

# Eastern Lake Ontario Invasive Species Symposium

Live  
Webinar

6.24.21

1:05pm EST

## Sustaining Healthy Lands

*Robert Smith*

*Terrestrial Restoration  
& Resiliency Coordinator-SLELO PRISM*

### AGENDA

Urban Forest Sustainability Initiative  
Black River Feasibility Study

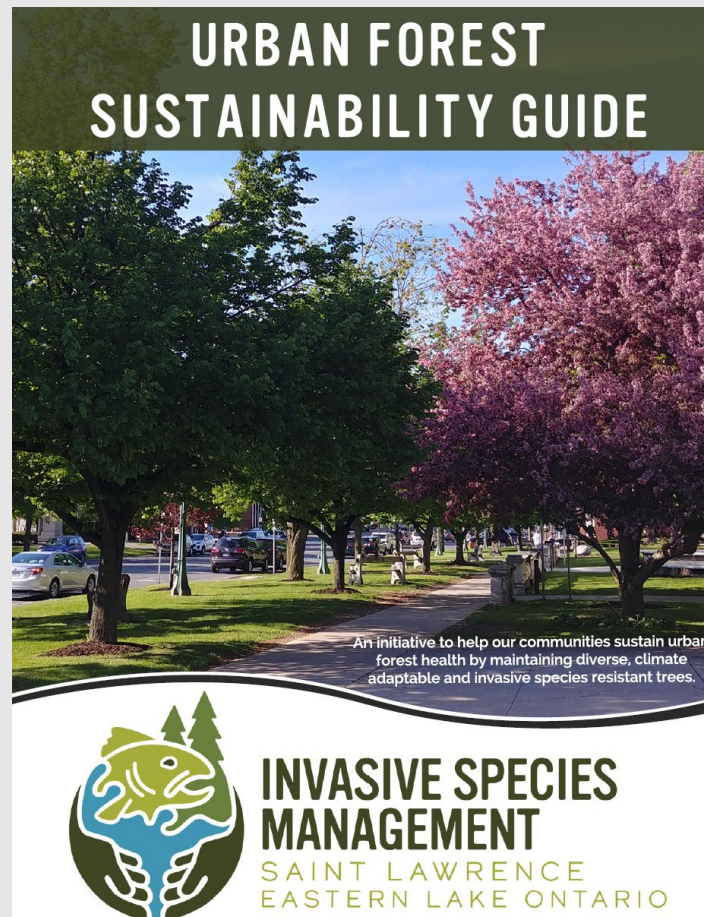


# Urban Forest Sustainability Initiative



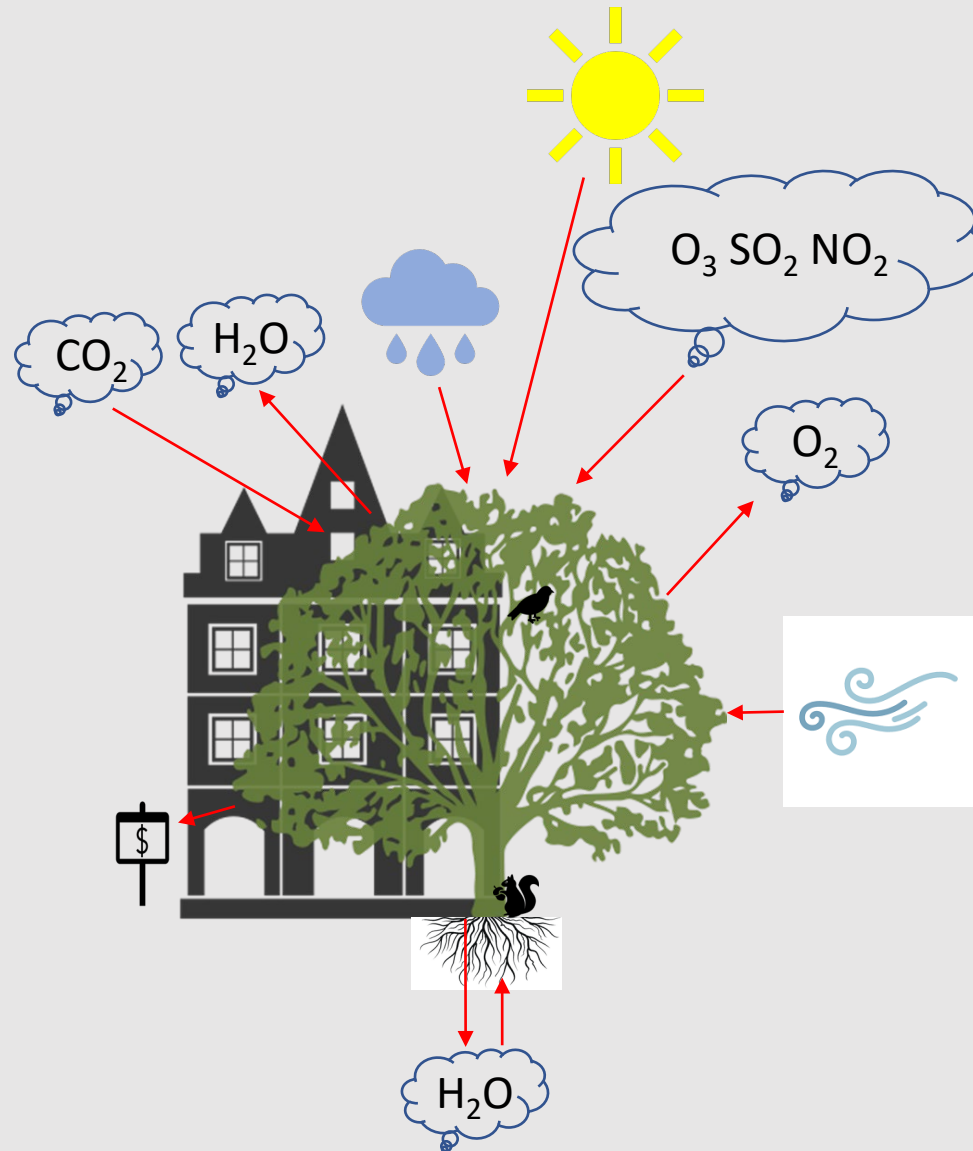
# Urban Forest Sustainability Initiative

- Urban Forest Sustainability Guide
- Presentation about the program
- Urban forest resources on the SLELO PRISM website
- \$5,000 reimbursement for purchase of non-invasive trees





# Benefits of the Urban Forest



**But only if the urban forest is healthy!**



# Developing a Sustainable Urban Forest (i.e. increasing resiliency)

## Components

- ✓ Tree Ordinance and Tree Board
- ✓ Urban Forest (Tree) Management Plan
- ✓ Tree City USA
- ✓ ReLeaf Program
- ✓ Community Science, Education, and Outreach
- ✓ Urban Forest Resiliency Plan



# What is an Urban Forest Resiliency Plan?

✓ A Proactive Strategy for Urban Forest Resilience to Invasive Pests, Pathogens, and Climate Change

✓ Main Components:

✓ **Urban Forest Resiliency Assessment** considers:

- ✓ invasive pest and pathogen risks
- ✓ climate change risks
- ✓ response and cost

✓ **Urban Forest Health (Resilience)** considers:

- ✓ right tree, right place
- ✓ invasive pest and pathogen resilience
- ✓ climate change resilience

Resiliency Assessment + Forest Health (Resilience) = Urban Forest Resiliency Plan





# Urban Forest Resiliency Assessment

## Risks to Consider Invasive Pests and Pathogens

### Present Risks



Emerald Ash Borer



Hemlock Woolly Adelgid

### Future Risks



Spotted Lanternfly



Asian Long-horned Beetle



# Urban Forest Resiliency Assessment (cont.)

## Risks to Consider Climate Change

- ✓ Predicted to increase 3-8°F by 2100 (1901-2011 increase of 2.4°F)
- ✓ Greater winter precipitation and longer summer droughts
- ✓ Negative impact on many northern and boreal tree species
- ✓ Which trees will do well and which will do poorly?

