

Urban Forest Sustainability Initiative

Presented by:

Robert Smith

Terrestrial Restoration and Resiliency Coordinator
SLELO-PRISM

www.sleloinvasives.org/urbanforestsustainability/



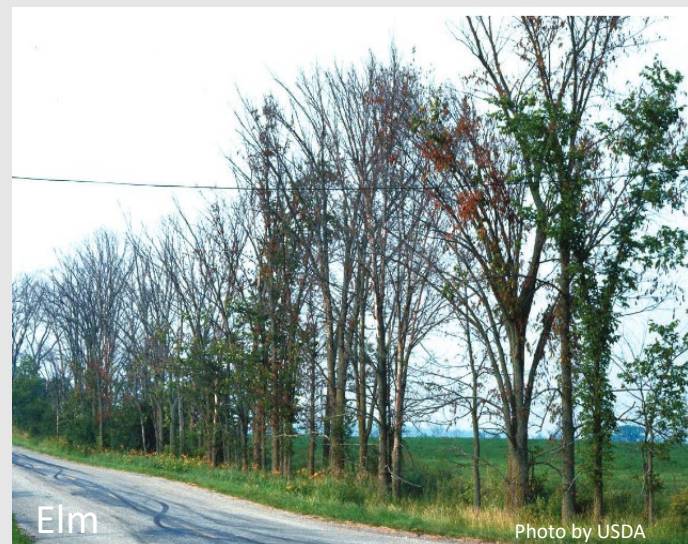
Introduction

- Urban Forests and Invasive Species
 - Host for invasive species
 - EAB
 - Spotted Lanternfly
 - Asian Longhorned Beetle
 - Source of invasive species
 - Black Locust
 - Norway Maple
 - Tree-of-Heaven



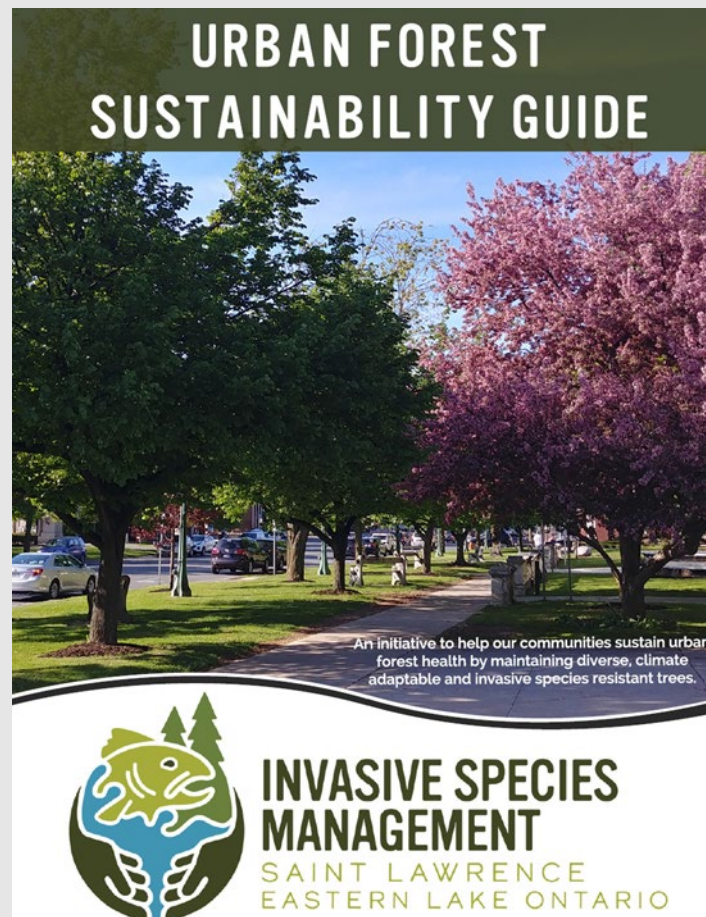
History of Tree Planting, Invasive Species, and the Urban Forest

