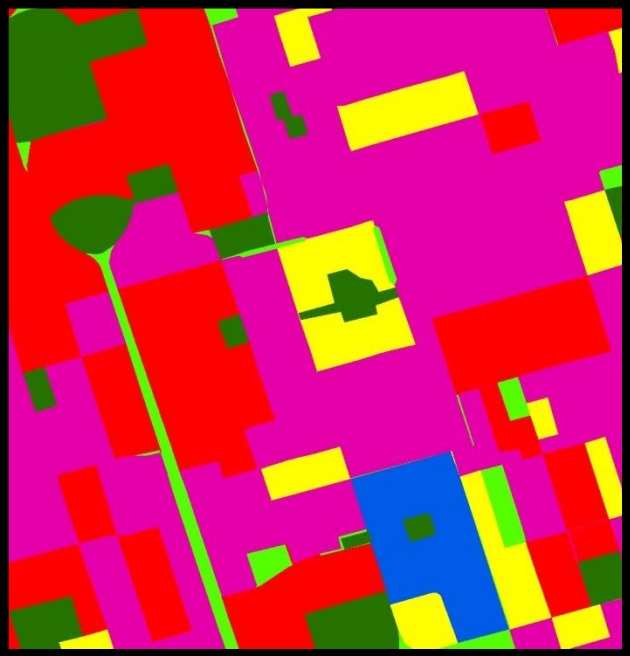
Ecosystem Classification

1. Ecosystem Components - Built Environment

Street Pattern



Land Use

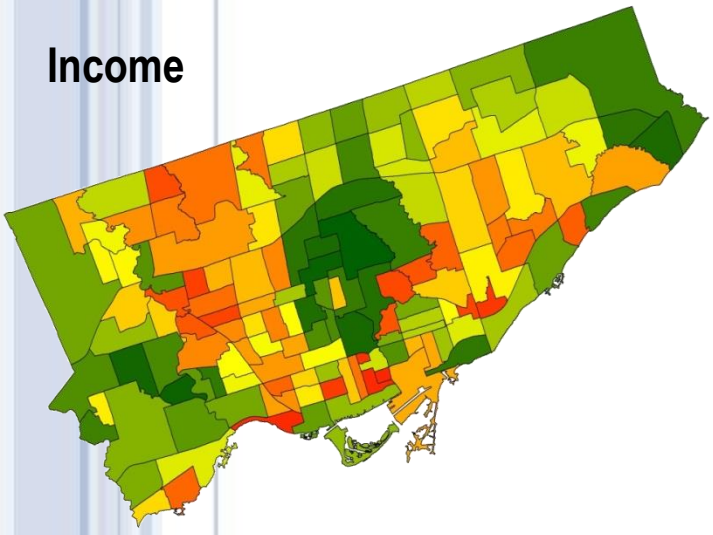


Density & Housing

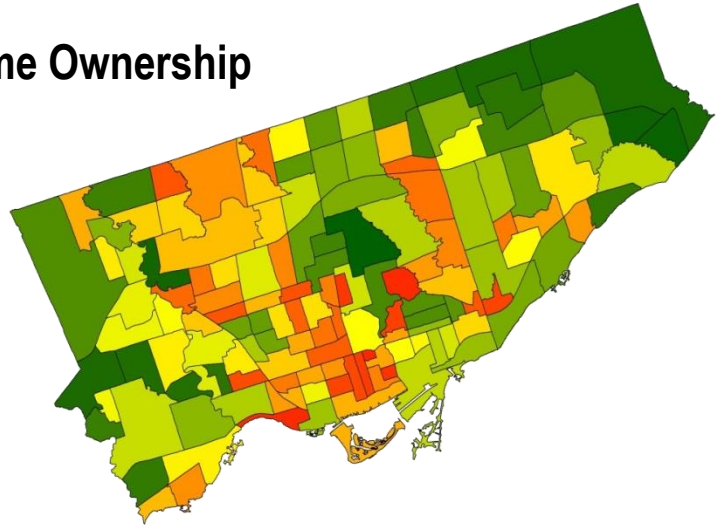
Ecosystem Classification

