Enhancing the Health Of Your Urban Forests

New York Invasive Species Awareness Week Webinar Series

INVASIVE SPECIES MANAGEMENT
SAINT LAWRENCE EASTERN LAKE ONTARIO

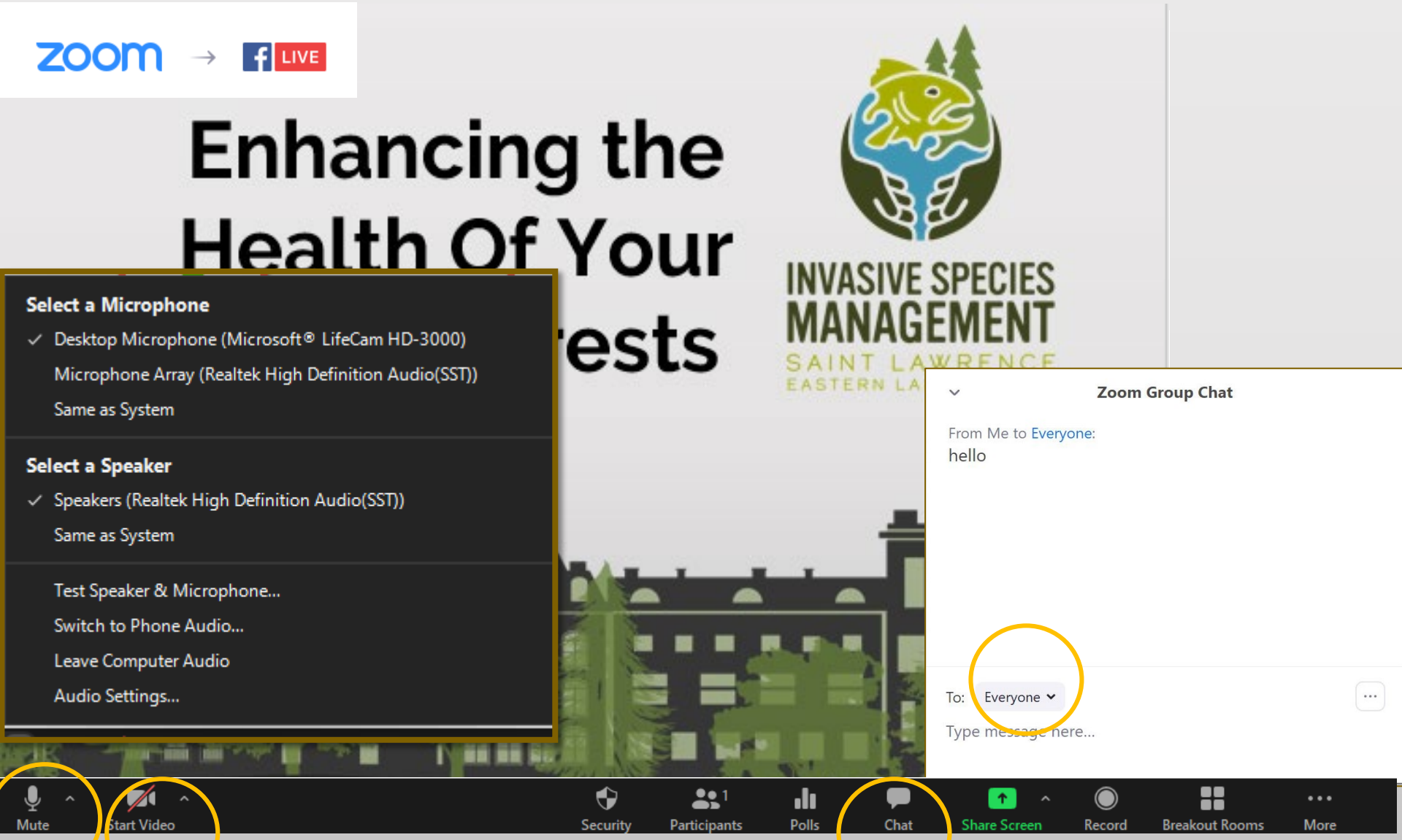
Chat Box Icebreaker

Introduce yourself

Where are you from?

