

Adapting Forestry Programs for Climate Change

NECC Summit

March 7, 2019

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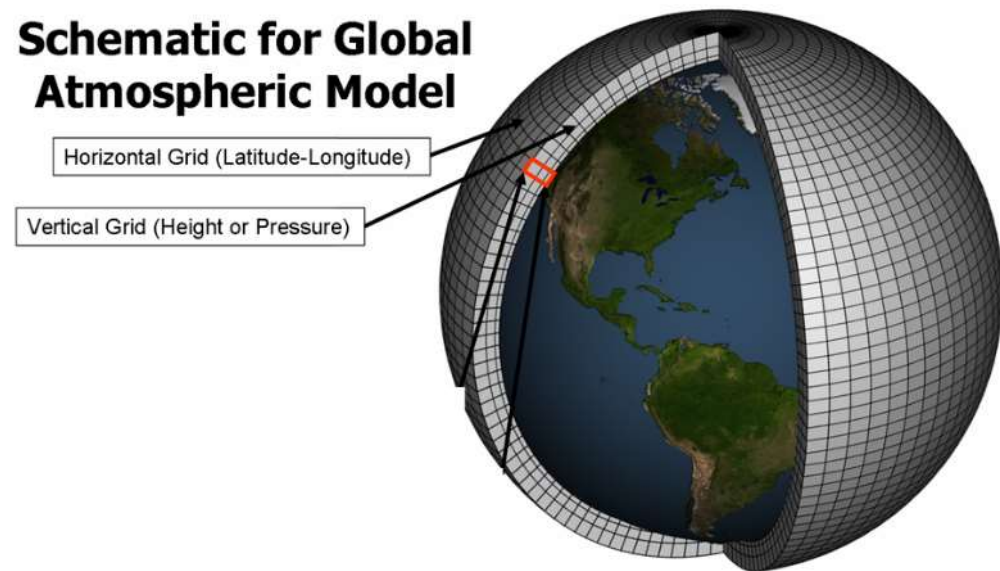
Lake Simcoe Region
conservation authority



Climate Change – A Big Picture

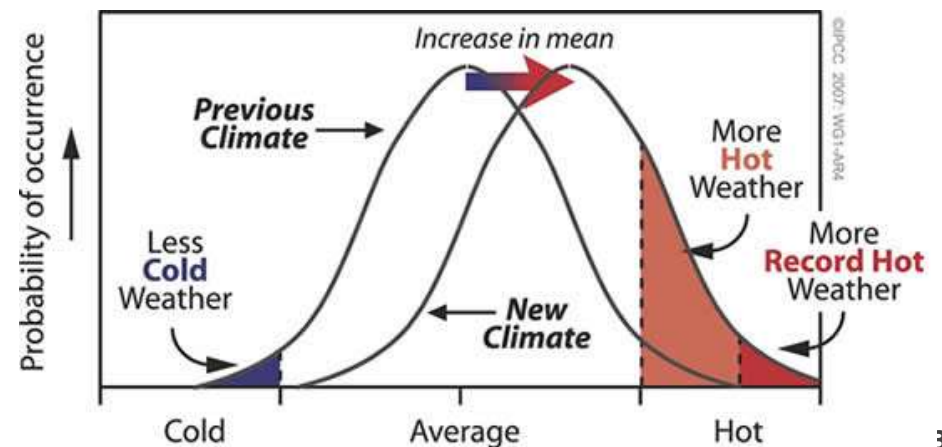
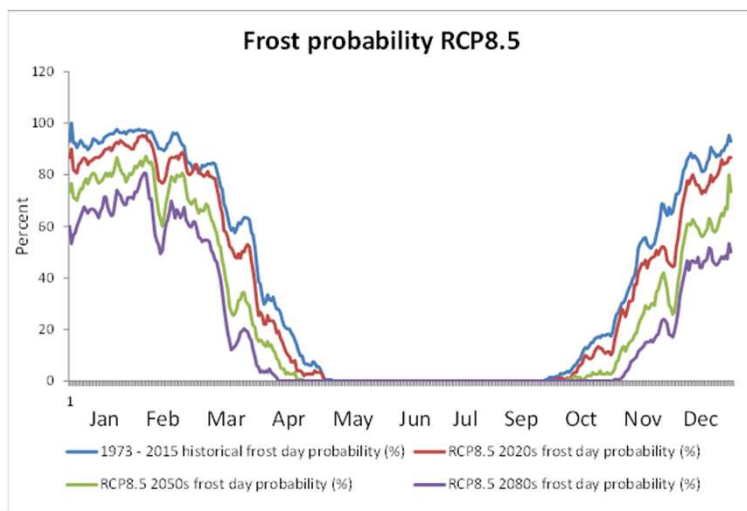
- Typically discussed at a global or national level
- Successful program delivery requires understanding at the watershed level