1. Ecosystem Components - Human Population

Income



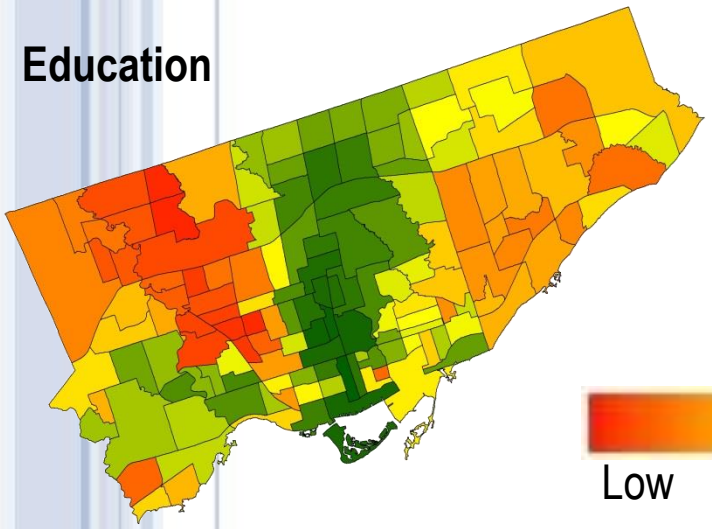
Home Ownership



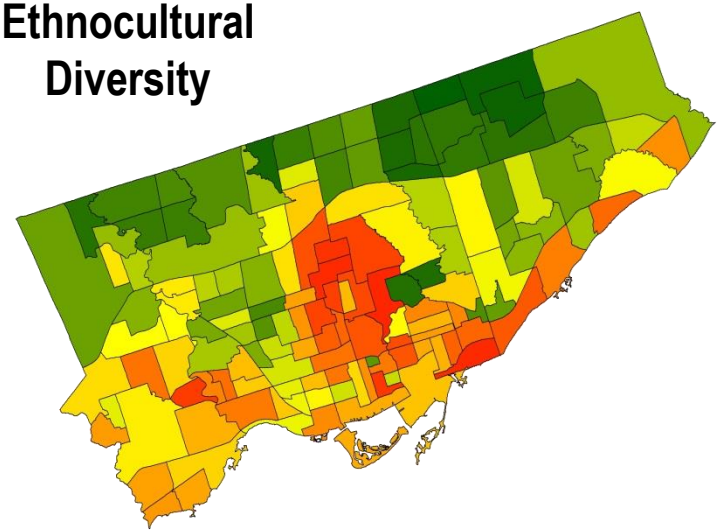
N

0 5 10 km

Education

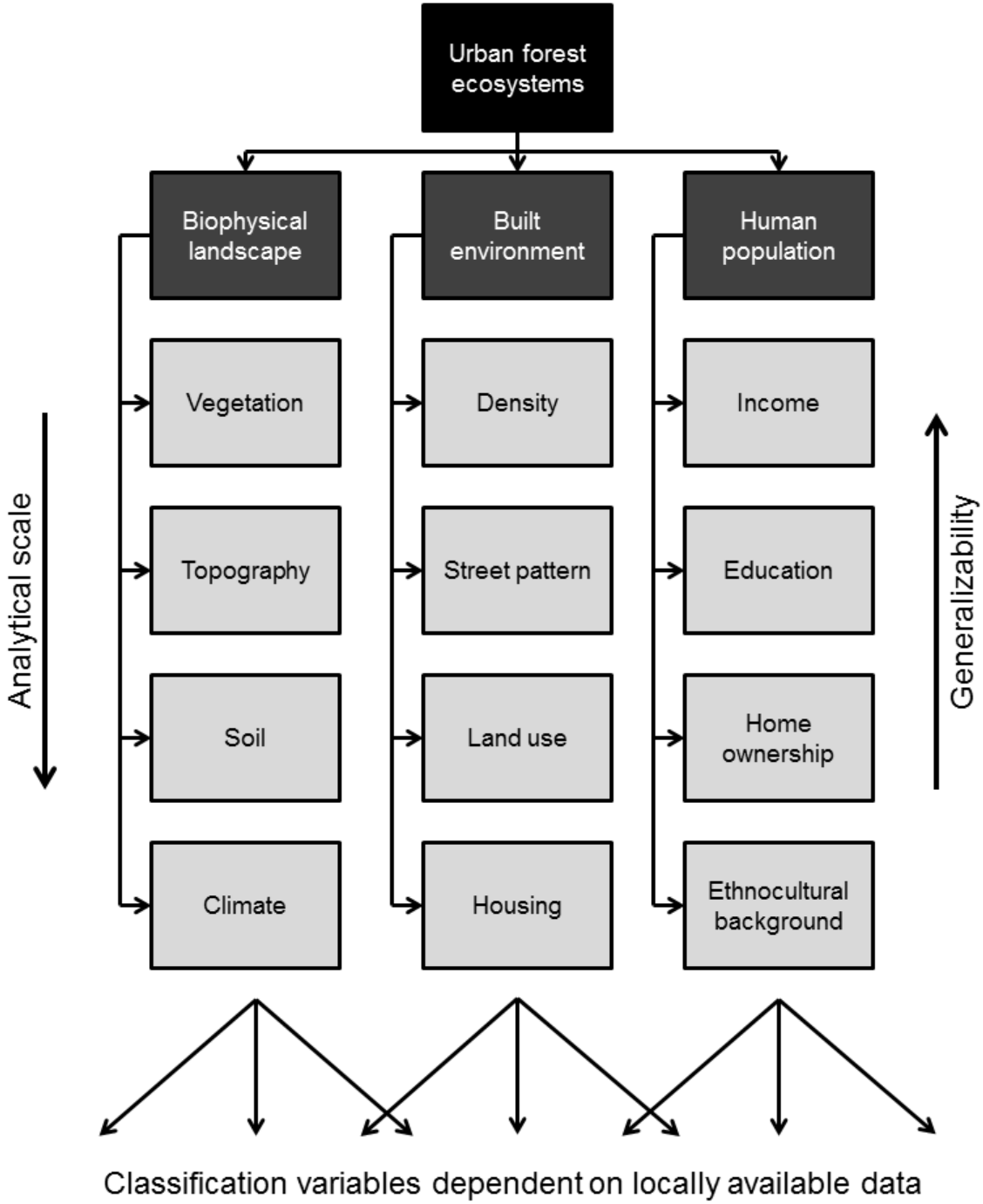


Ethnocultural Diversity



Low High

