Building Resilient Urban Ecosystems: A Decade of Natural Heritage System(s) in the Toronto and region

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Lake Ontario Evening, Gladstone Hotel

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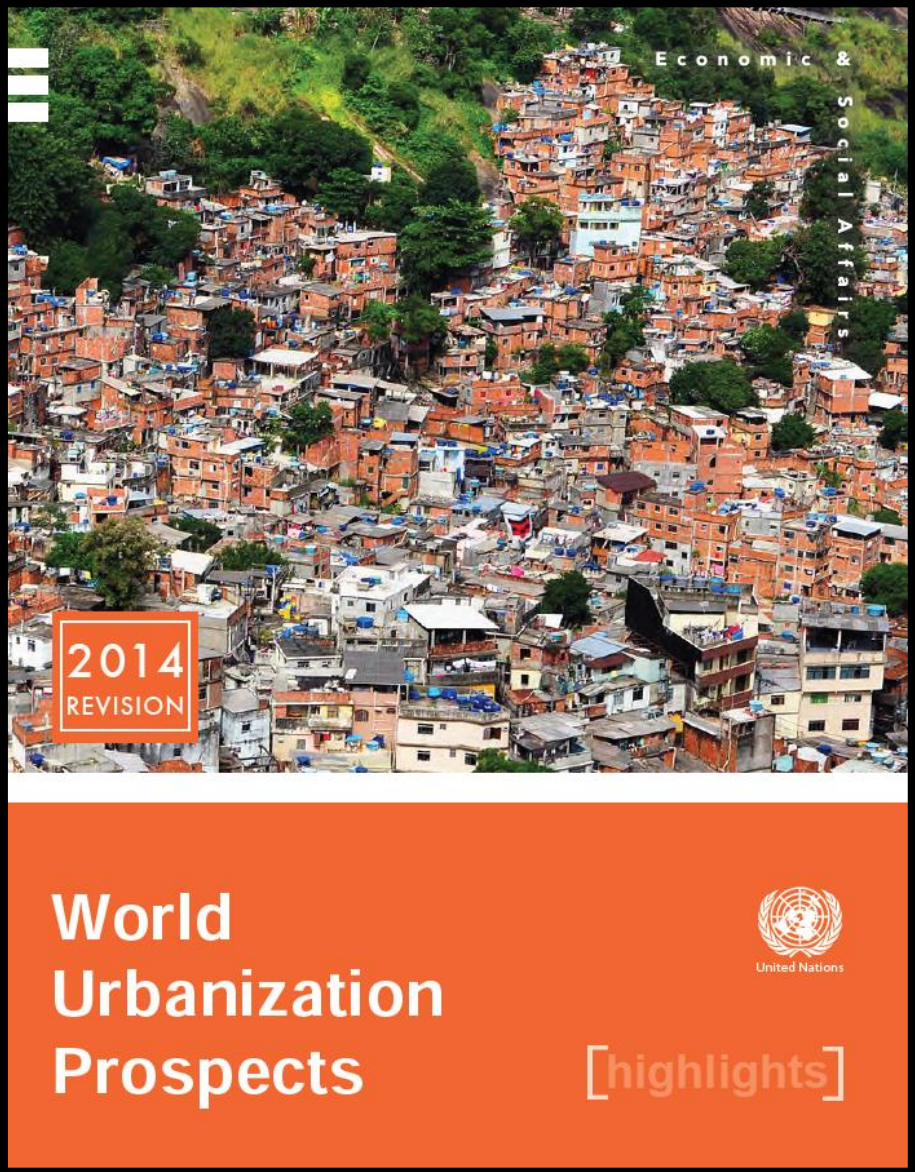
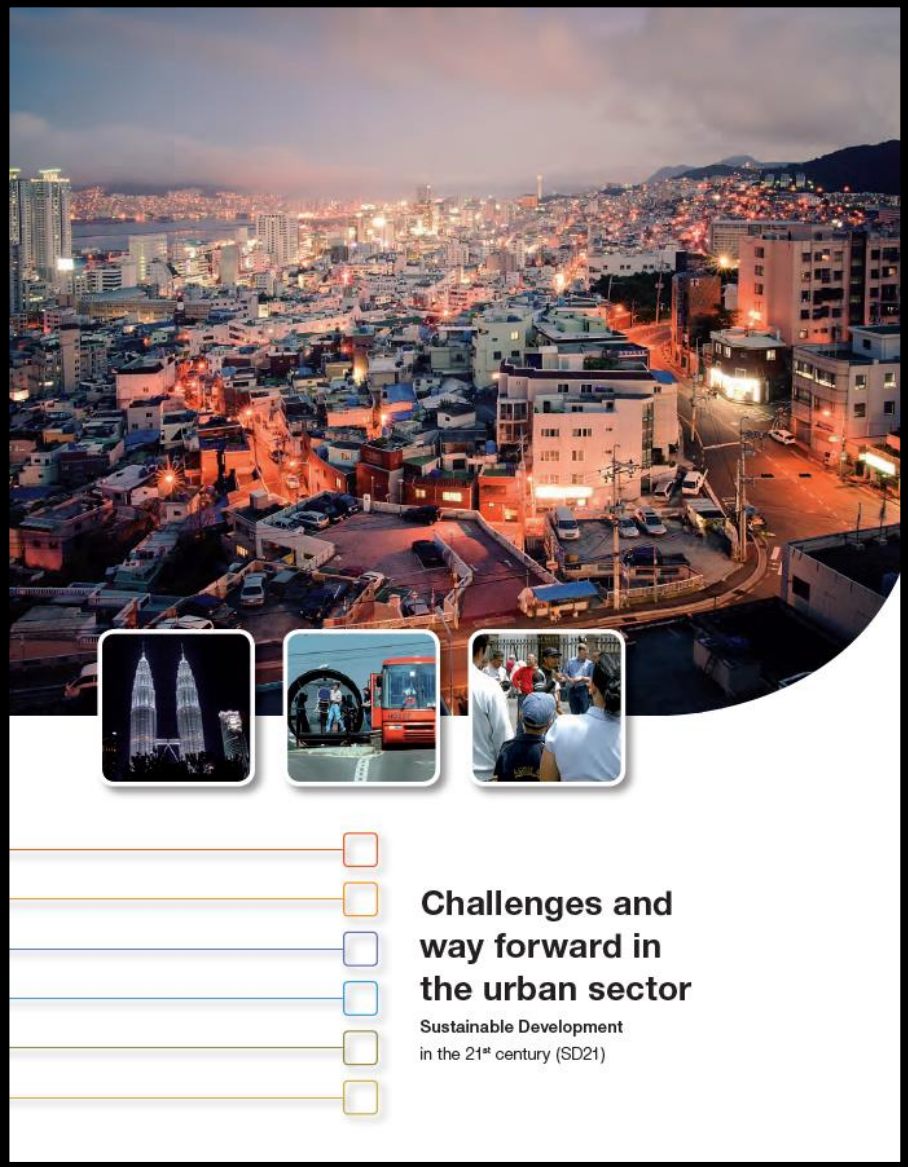
The Living City Foundation

