



# CLIMATE CHANGE IN ONTARIO: HOW DO LAND TRUSTS PREPARE THEMSELVES?

Michael Drescher & Nadya Mrochkovskaia  
School of Planning, University of Waterloo  
OLTA Gathering 2017, Alliston

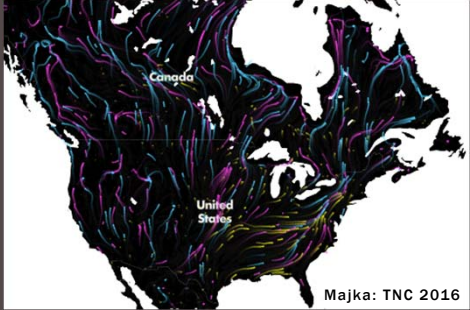
## CONTENT

1. Shifting climate zones & species
2. Land trust & climate change survey
3. Results
  - Land trust organization & operations
  - Perceptions & knowledge of climate change
  - Climate change adaptation & implementation
4. Climate change adaptation

# SHIFTING CLIMATE ZONES & SPECIES

## CLIMATE CHANGE & SPECIES MIGRATION

North America – continental scale




Majka: TNC 2016

Movement routes for 2954 species, connecting current habitats with projected locations under CC for the next 100 years

## CLIMATE CHANGE & SPECIES MIGRATION

Great Lakes - regional scale

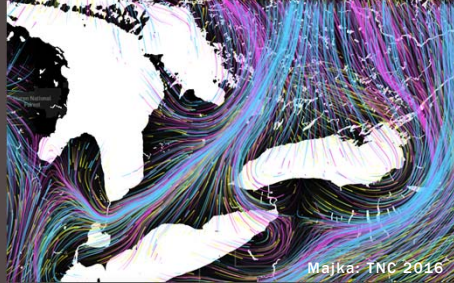


The Great Lakes will be an obstacle for many species migrating north trying to stay within suitable climate zones

Majka, TNC 2016

## CLIMATE CHANGE & SPECIES MIGRATION

South-central Ontario



South-central Ontario is an important route north for populations blocked by the Great Lakes, especially on the Michigan Peninsula & Niagara

Majka, TNC 2016

## LAND TRUST & CLIMATE CHANGE SURVEY

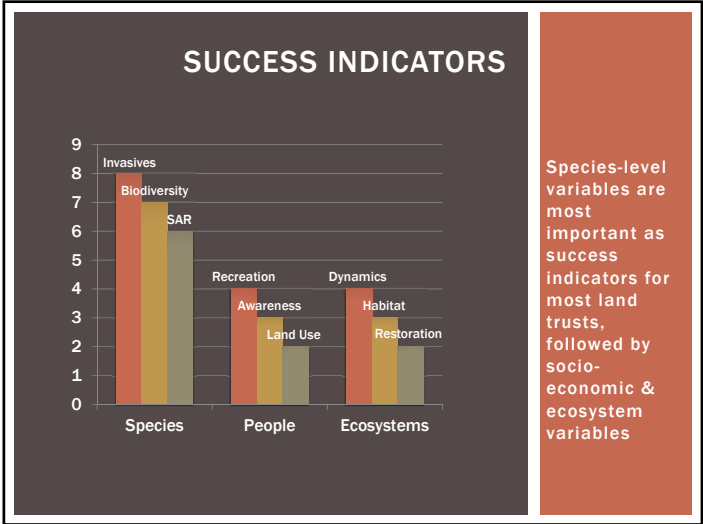
## ONTARIO LAND TRUST CLIMATE CHANGE SURVEY

- 33 questions w/ sub-questions
- 5 question themes:
  - Organization
  - Operations
  - CC perceptions/knowledge
  - CC adaptation measures
  - CC adaptation barriers & strengths
- Contacted all known land trusts in Ontario (N = 40, OLTAs & non-OLTAs)
- 13 responses (response rate = 32.5%)