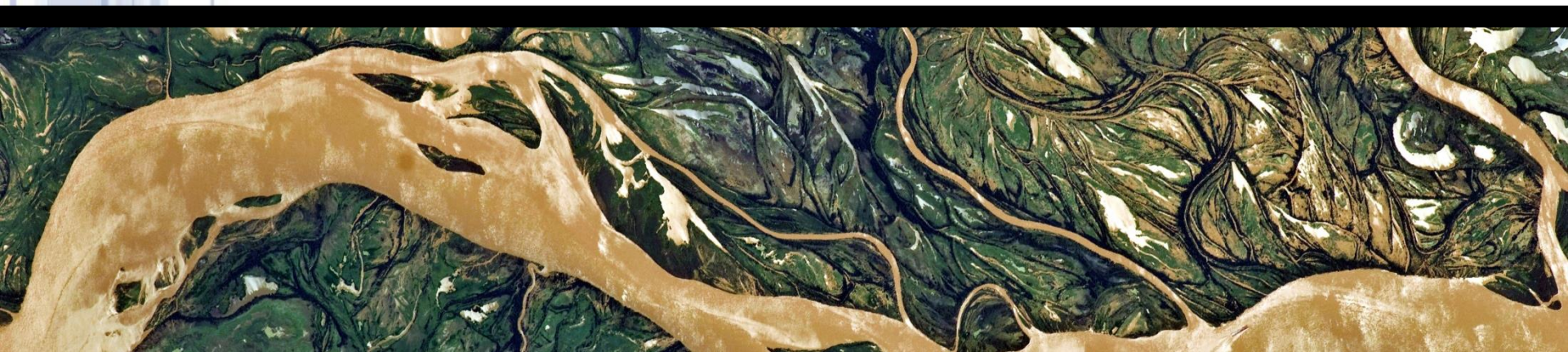
Ecosystem Classification Framework



Ecosystem Classification

2. Boundary delineation

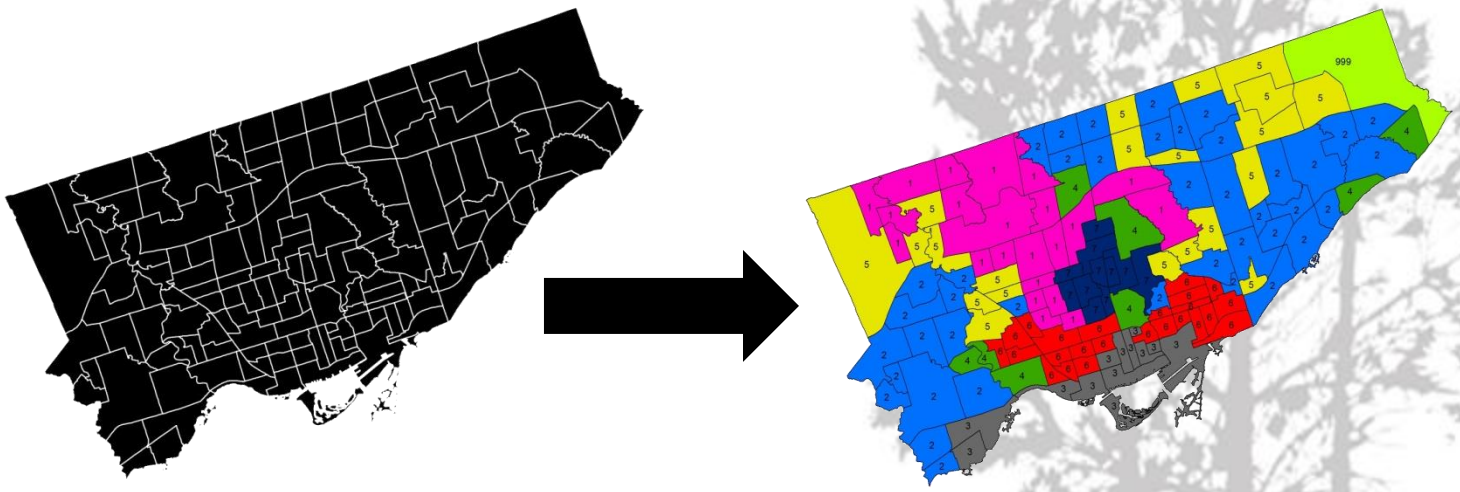
- Neighbourhoods as ecosystem boundaries
- Trade-offs in ecosystem homogeneity
  - e.g., Floodplain ecosystems