Toronto and Region Conservation for The Living City

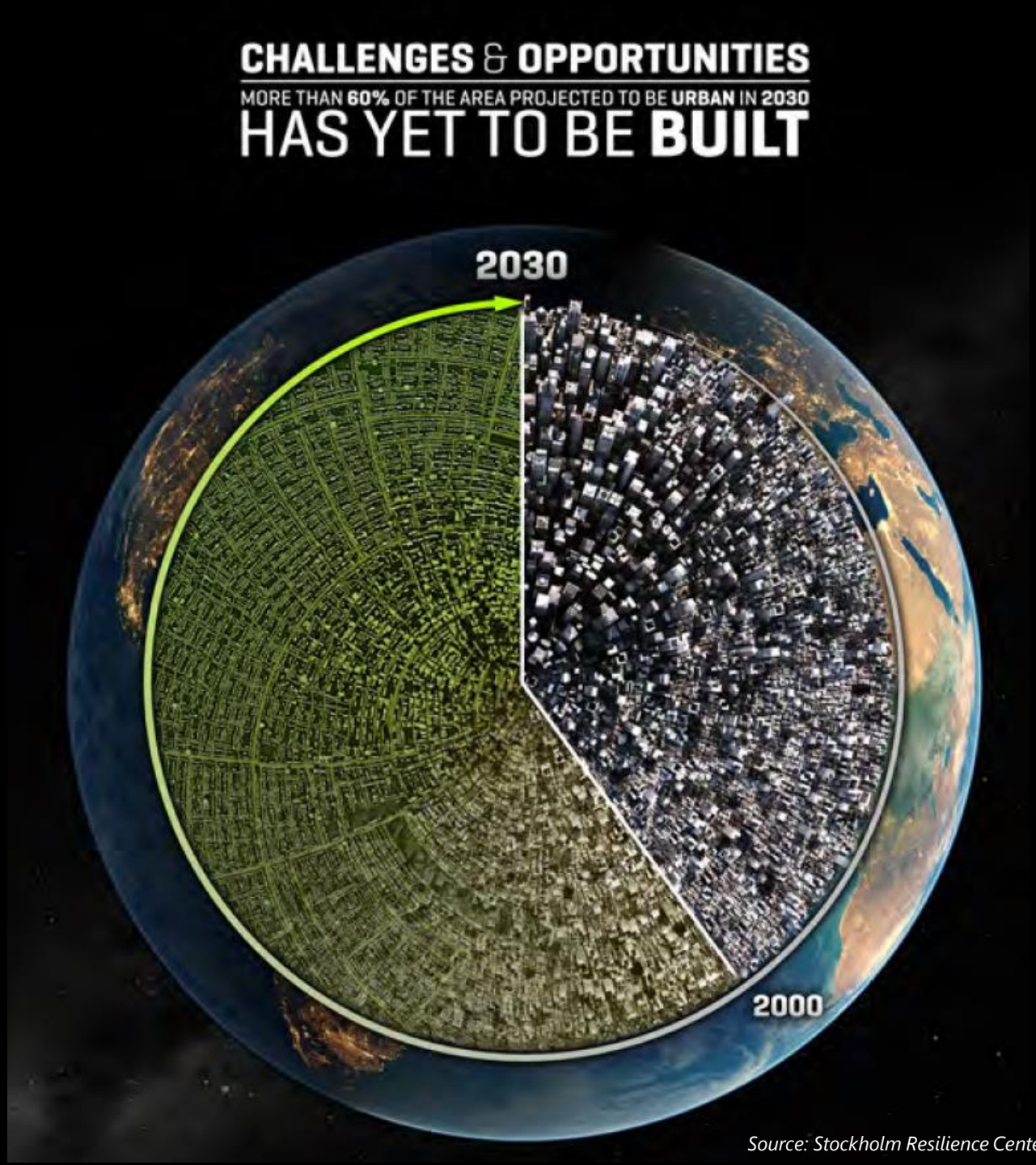
Member of Conservation Ontario



Source: United Nations, Department of Economic and Social Affairs, Population Division, 2014.



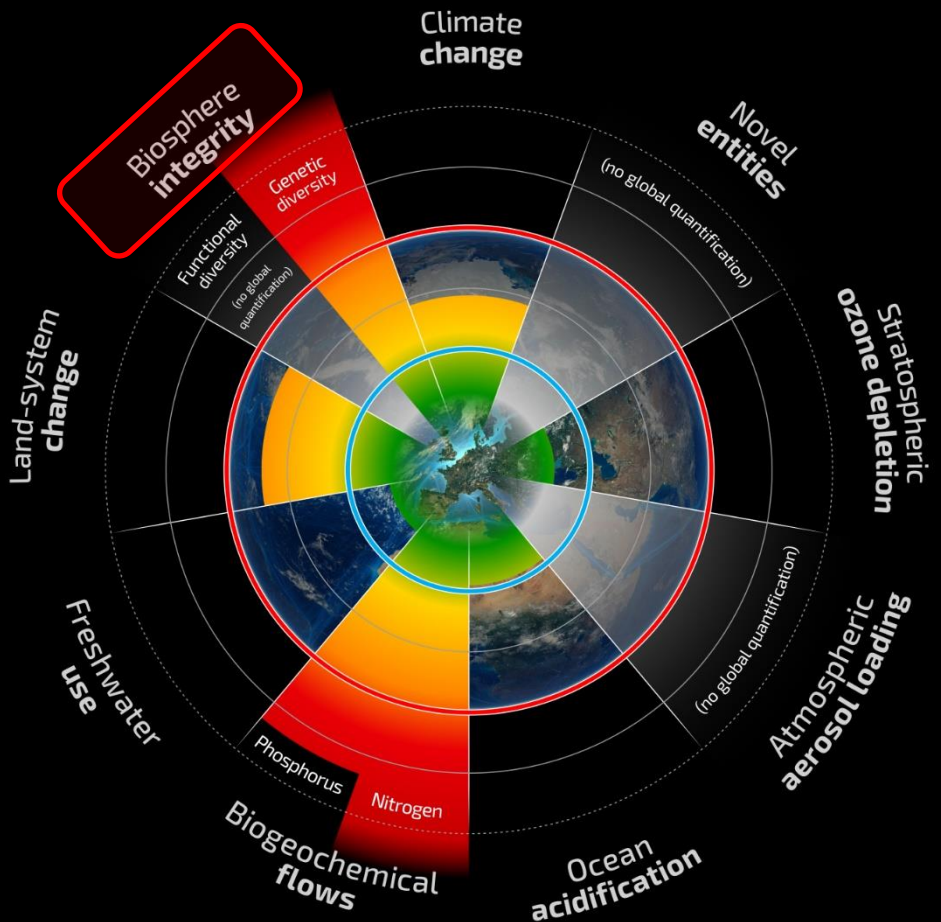
Source: United Nations Department of Economic and Social Affairs (UNDESA), 2012