Schematic for Global Atmospheric Model



Downscaling – Impacts at our level

- What do Observed & Forecasted changes mean for LSRCA forestry programs?
 - Temperature & precipitation – means and extremes
 - Growing season length, biotic interactions
- Planning and Operations



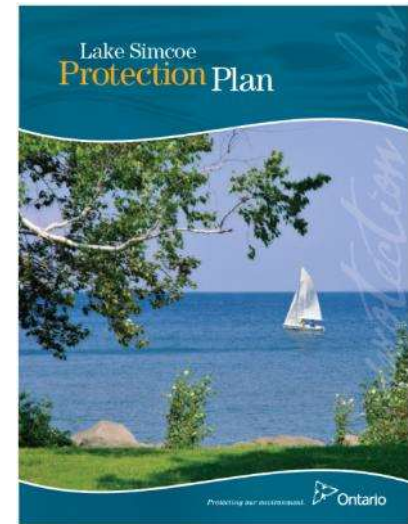
Challenges for Trees

- Finely adapted to sites at all stages
- Long-lived
 - Species lifespans exceed forecasted period of change
- Rapid pace of CC
 - Unable to migrate to keep up



Adapting Forestry Programs for CC

- Developed to inform changes in watershed afforestation & forestry programming
 - Funded by MOECC (MECP) under LSPP
 - Promote adaptation to maintain, expand and enhance watershed tree canopy
- Project approach
 - Stakeholder engagement
 - Internal & External
 - Literature review



Project Outcomes

1. Revised species planting list
 - Promote success of restoration projects
2. Adaptation Strategies for Forestry Programs
 - Afforestation
 - Forest management
 - Tree risk management
3. Knowledge transfer
 - Watershed & beyond





Adapting to Change in the Forest



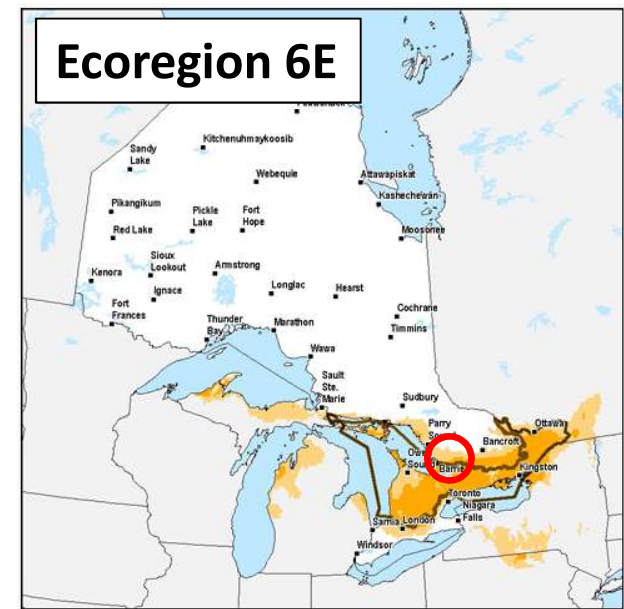
Impact:

Ecosystem Disequilibrium

Suitable habitat for many species moving north much faster than trees are able to naturally migrate

Adaptation Strategies:

- Shorten rotation ages
- Harvest prior to stand decline
- Promote better-adapted species
- Facilitate assisted migration



1971 - 2000



2041 - 2070

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Impact: Extreme Weather

Frequency, intensity, duration and timing of a variety of extreme weather events expected to change

Adaptation Strategies:

- Increase resilience to disturbance
 - Enhance species, structural & genetic diversity
 - More aggressive forest thinning
- Plan for response to disturbance
 - Develop recovery options
 - Revegetate following disturbance to establish less vulnerable cover



Impact: Carbon Sequestration

Forests play an important role in sequestering and storing atmospheric CO₂

Adaptation Strategies:

- Manage forests to increase C sequestration
- Prevent forest loss, reduce removals, increase stand stocking levels
- Promote use of local forest products
- Monitor trends in global C markets



Impact: Natural Heritage Values

CC threatens forest ecosystem biodiversity, as well as culturally significant species



Adaptation Strategies:

- Maintain or create climate refugia
- Promote high-quality habitat
- Increase landscape connectivity



Impact: Silviculture

Managing stand structure and sustainable harvesting becomes challenging in an uncertain future

Adaptation Strategies:

- Plan for operational limitations
 - Winters, less snow and more freeze/thaw
 - Greater potential for stand damage
 - Increased user conflict



Impact: Strategic Planning

Climate change adds complexity and uncertainty to traditional forest management



Adaptation Strategies:

- Incorporate CC into strategic planning documents
- Conduct frequent and intentional reviews of forest management plans
- Ensure projects have well-defined objectives
- Employ adaptive management
 - Monitor and adjust plans for continuous improvement





Planting Our Future Forests



Climate Change & Tree Planting

Establishing trees in the future will be impacted by a number of variables

- Shifts in tree species ranges
- More challenging early stage establishment
- Extending growing seasons
 - Frost-free sooner in spring and later in fall
- Operational challenges
 - Planting season length, access to labour
- Suitability and availability of plant stock



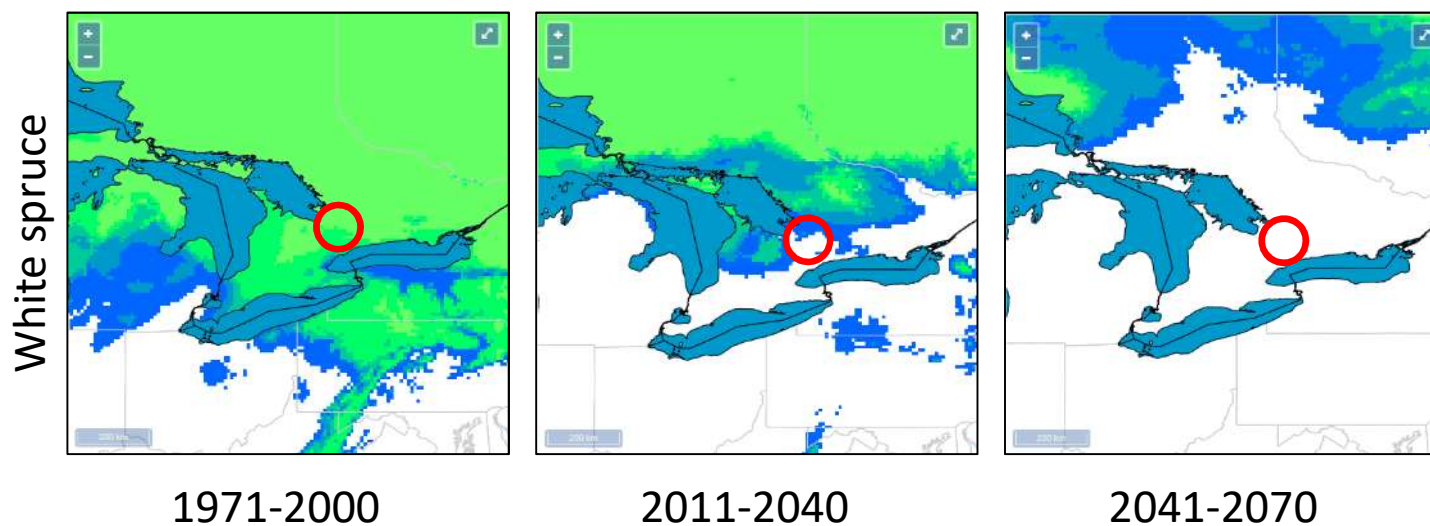
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Species List: Retreating

Species projected to no longer be climatically-suitable within decades:

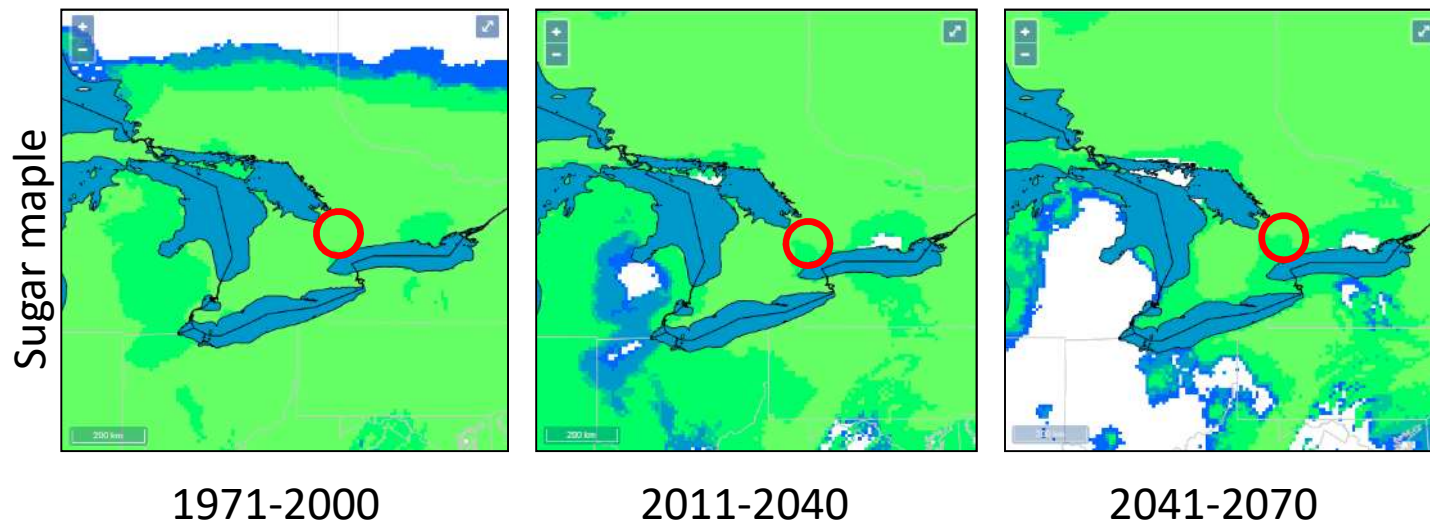
- White spruce
- Balsam fir
- Eastern white cedar
- Paper birch
- Tamarack
- Trembling aspen



Species List: Persisting

Currently prevalent in our watershed, and will continue to be climatically-suitable in the future:

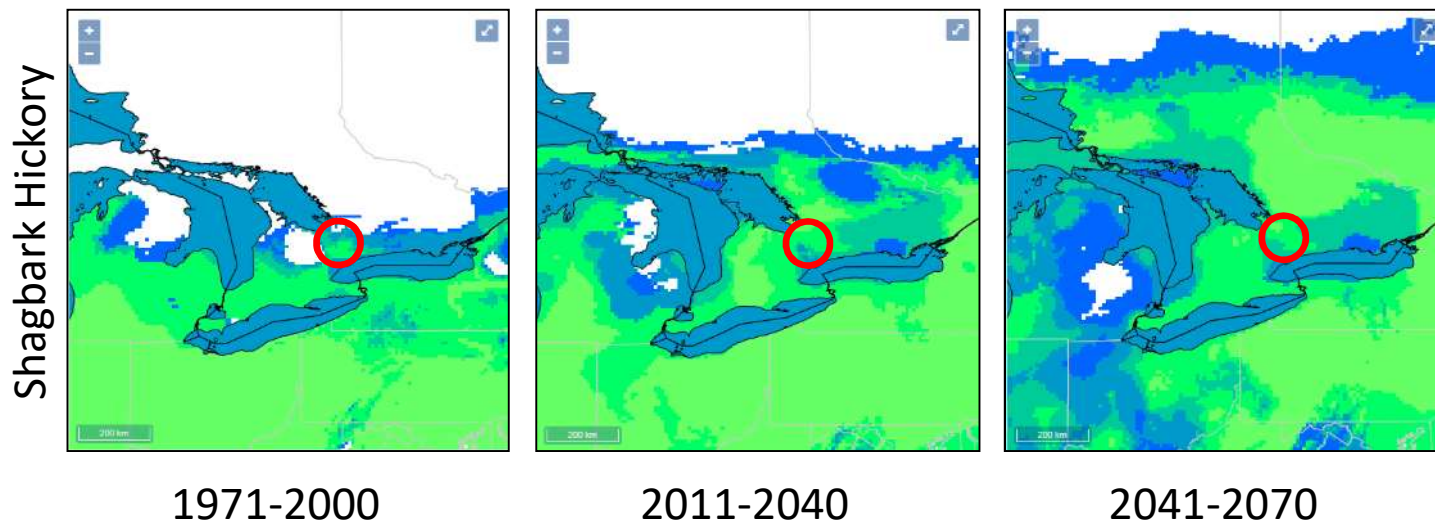
- Maple (sugar, red, silver)
- Oak (red, white, bur)
- White pine
- Beech
- Black cherry
- Ash...