- Early 20th century - American elm planted in large numbers
- 1930's - Dutch Elm Disease arrives
- 1970's - 40 million elm trees had died
- Many replaced with maples and ashes
- 2002 - emerald ash borer (EAB) discovered in southeastern Michigan
- Killed 10's of millions of ash trees across 30 states



Urban Forest Sustainability Initiative

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



Urban Forest Sustainability Initiative

Agenda

Benefits of the Urban Forest

Urban Forest Sustainability

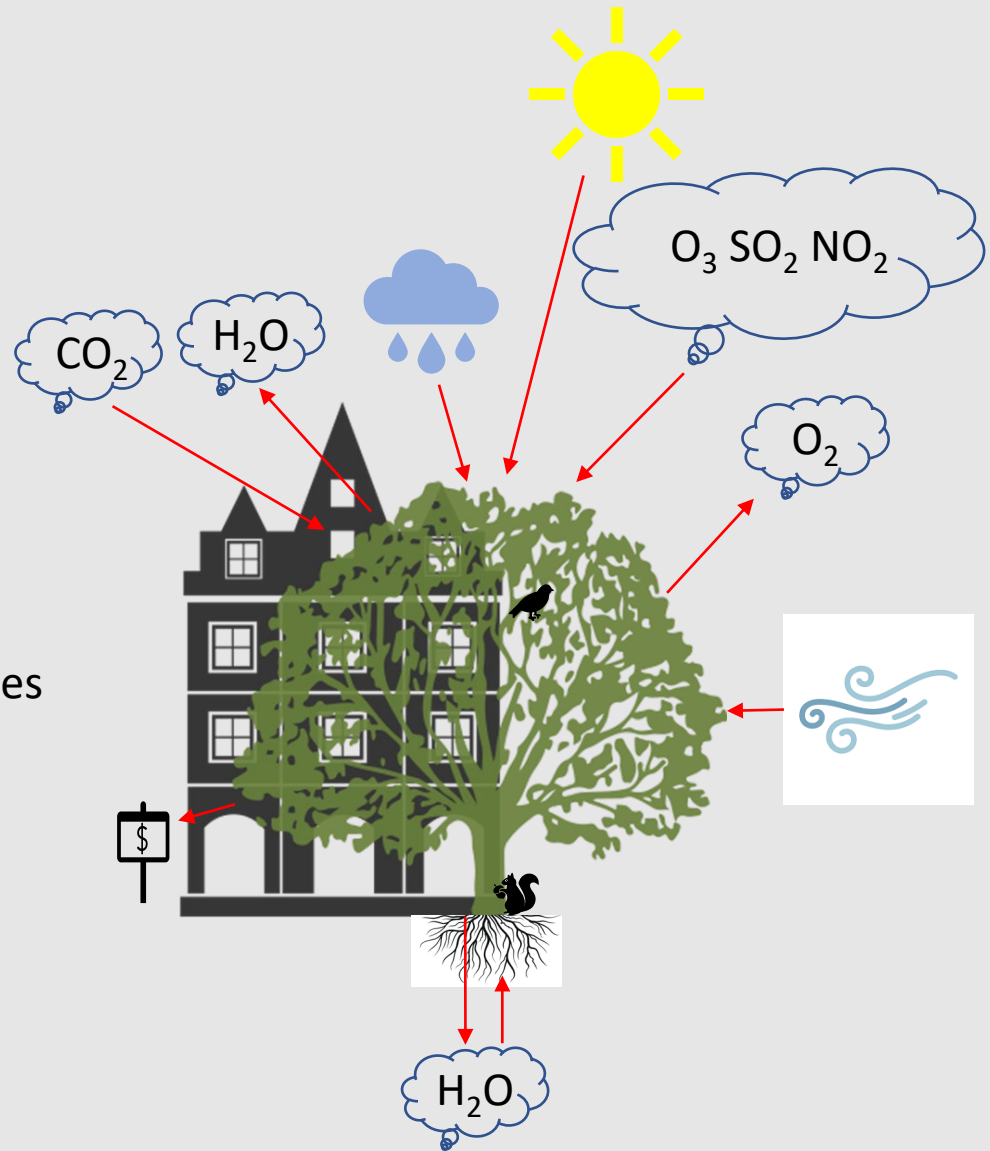
Urban Forest Resiliency Plan

Pocket Parks



Benefits of the Urban Forest

- ✓ Improve Air Quality
- ✓ Reduce Greenhouse Gases
- ✓ Reduce Stormwater Runoff
- ✓ Reduce Heating/Cooling Expenses
- ✓ Improves Aesthetics and Property Values
- ✓ Provide Food and Shelter for Wildlife