Do you manage trees in your municipality?

Welcome and Housekeeping



Enhancing the Health Of Your Urban Forests

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SLELO is Hosted by:
The Nature Conservancy

Where We Work:
Oneida
Oswego
Jefferson
Lewis
St. Lawrence

What We Do:
Collaborate with our partners to protect our lands and waters from the impacts of invasive species.

Teaming up to Protect Our Lands and Waters

www.sleloinvasives.org

Enhancing the Health Of Your Urban Forests

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Terrestrial Restoration and Resiliency Coordinator
SLELO-PRISM

www.sleloinvasives.org/urbanforestsustainability

INVASIVE SPECIES MANAGEMENT
SAINT LAWRENCE EASTERN LAKE ONTARIO

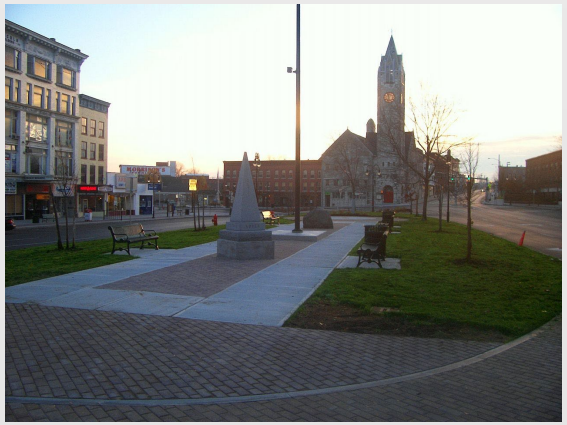
Developing a Sustainable Urban Forest Agenda