Species List: Advancing

New species options, which will become suitable to plant as the climate continues to warm:

- Hackberry
- Hickories
- Southern oaks
- Sycamore
- Tulip tree
- Blackgum



Impact: Selecting Tree Species

Selecting appropriate species and seed zones becomes more difficult in a changing climate

Adaptation Strategies:

- Select tree species according to management objectives
- Bet-hedge with species from range of seed zones – 50:25:25 approach
- Increase species, genetic and structural diversity



Impact: Seed Availability

Increased environmental stress threatens seed quality and availability

Adaptation Strategies:

- Support responsible forest genetic management
 - Adhere to seed transfer policies
 - Engage with stakeholders to protect and enhance seed supply



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Impact: Tree Planting Logistics

Climate change may impact the timing, site conditions and logistics of the spring planting season

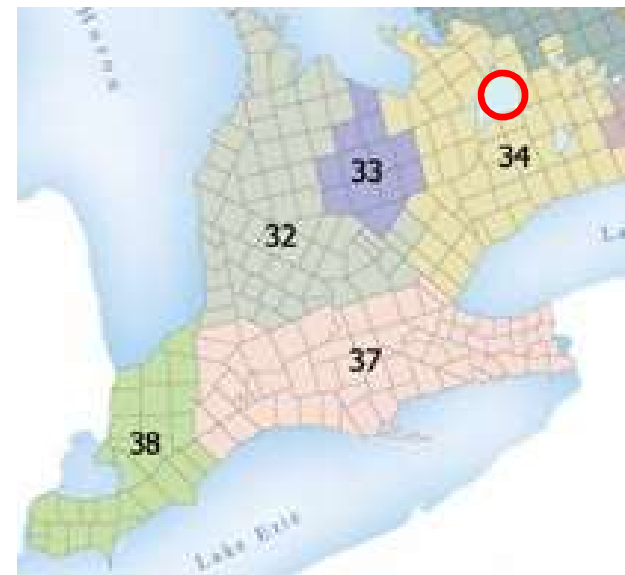
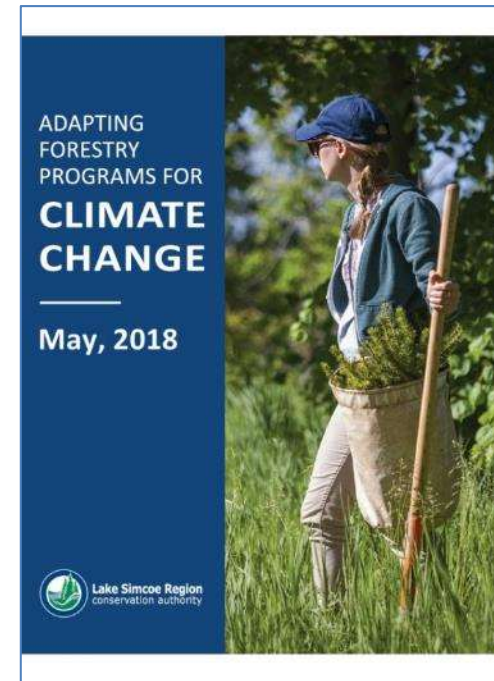
Adaptation Strategies:

- Modify to increase flexibility & spread risk
- Prepare for an earlier planting season
- Increase post-planting tending
 - Watering
 - Predator/pest control
 - Vegetation competition management



Actions Taken To-date

- Planted 3 Migration Trials in 2018
 - 2 with expanded seed zones
 - 1 with advancing species
- Report shared with Stakeholders
 - Document circulation & presentation
- Incorporating seed zones 32, 37 & 38
- Reviewing & prioritizing Adaptation Strategies



Thank-you for your time today

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Durham Region Natural Environment Climate Change Summit

Brought to you by: the Natural Environment
Climate Change Collaborative, with support from
the Region of Durham and Enbridge

thank you

thank you