Source: Stockholm Resilience Center

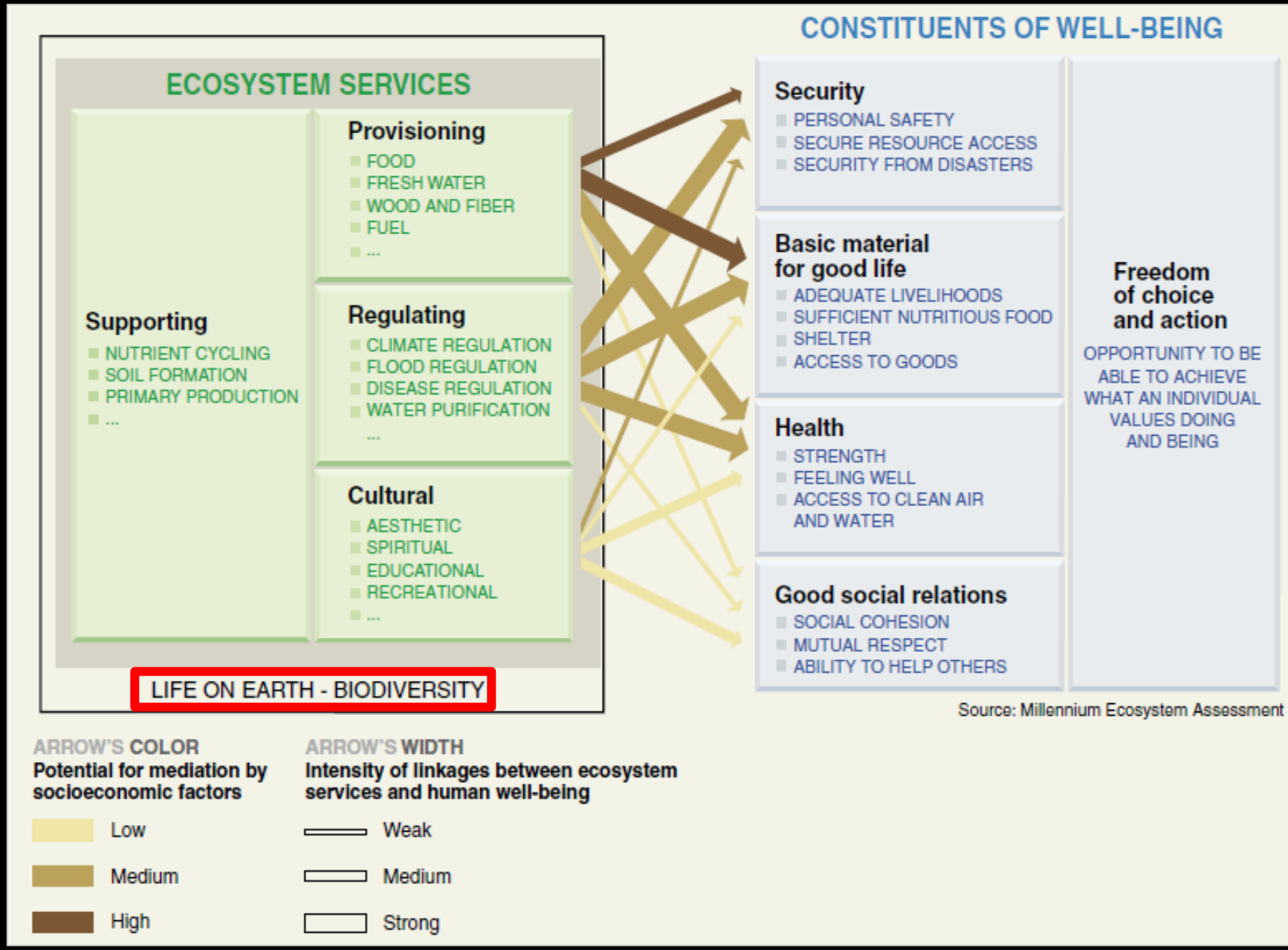
Planetary Boundaries

A safe operating space for humanity



Beyond zone of uncertainty (high risk)
In zone of uncertainty (increasing risk)
Below boundary (safe)
Boundary not yet quantified

Source: Steffen et al. Planetary Boundaries: Guiding human development on a changing planet, *Science*, 16 January 2015.
Design: Globaia



Source: Millennium Ecosystem Assessment

Photo by Jason van Bruggen


Biodiversity
Habitat
Ecosystems

Cities and Biodiversity Outlook

Action and Policy

A Global Assessment of the Links between Urbanization, Biodiversity, and Ecosystem Services