Benefits of the Urban Forest

Urban Forest Sustainability

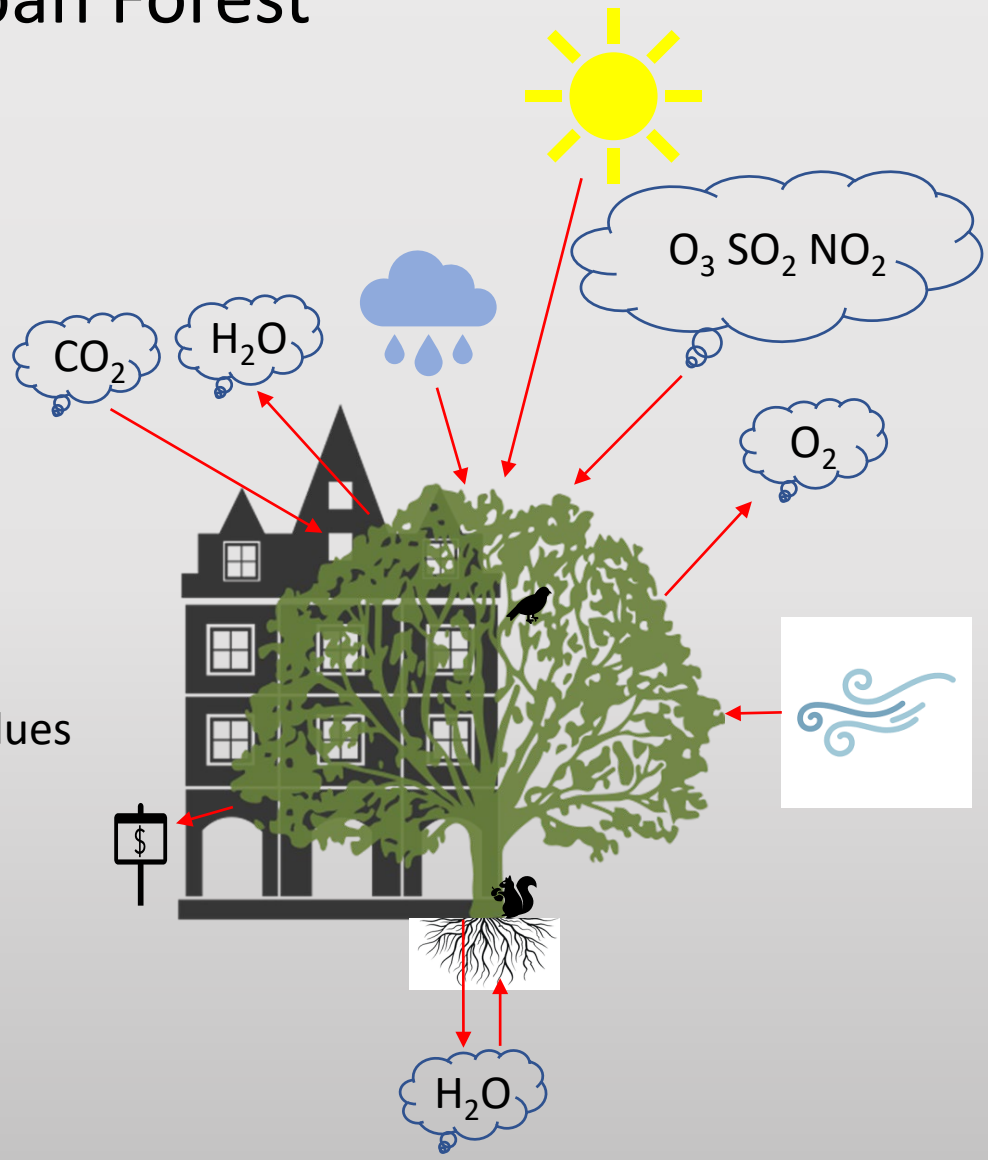
Urban Forest Preparedness Plan

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



Urban Forest Sustainability

Components

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

What is an Urban Forest Preparedness Plan?

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

- ✓ Main Components:
  - ✓ **Urban Forest Risk Assessment** considers:
    - ✓ invasive pest and pathogen vulnerability
    - ✓ climate change vulnerability
    - ✓ response and cost
  - ✓ **Urban Forest Health** considers:
    - ✓ basic urban forest health
    - ✓ invasive pest and pathogen resilience
    - ✓ climate change resilience

Risk Assessment + Forest Health = Urban Forest Preparedness Plan

Creating an Urban Forest Risk Assessment

Risks to Consider

Invasive Pests and Pathogens


Emerald Ash Borer


Hemlock Woolly Adelgid

- ✓ Current Tree Risk
  - ✓ Emerald Ash Borer – All types of ash trees
  - ✓ Future Tree Risks
    - ✓ Hemlock Woolly Adelgid - Eastern Hemlock
    - ✓ Spotted Lanternfly – Fruit Trees and other hardwoods
    - ✓ Asian Long-horned Beetle - Many species of hardwood trees, including birch, elm, horse chestnut, maple, sycamore, and willow