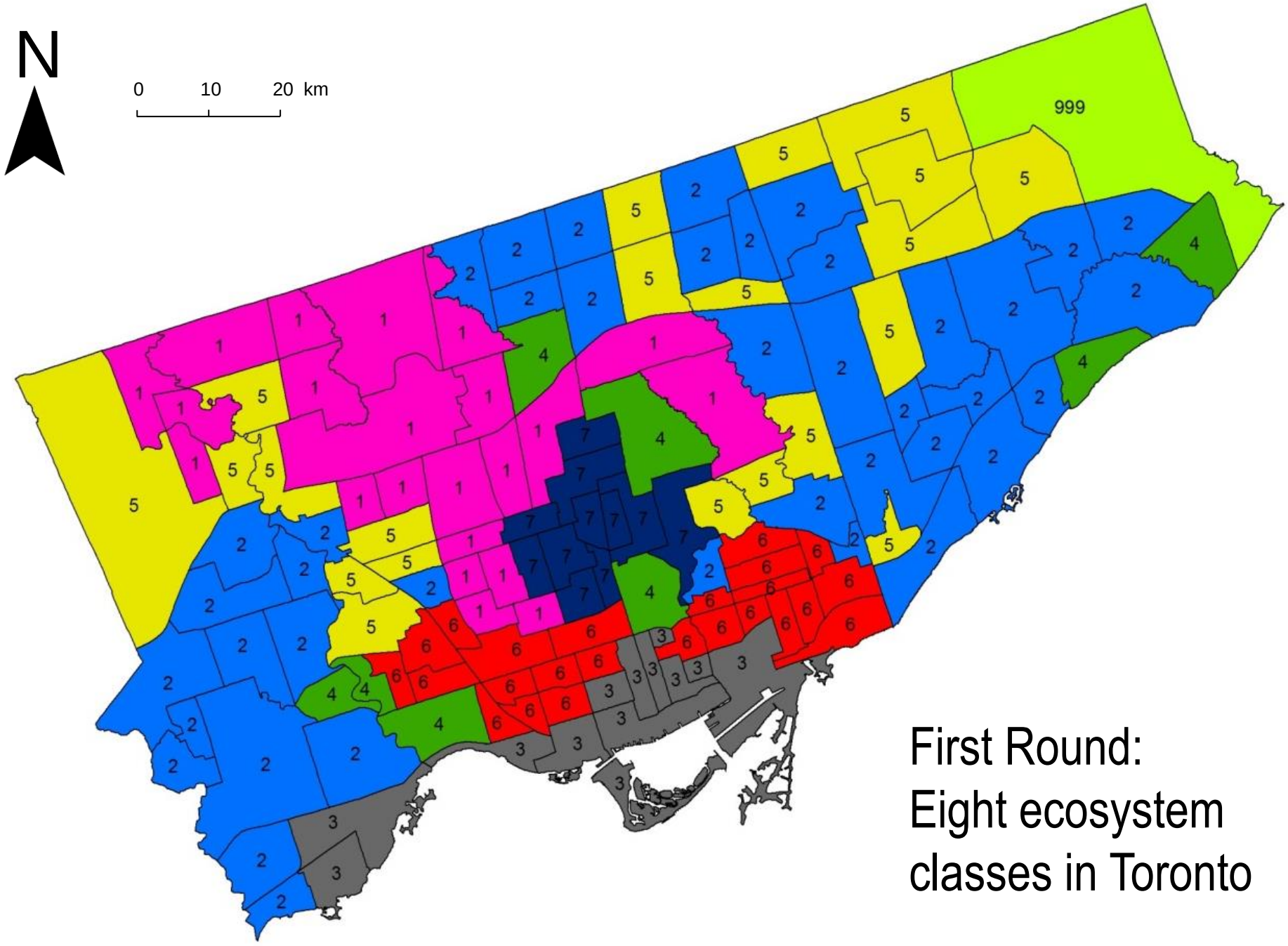


Ecosystem Classification

3. Classifying Neighbourhoods as Ecosystems

- Hierarchical cluster analysis
  - Natural groupings based on ecosystem components
- Assign each neighbourhood to an ecosystem class (i.e., cluster)




N
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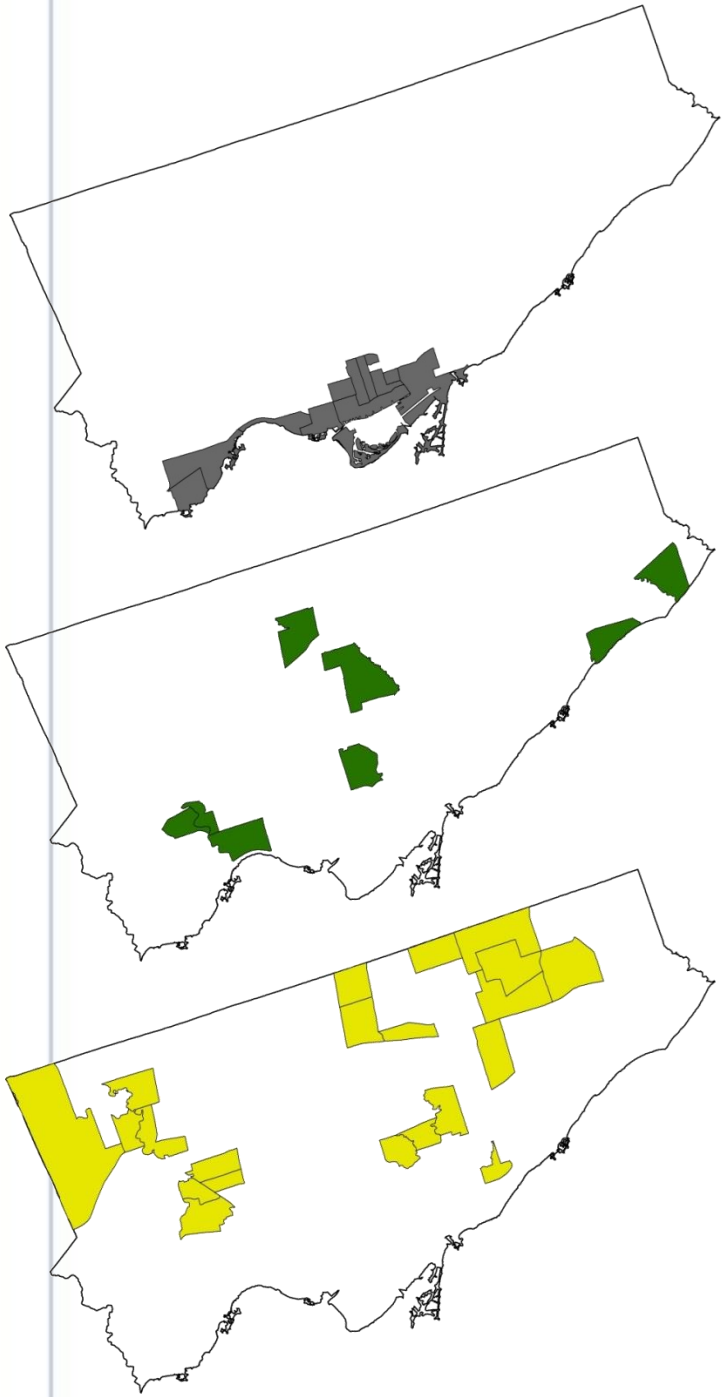
999
First Round:
Eight ecosystem
classes in Toronto



- Ecosystem Class 3:
  - Low vegetation cover
  - Mixed land use and dense
  - Low income, educated, diverse
- Ecosystem Class 4:
  - High tree cover, low grass cover
  - Steep terrain
  - Large, old homes and wealth
- Ecosystem Class 5:
  - High grass cover, low tree cover
  - Apartments, new houses mixed with industrial parks
  - Lower income, less education

Conclusions

- **Ecosystem-based management**
- Interpreting management needs and resource allocation
- Environmental justice and inclusive governance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