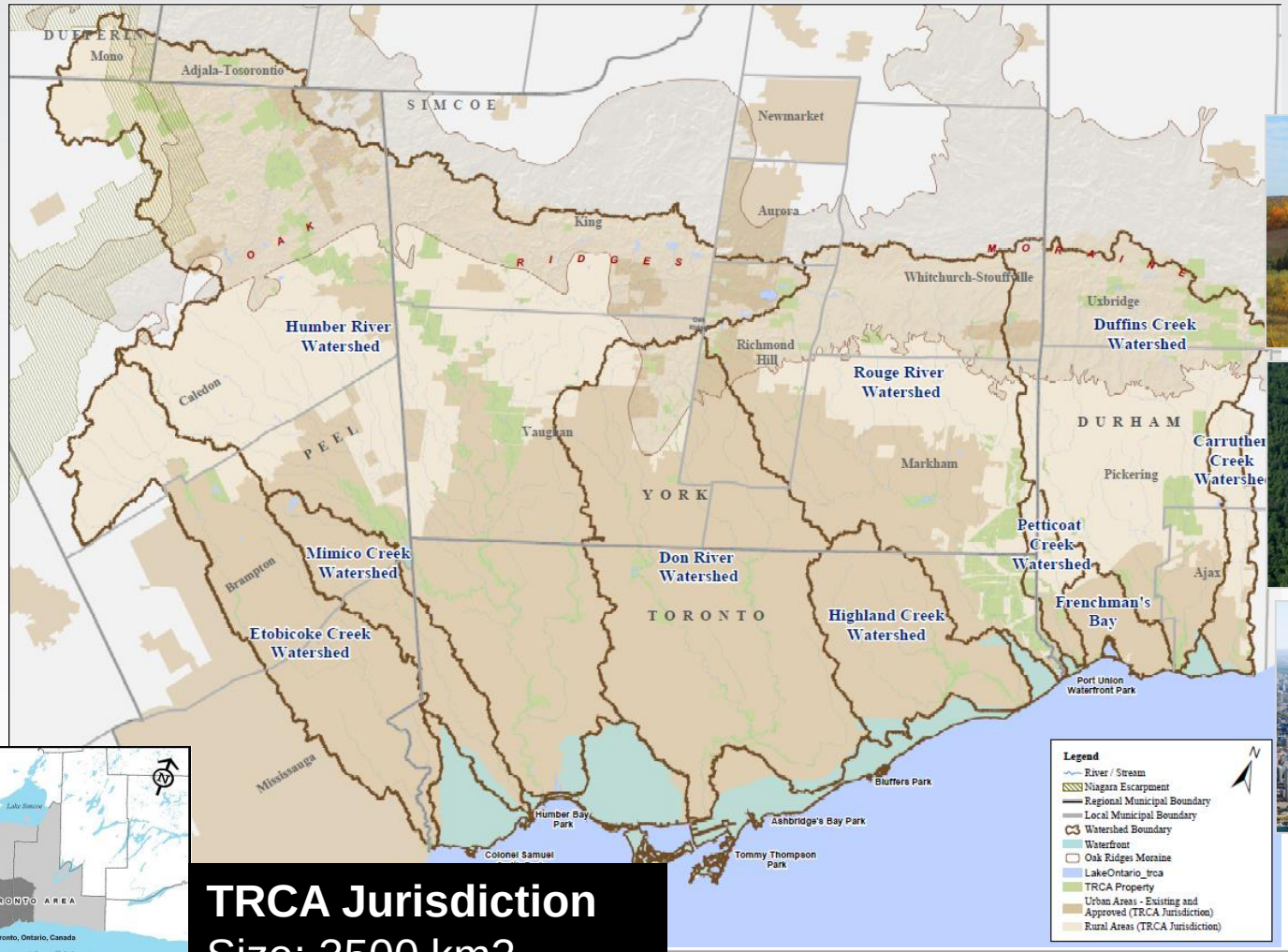
Convention on Biological Diversity

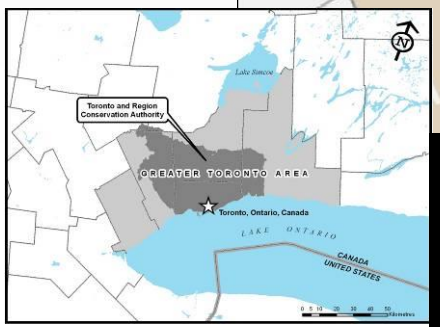
Stockholm Resilience Centre
Research for Governance of Social-Ecological Systems

Stockholm University

ICLEI
Local Governments for Sustainability

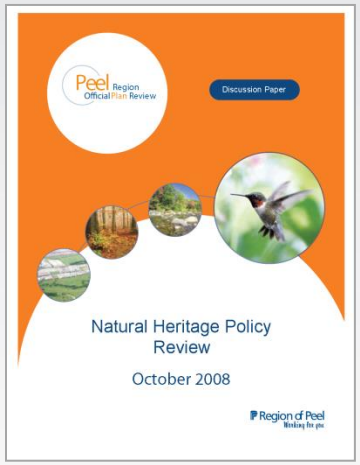
The Toronto and Region

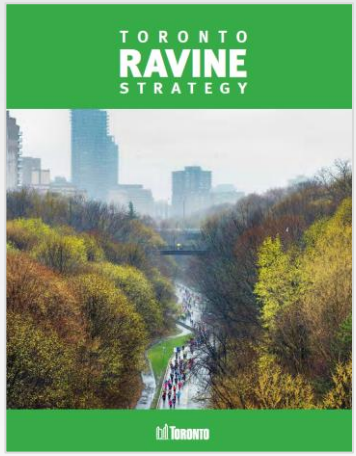


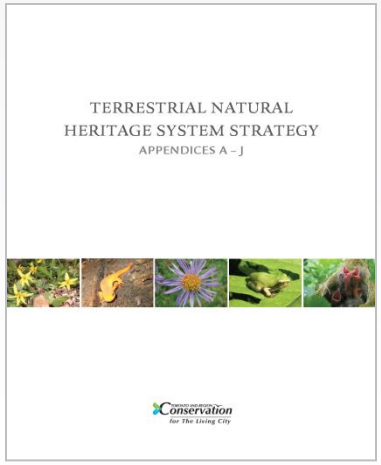


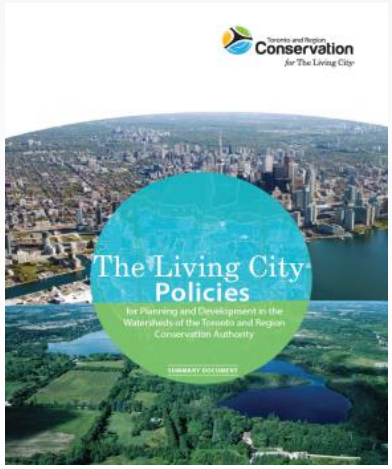
TRCA Jurisdiction
Size: 3500 km2
Population: 3.5 million

A Shared Vision for Resilient Ecosystem







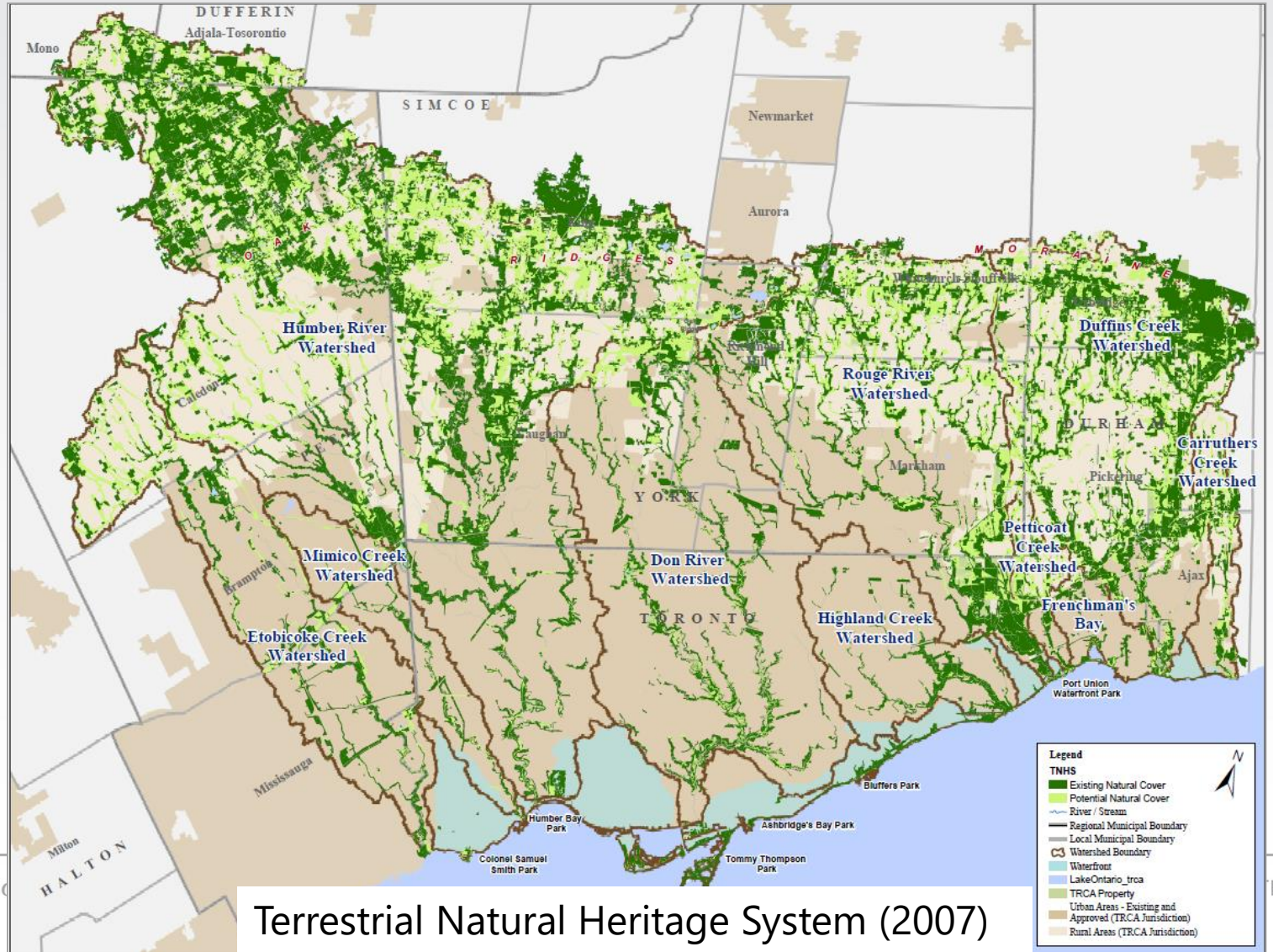


Government of Canada / Gouvernement du Canada
GREAT LAKES SUSTAINABILITY FUND
FONDS POUR LA DURABILITÉ DES GRANDS LACS

TORONTO & REGION
REMEDIAL ACTION PLAN

TRCA'S TERRESTRIAL NATURAL HERITAGE SYSTEM STRATEGY

Target for Resilient Ecosystem



Terrestrial Natural Heritage System (2007)

What did we achieve with TNHSS?