USDA United States Department of Agriculture Forest Service Northern Research Station

You are here: [Northern Research Station Home](#) / [Tools & Applications](#) / [Climate Change Atlas](#)

### Climate Change Atlas

**Explore the Climate Change Tree Atlas**

Explore the potential habitat shifts for 134 tree species

**Featured Research**

Central Appalachians forest ecosystem vulnerability assessment and synthesis: a report from the Central Appalachians Climate Change Response Framework project

**Combined Species Outputs**

Potential Changes by Region, State, Forest Type or National Forest and Parks

**Search for Trees & Birds:**

Enter a common or scientific name

[List of Trees](#) | [List of Birds](#)

**About the Climate Change Atlas**

The Climate Change Atlas documents the current and possible future distribution of **134 tree species** and **147 bird species** in the Eastern United States and gives detailed information on environmental characteristics defining these distributions. Please be sure to read the **warnings, cautions and questions**.

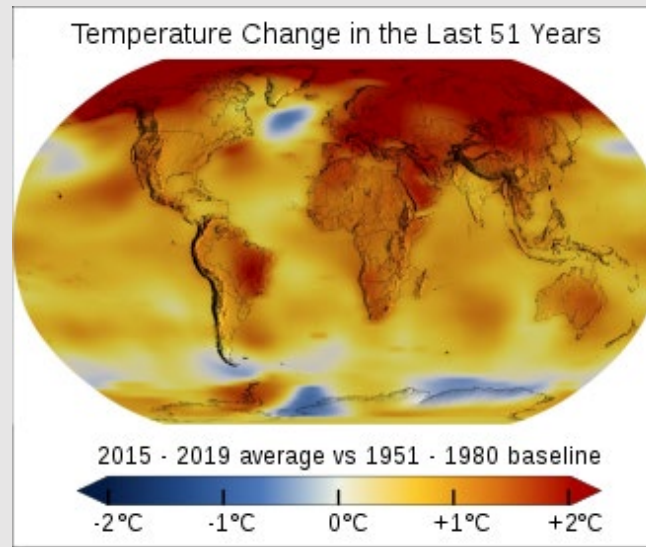
You may also browse and view the **previous version of the Tree Atlas** or the **previous version of the bird atlas**.

**Climate Change Atlas Resources**

[Hands-on Guide to Atlas](#) (pdf)

**Videos**

- ▶ Quick Start Guide
- ▶ An Introduction to the Climate Change Atlas: How does it work?
- ▶ An Overview of the Climate Change Atlas Components
- ▶ Exploring Current Species Information
- ▶ Modeled Future Habitats
- ▶ Combined Species Outputs



# Urban Forest Resiliency Assessment (cont.)

## ✓ Document Risks

- ✓ List tree species in your urban forest
- ✓ Determine the current and potential risks for each tree species

## ✓ Estimate financial cost for:

- ✓ Tree removal, replacement, or pesticide treatment
- ✓ Lost ecosystem services (iTree ([itreetools.org](http://itreetools.org)))

## ✓ Summarize results in resiliency assessment report



# Urban Forest Health

## Right Tree, Right Place

- ✓ Healthy Trees = Resilient Trees
- ✓ Tree species are adapted to the conditions where they naturally occur
- ✓ Match location with tree suitability
- ✓ Ultimately saves the municipality money and time





# Urban Forest Health (cont.)

## Urban Forest Invasive Pest and Pathogen Resilience

- ✓ Increase species and age diversity
- ✓ Select less vulnerable tree species
- ✓ Good Resource: Potter et al. (Global Ecology and Conservation)
- ✓ Have an early detection/rapid response team



# Urban Forest Health (cont.)

## Climate Adaptability

- ✓ Increase Species Diversity
- ✓ Increase Age Diversity
- ✓ Plant Climate Change Adaptable Trees
- ✓ Good Resources:
  - ✓ USDA Forest Service Climate Change Atlas
  - ✓ Potter, Crane, and Hargrove (New Forests)



New Forests (2017) 48:275–300  
DOI 10.1007/s11056-017-9569-5



### A United States national prioritization framework for tree species vulnerability to climate change

Kevin M. Potter<sup>1</sup> · Barbara S. Crane<sup>2</sup> · William W. Hargrove<sup>3</sup>