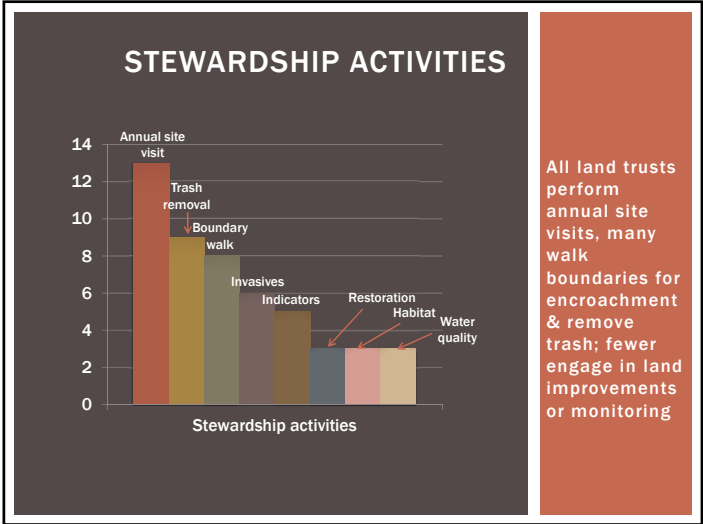
# LAND TRUST ORGANIZATION & OPERATIONS



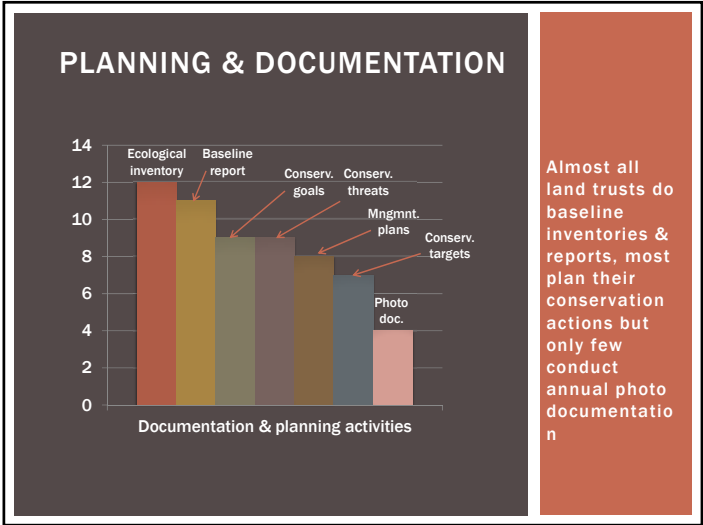
All land trusts name biodiversity as a goal, while various socio-economic & ecosystem goals are pursued to varying degree



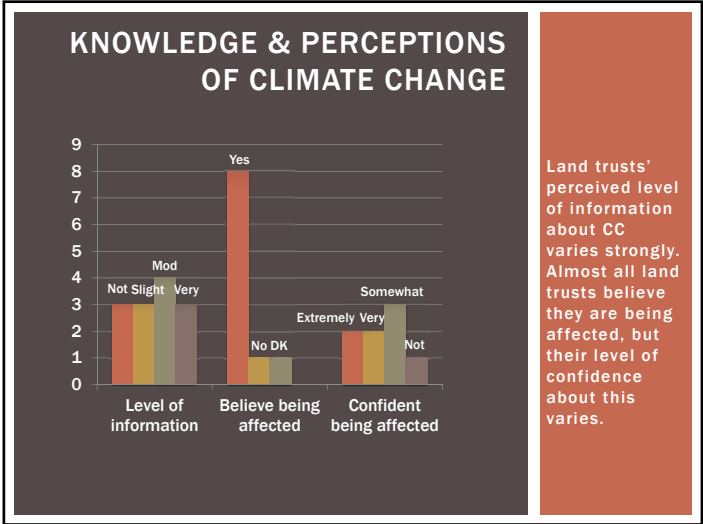
Species-level variables are most important as success indicators for most land trusts, followed by socio-economic & ecosystem variables



All land trusts perform annual site visits, many walk boundaries for encroachment & remove trash; fewer engage in land improvements or monitoring



### PERCEPTIONS & KNOWLEDGE OF CLIMATE CHANGE



### EXPECTED CLIMATE CHANGE EFFECTS

	Increase	Same	Decrease
Invasives land	9	1	1
Invasives water	7	1	1
Biodiversity animals	4	2	4
Biodiversity plants	4	2	4
Diversity ecosystems	6	3	1
Pests & diseases	7	2	0
Ecosystem services	6	2	2

Almost all land trusts believe that invasives & pests will increase. But they are split on whether biodiversity will increase. Most land trusts think ecosystems will become more diverse.