1. Assisted municipal partners in development of NHS in their OPs
2. Informed provincial and other CA initiatives related to NHS
3. Over 1300 ha of land acquired by TRCA within TNHS since 2007
4. Over 450 restoration projects were completed within TNHS since 2012
5. Informed various TRCA operations

Project Goal

To evaluate how the implementation of the TNHSS has and will contribute to addressing the loss of wildlife habitat and populations in the Toronto and Region and the Area of Concern




Project Objectives

1. Asses trends in natural cover change across Toronto and region to infer reasons driving it.

2. Evaluate adoption of TNHSS in municipal natural heritage system and associated policies to infer the state of current and future habitat protection across Toronto and region.

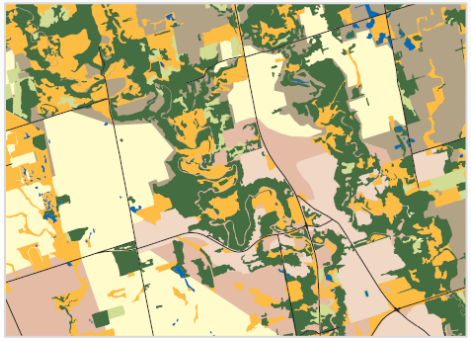
3. Analyze long term fixed monitoring plots data to assess wildlife population across Toronto and region.

4. Bringing it all together to highlight key recommendations moving forward.

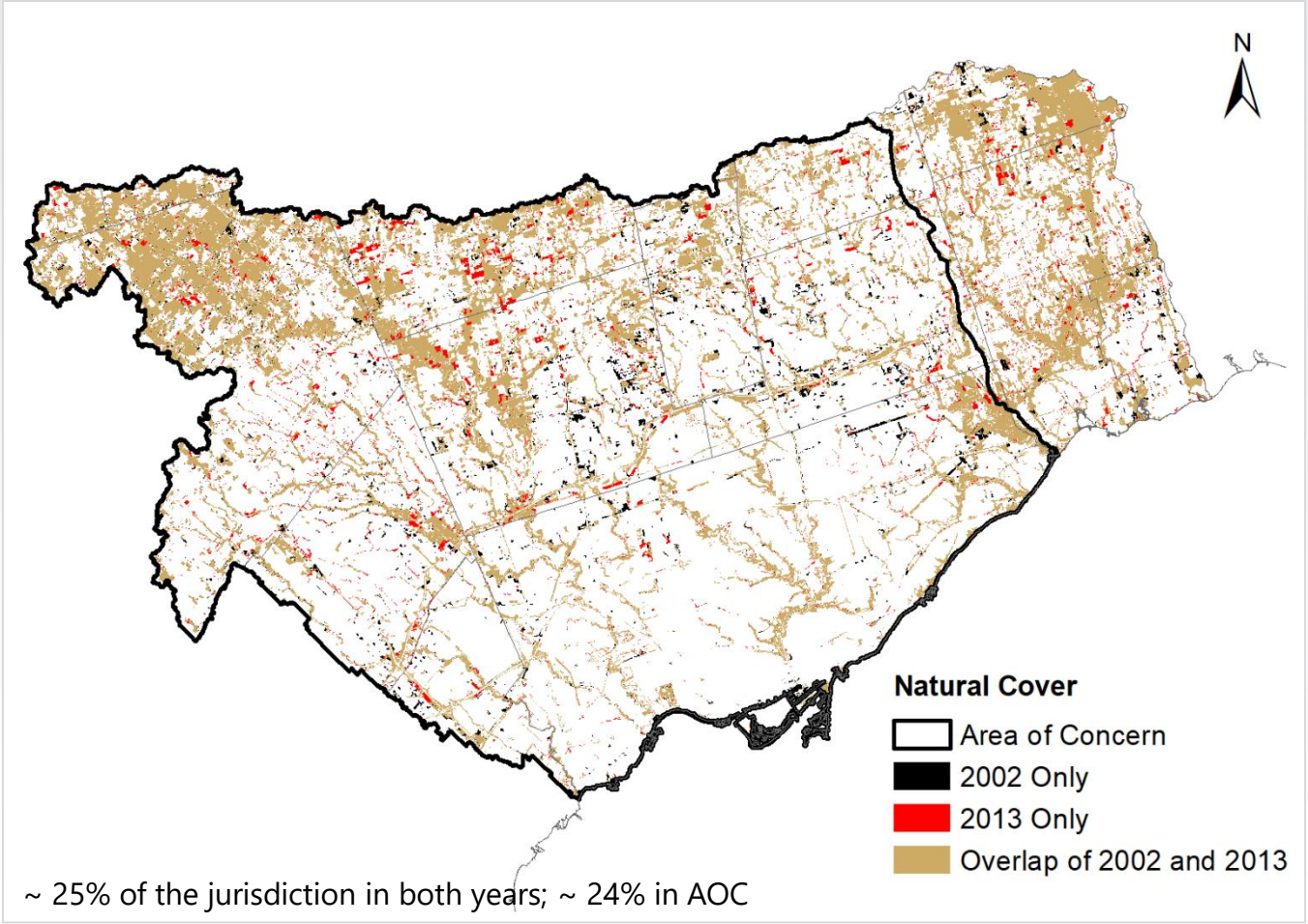
NATURAL COVER CHANGE

Natural Cover Quantity Change Analysis

- Rapid assessment of 2002 and 2013 TRCA ortho-photo interpreted natural cover data
- Change estimates for
  1. Habitat quantity
  2. Habitat quality
  3. Habitat types