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/Citizen Science, Education, and Outreach
- ✓ Pocket Parks
- ✓ **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
 - ✓ **Maintaining Urban Forest Health** considers:
 - ✓ Right tree, Right place
 - ✓ Increasing resiliency to invasive pest and pathogen
 - ✓ Increasing resiliency to climate change



Creating an Urban Forest Resiliency Assessment

Risks to Consider Invasive Pests and Pathogens

Present Risks



Emerald Ash Borer



Hemlock Woolly Adelgid

Future Risks



Spotted Lanternfly



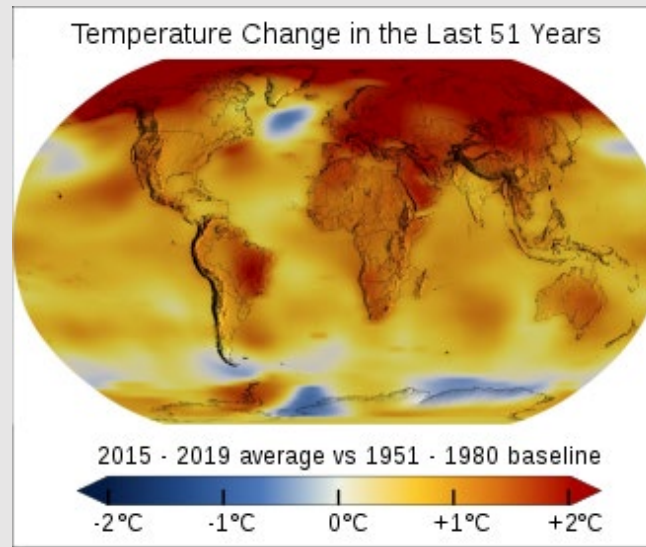
Asian Long-horned Beetle

Creating an Urban Forest Resiliency Assessment

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 tree species
- ✓ Which trees will do well and which will do poorly?

The screenshot shows the USDA Northern Research Station Climate Change Atlas website. The header includes the USDA logo and the text "Northern Research Station". Below the header is a navigation bar with links: "Forest Service Home", "About the Agency", and "Contact the National Office". The main content area is titled "Climate Change Atlas" and features a section "Explore the Climate Change Tree Atlas" with a map of the United States showing potential habitat shifts for 134 tree species. To the right of the map is a search bar for trees and birds, and a section "About the Climate Change Atlas" providing information on the atlas's content. Below the main content area are two featured research sections: "Central Appalachians forest ecosystem vulnerability assessment and synthesis: a report from the Central Appalachians Climate Change Response Framework project" and "Potential Changes by Region, State, Forest Type or National Forest and Parks".



Creating an Urban Forest Resiliency Assessment

✓ 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))

✓ Summarize results in resiliency assessment plan



Maintaining 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



Maintaining Urban Forest Health

Pest and Pathogen Resilience

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



Yellow Poplar



Eastern Hophornbeam



Maintaining Urban Forest Health

Pest and Pathogen Resilience

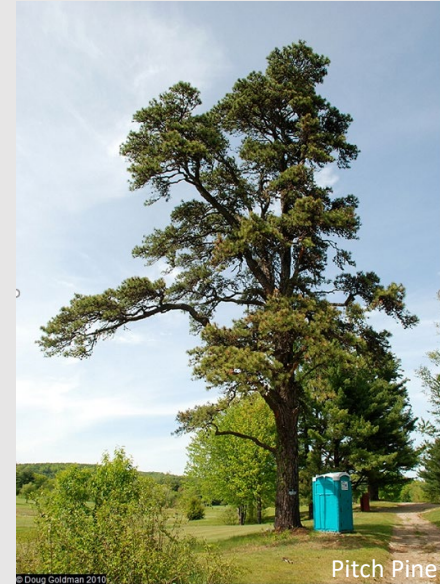
- ✓ New York tree species rated highest for insect and disease vulnerability (low resilience):
 - ✓ white ash, green ash, black ash (*Fraxinus* spp.)
 - ✓ eastern hemlock (*Tsuga canadensis*)
 - ✓ butternut (*Juglans cinerea*)