### CONCERN ABOUT POTENTIAL STRESS FACTORS

	Extreme/very	Somewhat	Not
Infrastructure develop.	8	3	2
Population growth	7	5	1
Industrial develop.	6	7	0
Climate change	5	6	2
Limited gov. capacity	5	5	3
Residential develop.	4	4	4
Natural disaster	3	5	5
Weak economy	3	4	6

Most land trusts are quite concerned about development, some are also quite concerned about CC & limited capacity in government. Other factors are less concerning.

### CONCERN ABOUT POTENTIAL STRESS FACTORS

Number of concerns	Number of land trusts
0	2
1	2
2	1
3	1
4	2
5	3
6	0
7	1

Some land trusts are quite concerned about many stress factors, while other land trusts have very few concerns

## CLIMATE CHANGE ADAPTATION IMPLEMENTATION

### KNOWHOW & IMPLEMENTATION OF ADAPTATION

Category	Sub-category	Number of land trusts
Knowledge	Not	2
	Some	7
	Very	1
	Extreme	1
Implementation	Yes	1
	No	12

Most land trust have at least some knowledge of CC adaptation measures, but almost none have implemented these measures.

### OBSTACLES FOR ADAPTATION

	Yes	No	Unsure
Lack of trust in science	1	8	3
Lack of information	3	7	2
Unsure CC is problem	4	6	2
Lack of capacity	5	3	4
Lack of urgency	6	4	2
Insufficient funds	7	1	4

Most land trusts have the information they need to adapt, but logistic constraints & more urgent issues are obstacles to adaptation

### COSTS AS OBSTACLES FOR ADAPTATION

	Very	Some	Not
Time	6	3	0
Unable to hire more staff	6	2	0
Cost of equipment	5	2	1
Training expenses	4	4	0
Cost of assessment	4	3	1
Cost of public particip.	2	3	2

Available time & staff numbers are most frequent obstacles to adaptation, followed by costs for planning & implementing adaptation

### DESIRED SUPPORTS FOR IMPROVED ADAPTATION

	Agree	Neutral	Disagree
Support for conferences & forums	10	2	0
Better regional CC information	9	3	0
Info how to propose innovations to decision-makers	8	4	0
More training & practical guidance	7	5	0
Increased flexibility in conservation measures	3	8	1

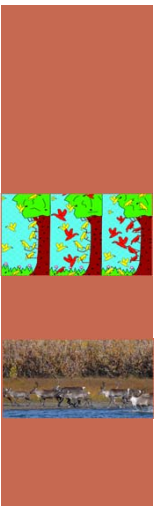
Most land trusts would appreciate more information & training in communication & practical matters. But more organizational flexibility is not required.

### CLIMATE CHANGE ADAPTATION

## CLIMATE CHANGE & ADAPTATION

Niche & Cumulative stress


- Species niche
  - Climate & nutrients – fundamental niche
  - Species-interactions – realized niche
- Cumulative stress
  - Climate change interacts w/ other stress factors
    - Harvest
    - Disturbance
    - Habitat degeneration
    - Invasive species
    - Fragmentation



## CLIMATE CHANGE & ADAPTATION

Refugia & corridors


- Refugia
  - Can be of any scale
  - Provide temporary or permanent reprieve of CC effects
- Corridors
  - Can connect "old" habitats
  - Can connect "old" with "new" habitats
  - Requires landscape & regional-level thinking across organizations & sectors



## CLIMATE CHANGE & ADAPTATION


Flexible conservation approaches

- Specific species & ecosystem goals
  - SAR, biodiversity
  - Dynamics, habitat
- Changing environmental conditions
  - Climate change interacting w/ other stress factors
- Flexible approaches
  - Land holdings
  - Management agreements
  - Conservation measures



Small white lady's slipper

# QUESTIONS?



# ACKNOWLEDGEMENT

Thanks to all land trusts that have participated in our survey

# THANK YOU!

Michael Drescher  
mdresche@uwaterloo.ca