Habitat Quantity - 2002 and 2013

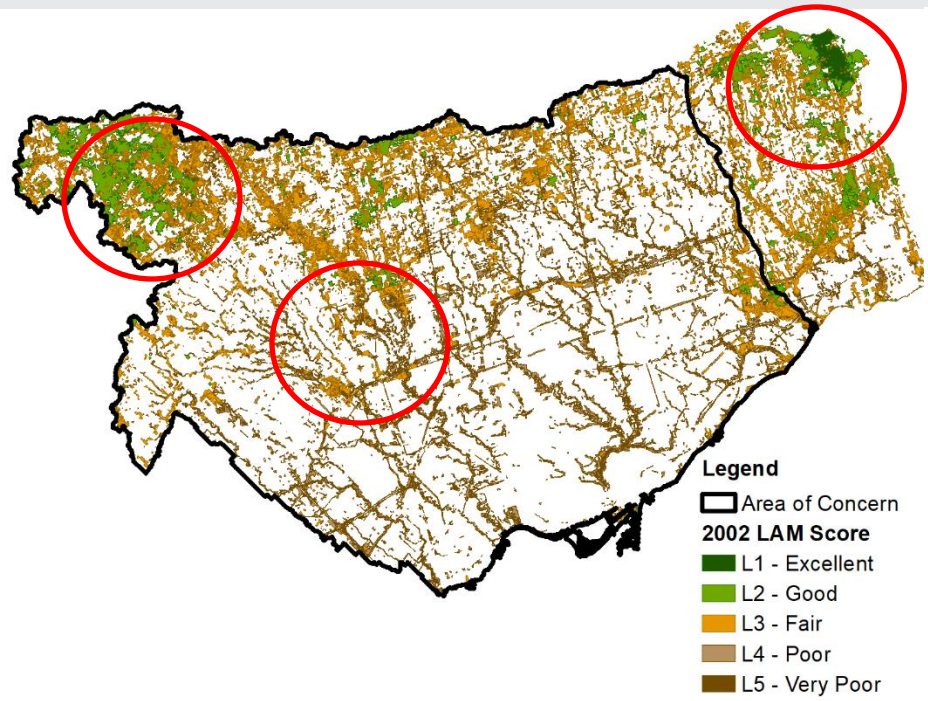


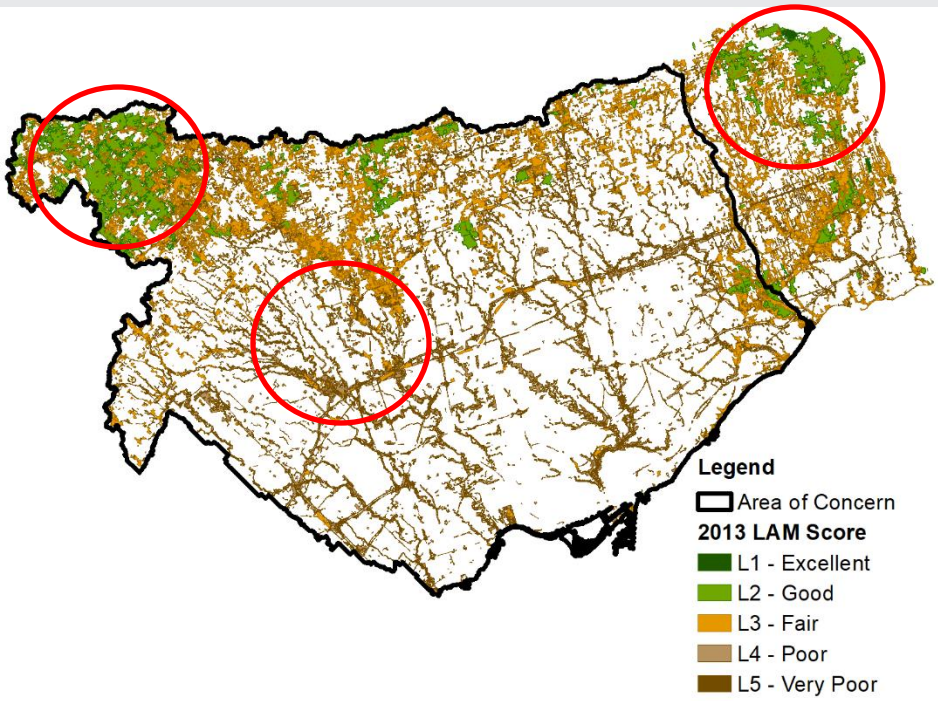
~ 25% of the jurisdiction in both years; ~ 24% in AOC

Habitat Quantity - 2002 and 2013

(1 km grid summary)

Habitat Quality – 2002 and 2013





Modelled based on size, shape and urban matrix influence

Habitat Types - 2002 and 2013

Habitat Type	2002 (ha)	2013 (ha)	Change (ha)	Change trend
Forest	33851	36382	2531	+
Meadow	23615	19252	- 4363	-
Successional	3150	4787	1637	+
Wetland	2572	3263	691	+
Beach/bluff	162	180	18	+
Overall	63350	63864	514	+

Calculate based on aerial photo interpreted habitat information

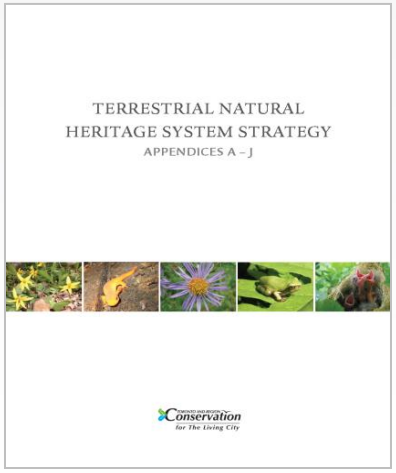
Natural Cover Change Analysis: Results

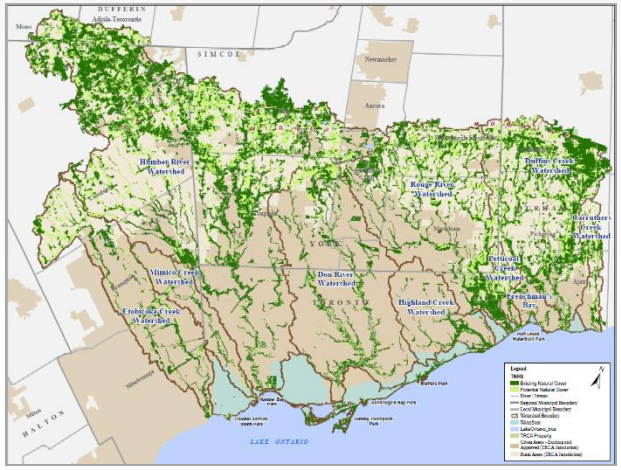
- Habitat quantity stayed relatively same in Toronto and region & AOC
- Overall decrease in meadow habitat across the jurisdiction, thus implications on meadow dependent species
- Habitat change is not evenly distributed across the jurisdiction
  - Most of the habitat increase is in the north and greenbelt
  - Most of the habitat loss is in urbanizing areas
  - Very little change in existing older urban areas
- Most of the future development areas overlap with habitat gain areas outside of greenbelt, thus challenges ahead for habitat and species conservation

