UArctic Graduate Seminar

Climate Change & Resilience in the North

Urban resilience through ecosystem services:

An assessment of gaps and recommendations

Nickolas Zazula, M.Sc.

School of Urban & Regional Planning

Dept. of Earth & Atmospheric Science
University of Alberta, Canada

CARL

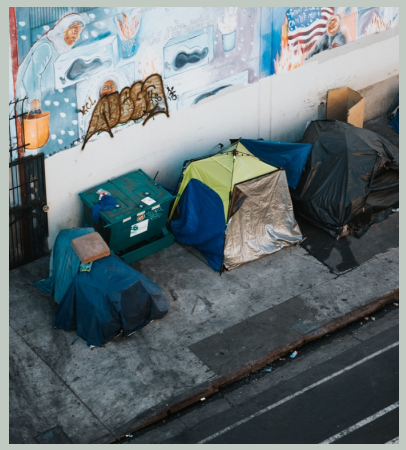
CLIMATE ADAPTATION + RESILIENCE LAB

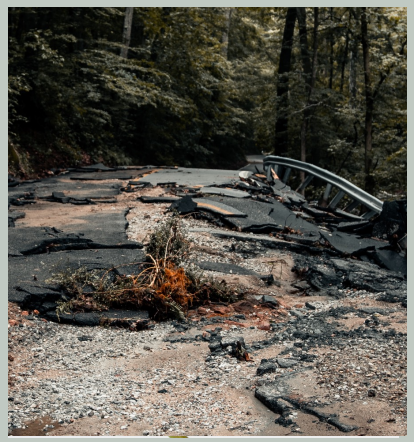
Outline

01 Introduction

Climate change will impact urban environments by:

- Degrading infrastructure
- Fragmenting communities
- Augmenting social disparities





Urban Resilience is the ability of a city to *"thrive during periods of stability and to adapt, organize and grow in response to change or disruption"*

Gardner (2019, p. 10)

Infrastructure to build Urban Resilience

Engineered Infrastructure:

Hardscaped Landscapes

Immediate results

Costly & inflexible

Green Infrastructure:

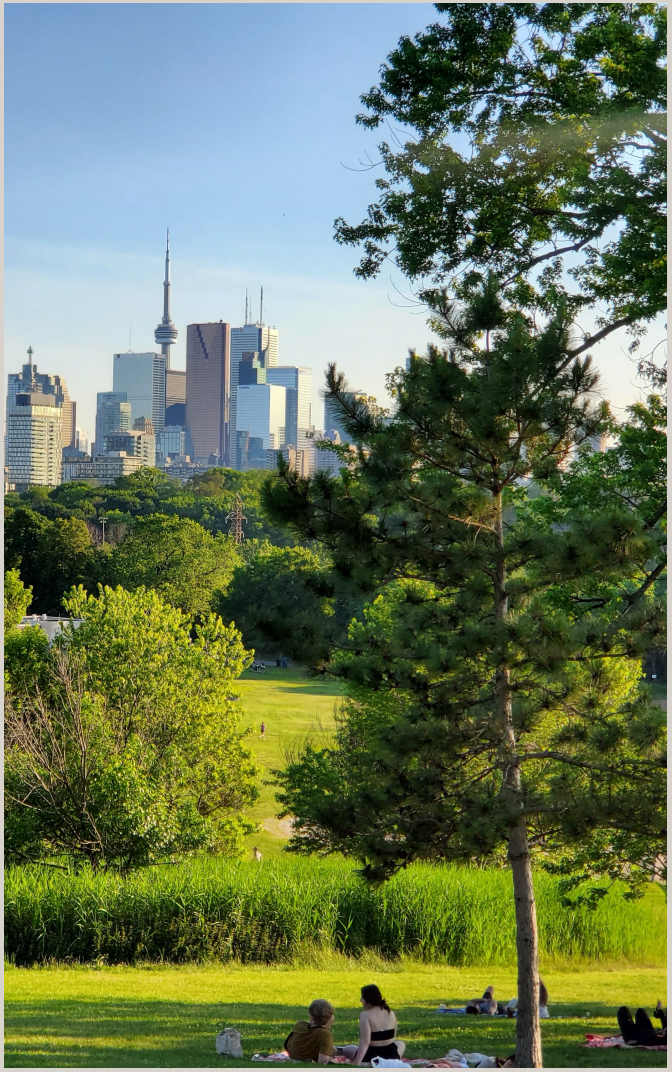
Ecosystem Driven

Slower & less predictable results

Low cost & adaptable

Challenges for resilience-building

- Political Inaction
- Risk Denialism
- Lack of Public Support



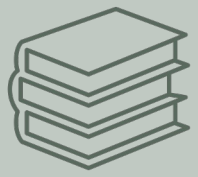
An Opportunity to leverage ecosystem services:

- Viable substitute to increase adaptive capacity
- Often require lower upfront costs
- Benefits grow over time
- Provide numerous positive externalities for the public

Case Study - Objectives

(1) Assess the extent to which Edmonton's policy approach to build urban resilience includes ecosystem services; and

(2) Identify gaps in this approach and provide recommendations for improvement.



02 Context

Edmonton & Ecosystem Services

Edmonton, Canada

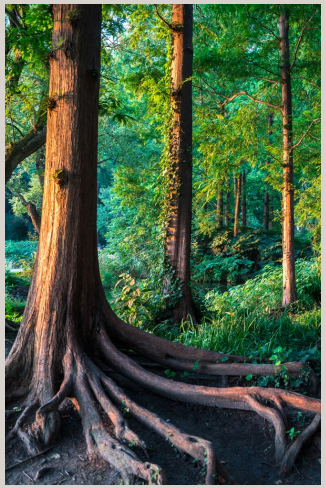
- Northern most city with a population over 1 million (NA)
- Land Naturalization program began in 1960s
- Urban Resilience is a key strategic goal of MDP

Ecosystem Service Categories

Provisioning

Regulating

Supporting



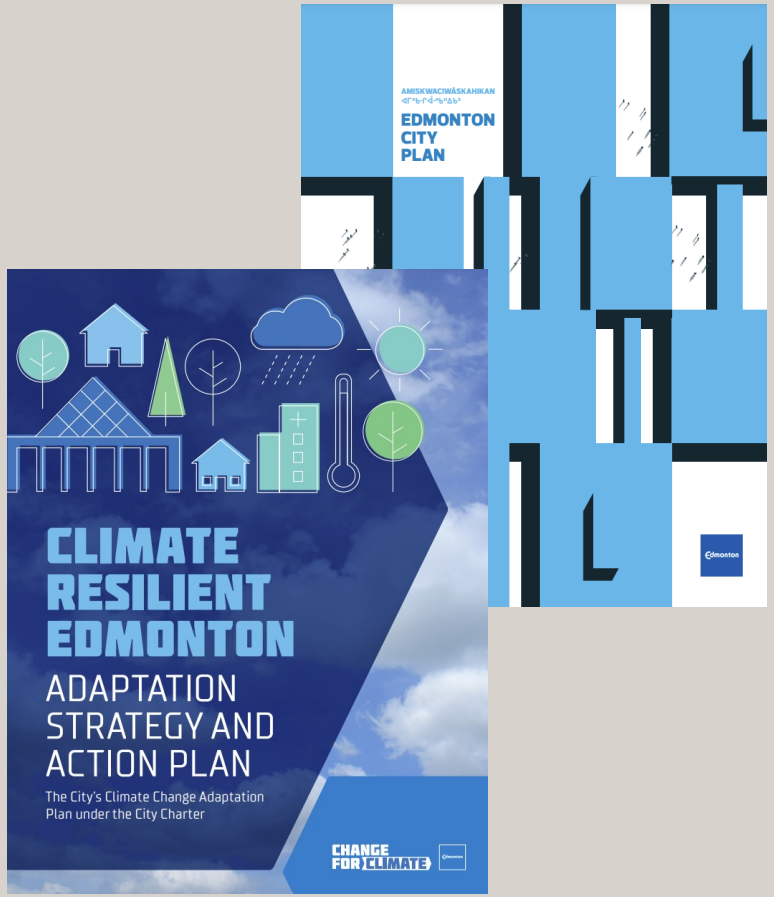
Cultural

03 Approach

Case Study & Content Analysis

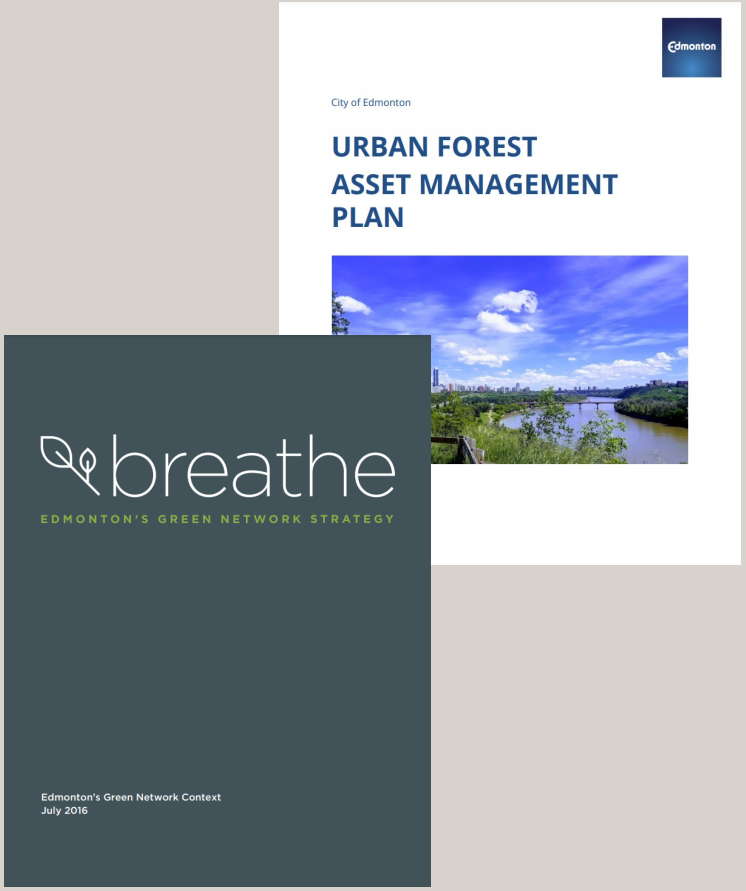
Approach

- Qualitative study
- Case Study Methodology
- Criterion Sampling of Documents
  - Ecosystem/Ecological services
  - Green infrastructure
  - Resilience



Approach

- 28 planning documents were sampled.
  - 18 selected for further study
- Each instance of 'ecosystem services' was noted and thematically coded.
- Patterns and gaps were analysed to produce recommendations



04 Overview of Findings
& Recommendations

Themes

Climate change resilience

Biodiversity Preservation

Public Health Benefits

Economic Savings

Climate Change Resilience

Natural systems provide security and resilience

Public Understanding of services increases support

Preference for integration of indigenous plants in naturalized areas.

Biodiversity Preservation