Received: 8 August 2016 / Accepted: 12 January 2017 / Published online: 19 January 2017  
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**Abstract** Climate change is one of several threats that will increase the likelihood that forest tree species could experience population-level extirpation or species-level extinction. Scientists and managers from throughout the United States Forest Service have cooperated to develop a framework for conservation priority-setting assessments of forest tree species. This framework uses trait data and predictions of expected climate change pressure to categorize and prioritize 339 native tree species for conservation, monitoring, management and restoration across all forested lands in the contiguous United States and Alaska. The framework allows for the quantitative grouping of species into vulnerability classes that may require different management and conservation strategies for maintaining the adaptive genetic variation of the species within each group. This categorization is based on risk factors relating to the species' (1) exposure to climate change, (2) sensitivity to climate change, and (3) capacity to adapt to climate change. We used K-means clustering to group species into seven classes based on these three vulnerability dimensions. The most vulnerable class encompassed 35 species with high scores for all three vulnerability dimensions. These will require the most immediate conservation intervention. A group of 43 species had high exposure and sensitivity, probably requiring conservation assistance, while a group of 69 species had high exposure and low adaptive capacity, probably needing close monitoring. This assessment tool should be valuable for scientists and managers determining which species and populations to target for monitoring efforts and for proactive gene conservation and management activities.

**Electronic supplementary material** The online version of this article (doi:10.1007/s11056-017-9569-5) contains supplementary material, which is available to authorized users.

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# Urban Forest Health (cont.)

## Increase Species Diversity with Natives

- Supports Local Wildlife (NYS DEC)
- Low Maintenance (NYS DEC)
- Unlikely to be invasive or overly competitive with other native plants (U.S. Forest Service)



Bur Oak



Photo by  
mdf

Photo by  
Jane S. Richardson



Photo by  
USDA

White Oak



Photo by  
Andrew  
Nelson

White Spruce

Eastern





# Urban Forest Health (cont.)

## Avoid Selecting Invasive Tree Species

- iMapInvasives Website (NY Natural Heritage Program)
- Includes species such as:
  - Tree-of-Heaven
  - Norway Maple
  - Black Locust



Photo by USDA

Norway Maple

Bur Oak

Yellow Poplar



Black Locust



Photo by Andrew Nelson

Tree-of-Heaven





American Sycamore



Photo by  
USFS

Northern White-Cedar

**Please Visit The  
SLELO PRISM Website  
For  
Urban Forest Sustainability Guide and  
Additional Urban Forest Sustainability Resources  
[www.sleloinvasives.org/urbanforestsustainability/  
robert.l.smith@tnc.org](http://www.sleloinvasives.org/urbanforestsustainability/robert.l.smith@tnc.org)**



American Basswood



Photo by  
Randy Everette

Sassafras





# Black River Feasibility Study

- **Introduction**
  - 3.5 Mile Trail between Watertown and Fort Drum
  - 104,000 visits to the trail in 2019
- **Issue**
  - Several known invasive plant species present
    - Phragmites, swallow-wort, oriental bittersweet, buckthorn, honeysuckle
- **Data Collection (summer)**
  - Surveyed 29 compartments
    - Length: 1/8 mile
    - Width: north - trail to river, south - 100 ft from trail
  - Recorded:
    - Tree abundance and canopy cover
    - Herbaceous/understory plant abundance and cover
    - Invasive plant abundance and cover
    - Location of culverts and tributaries





# Black River Feasibility Study Progress

- **Data Analysis**
  - Compile and compare native, non-natives, invasives, and rare plant species composition
  - Compare invasive species management methods
  - Analyze terrain
- **Results**
  - Priority Score for each compartment
  - Recommended management/removal methods
  - Recommended native plant species for restoration work



# Black River Feasibility Study

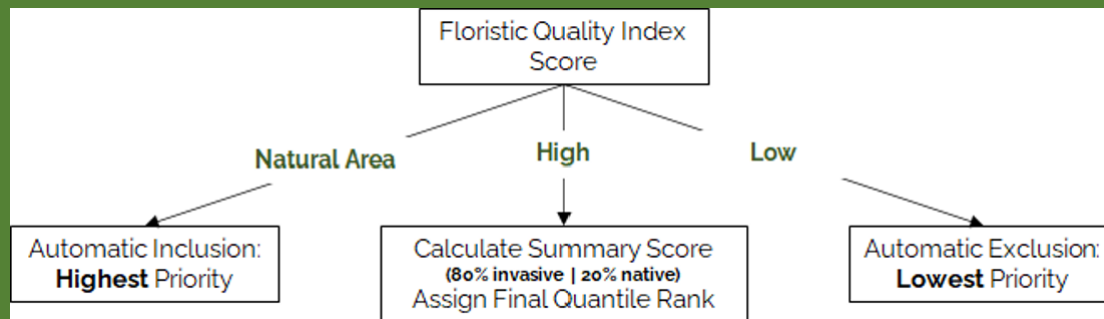
- Prioritization Score
  - Determine Floristic Quality Index (FQI) Score
    - Coefficient of Conservatism (C)
    - Number of Species (N)