NHS SPATIAL OVERLAP

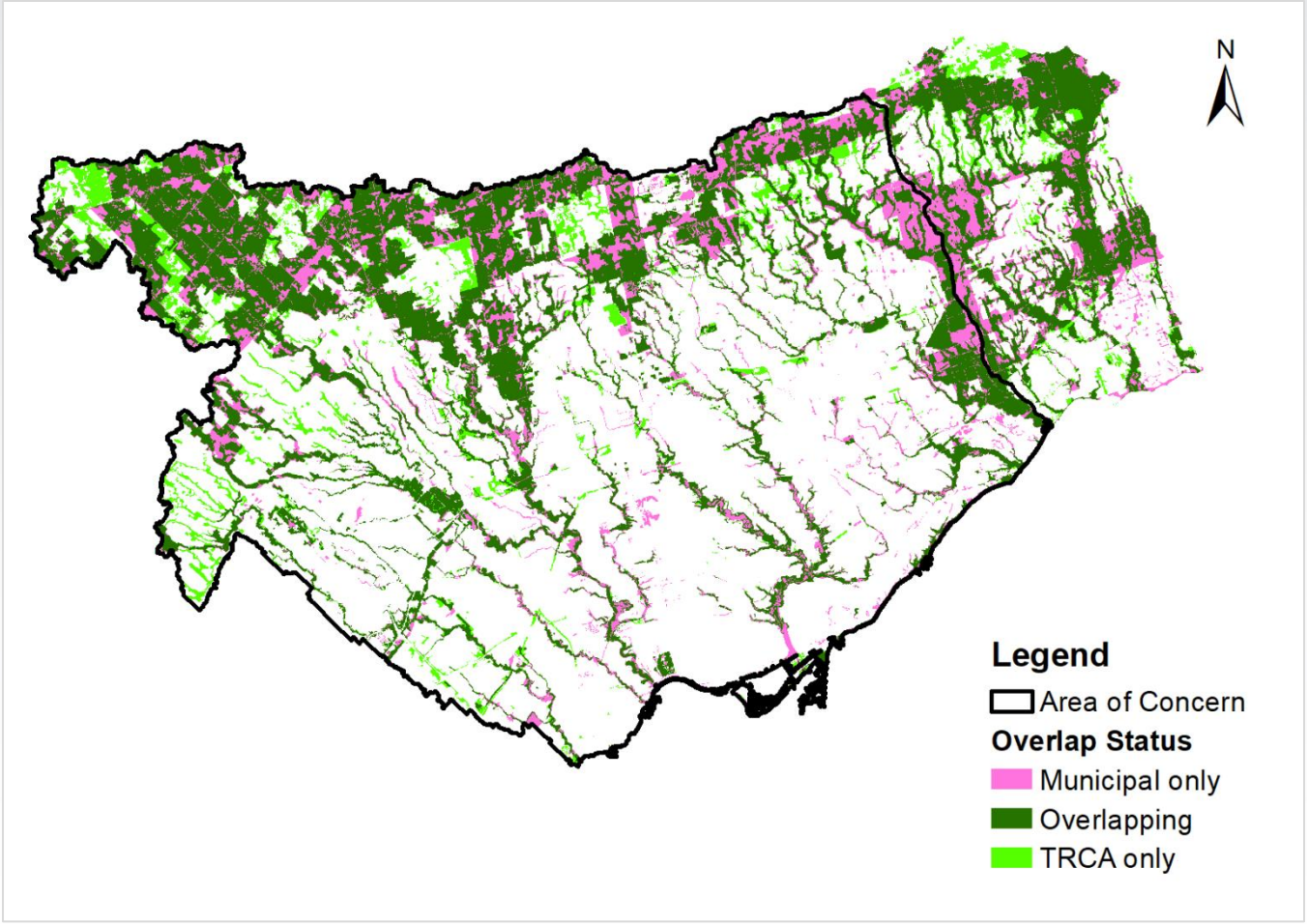
NHS Spatial Overlap Analysis

- Rapid assessment to compare TRCA TNHS and the municipal Official Plan NHS to understand the extent of TRCA TNHS adoption.
- Identify the reasons for differences and similarities
- Infer the implications for wildlife habitat and populations



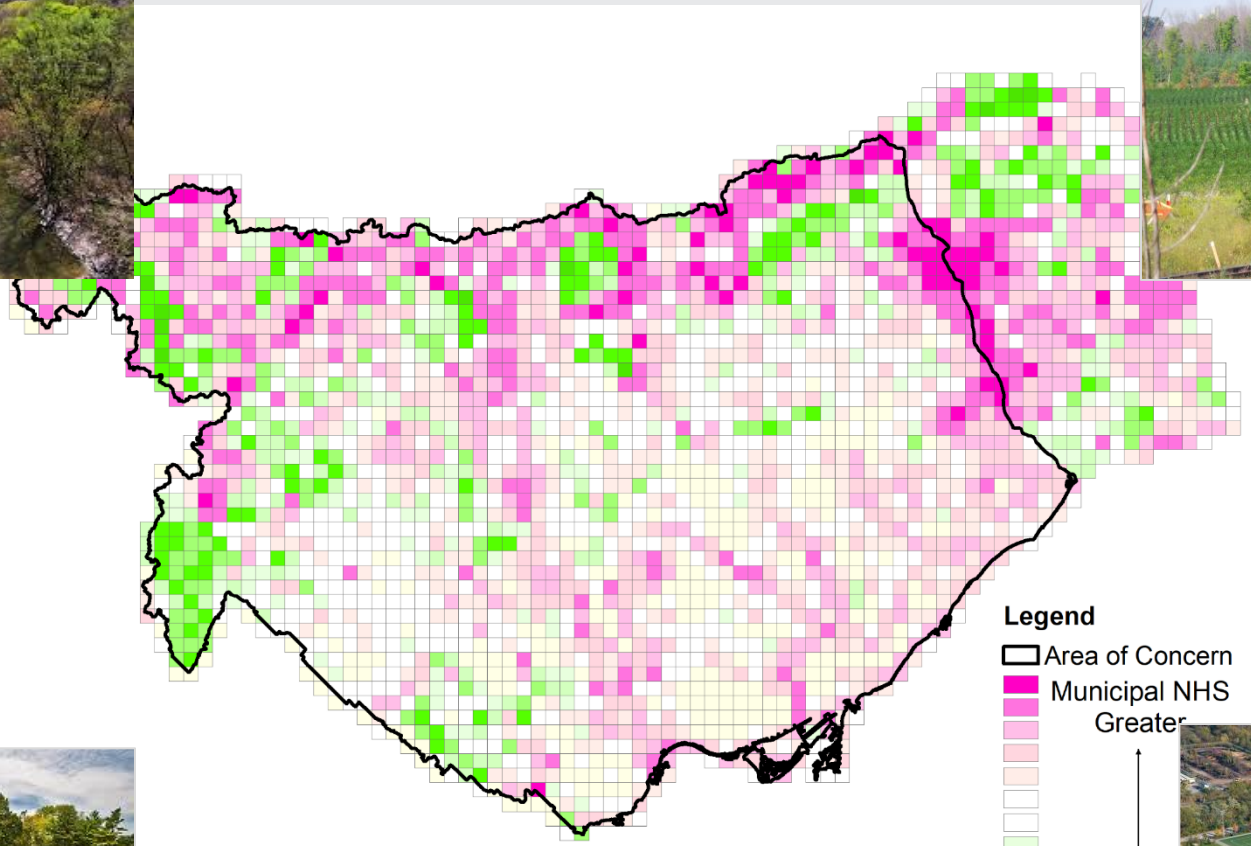


TRCA TNHS & Municipal NHS Overlap



TRCA TNHS & Municipal NHS Overlap

(km grid summary)



Overlap Analysis: Results

- Approximately 30% of the jurisdiction and AOC is included in municipal NHS indicating good coverage though the definition of NHS varies
- Approximately 85% of TRCA TNHS is included in overall municipal NHS
- Some TRCA TNHS areas were excluded and some additional areas were included in municipal NHS across all municipalities
- Main reasons for the discrepancy are:

1. Difference in NHS definition (natural areas verses active recreation areas/golf courses)
2. Coverage of provincial policies (broad swaths of green belt regardless of natural cover)
3. Planned land use / zoning issues (zoned for development but left as open space temporarily)
4. Temporal land cover and land use change (areas in 2007 is already developed in newer NHS)
5. Data processing errors (data clipping slivers, mapping errors)

NHS POLICY ANALYSIS

Policy Analysis

- To evaluate the NHS policies identified by local and regional municipal Official Plans as they provide the primary mechanism for implementation of the NHS.