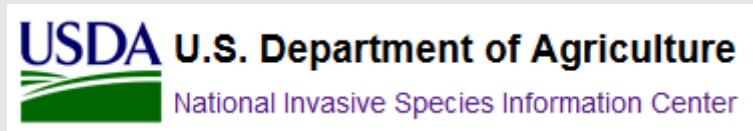
Maintaining Urban Forest Health

Pest and Pathogen Resilience

- ✓ New York tree species rated low for insect and disease vulnerability (high resilience):
 - ✓ Pitch Pine (*Pinus rigida*)
 - ✓ River Birch (*Betula nigra*)
 - ✓ Blackgum (*Nyssa sylvatica*)



Sources for Tree Pest and Pathogen Vulnerability



Maintaining Urban Forest Health

Climate Change Resilience

- ✓ 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. Potter¹ · Barbara S. Crane² · William W. Hargrove³

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.

✉ Kevin M. Potter
kpotter@ncsu.edu



Maintaining Urban Forest Health

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)



Photo by
Gilles Gonthier

Bur Oak



Photo by
mdf

Photo by
Jane S. Richardson



Photo by
USDA

White Oak



Photo by
Andrew
Nelson

White Spruce

Eastern



Maintaining Urban Forest Health

Avoid Selecting Invasive Tree Species

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



Bur Oak

Yellow Poplar



The Benefit of Pocket Parks

- ✓ A pocket park is:
 - ✓ usually $\frac{1}{4}$ acre or less in size
 - ✓ serves the same function as a city park
 - ✓ many benefits



The Benefit of Pocket Parks

✓ The benefits of these parks may include:

- ✓ Improving the overall ecology of cities through decreased driving to bigger parks
- ✓ Reduced pollution, traffic, and consumption of resources such as oil
- ✓ Renovation of run-down areas
- ✓ Habitat for some animals, particularly birds
- ✓ Increased amount of permeable surface (reduce runoff)
- ✓ Increased physical activity and lowered stress
- ✓ Reduction in criminal activity
- ✓ Increase in ecosystem services associated with trees in the urban environment





American Sycamore

Thank You!



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



Presentation Resources

Tree Species Vulnerability to Pests and Pathogens

Potter, K. M., Escanferla, M. E., Jetton, R. M., Man, G., & Crane, B. S. (2019). Prioritizing the conservation needs of United States tree species: Evaluating vulnerability to forest insect and disease threats. *Global Ecology and Conservation*, 18, e00622: <https://www.sciencedirect.com/science/article/pii/S2351989418304864>

National Invasive Species Information Center: <https://www.invasivespeciesinfo.gov/species-type>

New York Department of Environmental Conservation Nuisance & Invasive Species: <https://www.dec.ny.gov/animals/265.html>

SLELO PRISM: <https://www.sleloinvasives.org/invasives/>

iMapInvasives Invasive Species List: <https://imapinvasives.natureserve.org/imap/services/page/JurisdictionSpeciesList.html>

Tree Species Vulnerability to Climate Change

Potter, K. M., Crane, B. S., & Hargrove, W. W. (2017). A United States national prioritization framework for tree species vulnerability to climate change. *New forests*, 48(2), 275-300: https://www.srs.fs.usda.gov/pubs/ja/2017/ja_2017_hargrove_001.pdf; Supplementary Material: <https://link.springer.com/article/10.1007%2Fs11056-017-9569-5>

USDA U.S. Forest Service Climate Change Atlas: <https://www.fs.fed.us/nrs/atlas/>

The UFSI Guide: <https://www.sleloinvasives.org/initiatives/urbanforestsustainability/>