$$FQI = \bar{C} * \sqrt{N}$$

## FQI Quality Categories

Floristic Quality Index (FQI)	Description of Quality
1-19	Low
20-35	High
Over 35	Natural Area (Exceptional)

- Prioritize by FQI Quality Categories



# Black River Feasibility Study

- Data Analysis
  - Determine Summary Score for High FQI Category Segments
    - = 20% Native Species Score + 80% Invasive Species Score
  - Final Black River Prioritization Scores

Compartment	FQI Category	Summary Score	Final Ranking Quantile
13	Natural	1	1
14	Natural	1	1
15	Natural	1	1
11	High	3	2
2	High	4	3
4	High	6	4
24	High	6	4
3	High	9	5
6	High	10	6
10	High	10	6
1	High	11	7
18	High	11	7
5	High	12	8
22	High	12	8
23	High	12	8

Compartment	FQI Category	Summary Score	Final Ranking Quantile
12	High	13	9
17	High	13	9
8	High	14	10
9	High	15	11
19	High	18	12
26	High	18	12
16	High	20	13
21	High	20	13
25	High	20	13
7	High	21	14
20	High	21	14
0	High	26	15
27	Low	999	999
28	Low	999	999



# Black River Feasibility Study

- Data Analysis
  - Spatial Analysis of Top Ranked Grids



# Black River Feasibility Study

## Management/Removal Methods

- **Strategy**
  - Minimize Chemical Use
  - Long-Term Monitoring and Management
- **Recommendations**
  - Combination of digging and hand pulls for non-woody invasive plant species and seedlings of woody invasive species
  - Hand tools such as an “uprooter” or “root talon” for invasive shrub removal
  - Spade cut method and smothering for Phragmites
  - Cut-stem chemical treatment with secured covers over treated surface for woody invasive vine (oriental bittersweet)
  - Formation of volunteer group to perform annual hand pulls of invasive species



# Black River Feasibility Study

## Recommended Native Plant Species for Restoration

- Based on plants found (over 200 natives)
  - Trees, shrubs, herbs, and graminoids selected by wetland indicator & shade tolerance
  - Most common species



## Top Herbs by Wetland Indicator

Wetland Areas	
Common Name	Scientific Name
northern bugleweed	<i>Lycopus uniflorus</i>
white turtlehead	<i>Chelone glabra</i>
maple-leaved viburnum	<i>Viburnum acerifolium</i>
false nettle	<i>Boehmeria cylindrica</i>
nodding beggar ticks	<i>Bidens cernua</i>
sweet-scented bedstraw	<i>Galium triflorum</i>
sensitive fern	<i>Onoclea sensibilis</i>
tall meadow rue	<i>Thalictrum pubescens</i>
boneset	<i>Eupatorium perfoliatum</i>
Canada anemone	<i>Anemone canadensis</i>

Upland Areas	
Common Name	Scientific Name
common milkweed	<i>Asclepias syriaca</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
tall goldenrod	<i>Solidago altissima</i>
herb Robert	<i>Geranium robertianum</i>
blue-stemmed goldenrod	<i>Solidago caesia</i>
false Solomon's seal	<i>Maianthemum racemosum</i>
eastern enchanter's nightshade	<i>Circaea canadensis</i>
common white snakeroot	<i>Ageratina altissima</i>
common yellow wood sorrel	<i>Oxalis stricta</i>
prickly gooseberry	<i>Ribes cynosbati</i>

All Areas	
Common Name	Scientific Name
spotted Joe Pye weed	<i>Eutrochium maculatum</i>
calico aster	<i>Symphyotrichum lateriflorum</i>
hog peanut	<i>Amphicarpaea bracteata</i>
Indian hemp	<i>Apocynum cannabinum</i>
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>