- Rapid assessment of relative strength of the policies using the most up-to-date information
  1. Survey to Municipalities
  2. OP review
  3. TRCA Planners Input

- Three main aspects were identified
  1. Policy coverage
  2. Protection status
  3. Opportunities for expansion

Policy Analysis: Results

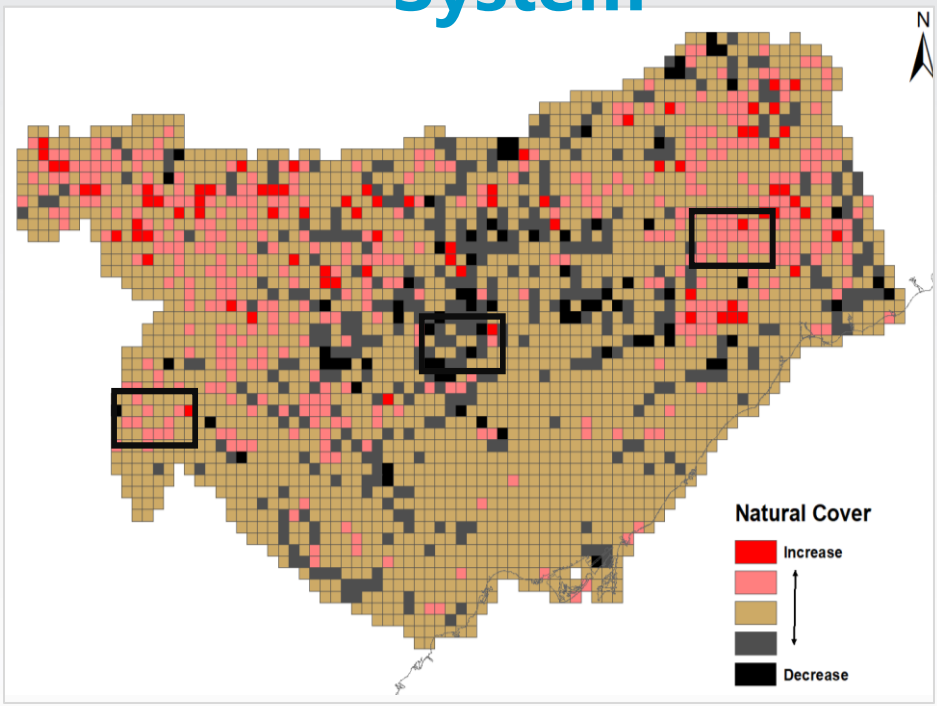
- The policy rating ranged from weak to strong, with mostly medium in the AOC

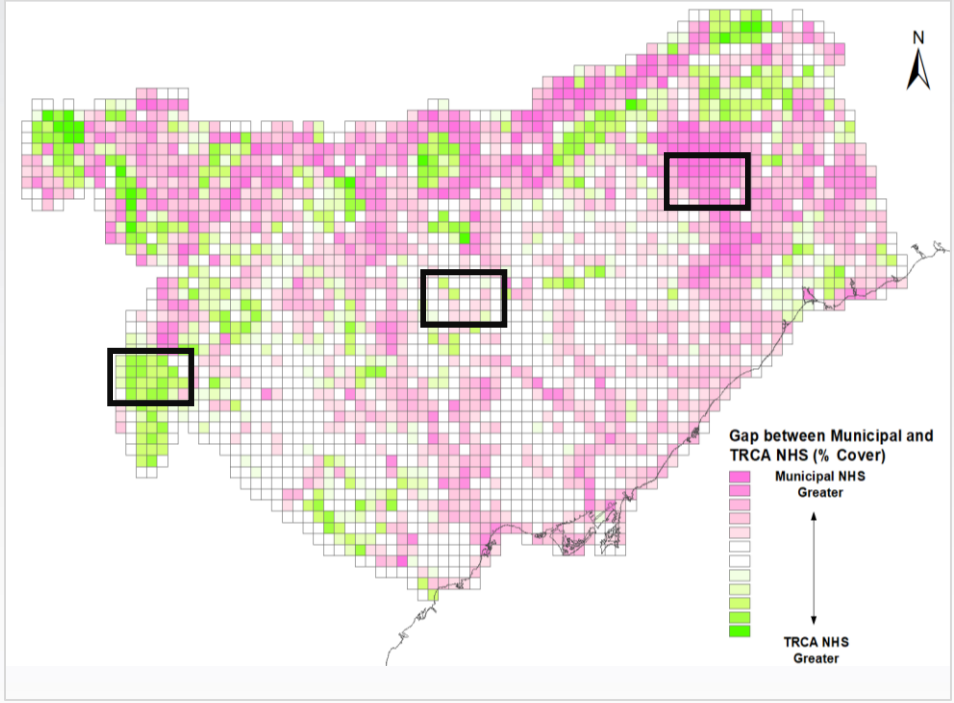
- Strong traits
  - Policy wording go beyond provincial policy requirements
  - Minimum buffers are applied to all Environmental Protection areas
  - EIS is typically required which may require larger buffers
  - Very few permitted uses with no exceptions; Infrastructure potential biggest threat
  - Explicit mapping of restoration areas and linkage enhancements
  - Discuss multiple strategies to acquire and restore new lands

- Weak traits
  - Lack clear minimum buffers,
  - Limited protection outside of provincially protected areas
  - Limited opportunities to acquire new land, improve connections, and expand/restore.

BRINGING IT TOGETHER

Habitat Change & Natural Heritage System





- Some of the past habitat gain areas may be vulnerable to future changes
- Some of the past habitat loss areas have lesser added protection
- Added support from the province and the federal policies facilitate municipal NHS
- Non-traditional NHS areas pose challenge & provide opportunities

Moving Forward…

- Prioritize habitat protection and implementation, especially in areas facing rapid urban growth
- Strengthen policies and implementation mechanisms to enhance habitat quality (size/shape)
- Develop additional guidance to more fully protect natural habitats not sufficiently addressed in current policy frameworks (e.g. meadows)
- Develop policies and implementation mechanisms to increase natural cover and promote urban matrix management through more innovative approaches using green infrastructure, especially where traditional opportunities may be limited.

Moving Forward…

- Continue effective implementation of protection and restoration efforts across the region
- Continue development and implementation of strong provincial policies to encourage, facilitate, and support strong municipal NHS policies
- Develop locally informed municipal NHS that go beyond Provincial direction to address the urban context of Toronto and region
- Strengthen the policies for expanded NHS, buffers, and other enhancements that go beyond natural feature boundaries
- Ensure stronger implementation of NHS policies to meet its objectives as having good NHS policy alone will not guarantee habitat protection and enhancement

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