Biodiversity supports pollinator species

Naturalization and Rewilding programs increase natural area connectivity.

Externalities of increased biodiversity benefit regional and global contexts.

Public Health Benefits

Recreation potential of natural

Natural systems can filter pollutants

Cultural and spiritual practices are enabled

Economic Savings

Capital costs of grey infrastructure can be offset

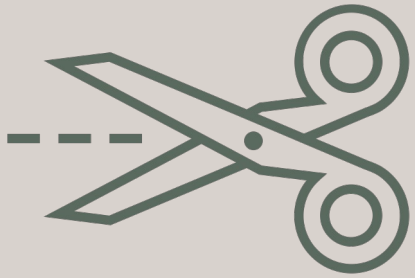
Conserving natural areas is more efficient that reclaiming land

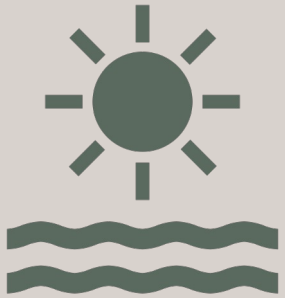
Economic evaluation is a challenge

(1) Edmonton succeeds at integrating Ecosystem Services into resiliency policy

(2) But gaps exist in Edmonton's Approach

- Separation of human and non-human systems
- underdeveloped approach to ecosystem service evaluation
- limited consideration for social accessibility





05 Conclusion

What can other cities learn from the Edmonton Case?

Recommendations to improve urban resilience through ecosystem services

1. Adopt a nature-based solution framework for implementation programs
2. Determine and mitigate social impacts of naturalization and reclamation efforts
3. Better account for positive externalities in cost-benefit analyses

Bush & Doyon (2019), Martin et al. (2021), Melathopoulos & Stoner (2015)

Summary

Urban Resilience is Essential

Green Infrastructure is a viable approach for resilience

Edmonton is a useful case for implementation lessons

The described recommendations will strengthen implementation

Thank you

References

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