Asian Long-horned Beetle

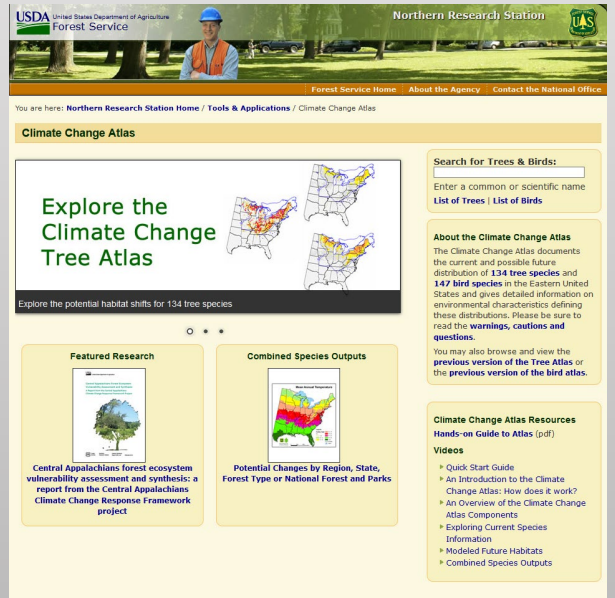

Spotted Lanternfly

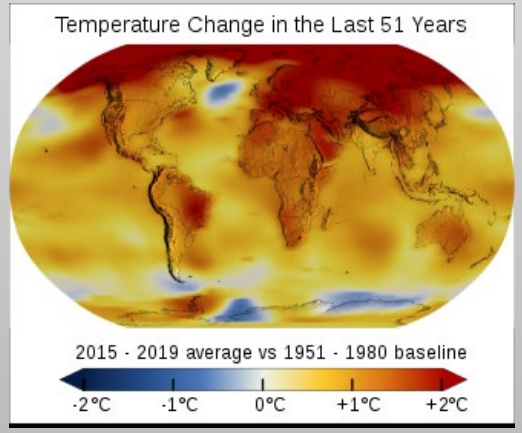
- ✓ More to Follow!

Creating an Urban Forest Risk Assessment

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?





Creating an Urban Forest Risk Assessment

<u>Document and Analyze Risks</u>

- ✓ **Create a spreadsheet**
  - ✓ tree species in your urban forest
  - ✓ current and future invasive pests and pathogens
  - ✓ climate adaptability of trees
- ✓ **Estimate financial cost for:**
  - ✓ tree removal, replacement, or pesticide treatment
  - ✓ lost ecosystem services (iTree (itreetools.org))
- ✓ **Summarize results in risk assessment report**
- ✓ **Include costs in annual budget proposal**

Creating an Urban Forest Risk Assessment

Benefits of Proactive Approach

- ✓ **Mitigates the risk from invasive pests and pathogens and climate change**
  - ✓ advanced funding decreases financial strain associated with sudden tree loss
  - ✓ decreased planting of vulnerable tree species minimizes financial impact from invasive pests, pathogens, and climate change

Maintaining Urban Forest Health

Planting Basics

- ✓ Tree species are adapted to the conditions where they naturally occur
- ✓ Trees in an urban environment are planted in a variety of locations:
  - ✓ sidewalks, parks, yards, private and public businesses, small public spaces
- ✓ Each location must be carefully matched with tree suitability
  - ✓ soil type, pH, salinity, amount of sunlight, cold hardiness, moisture levels, and growing space

Maintaining Urban Forest Health

Planting Basics

- ✓ **Right Tree, Right Place!**
  - ✓ Ultimately saves the municipality money and time
    - ✓ Avoids:
      - ✓ unnecessary pruning
      - ✓ removal of poor health/dead trees and those growing outside their urban boundaries

Maintaining Urban Forest Health

<u>Urban Forest Invasive Pest and Pathogen Resilience</u>

<u>Threats can be mitigated by:</u>

- ✓ **Increasing species and age diversity**
  - ✓ species diversity decreases the chance that a single invasive species will seriously damage your forest
  - ✓ age diversity limits the number of aging more susceptible trees

Maintaining Urban Forest Health

<u>Urban Forest Invasive Pest and Pathogen Resilience</u>

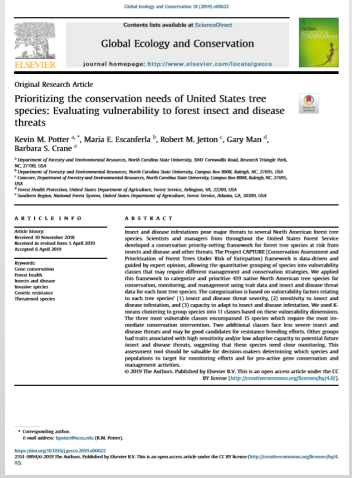
Add Diversity with Natives

- ✓ Supports Local Wildlife (NYS DEC)
  - ✓ Birds, Mammals, Insects, etc. prefer Native Plants
- ✓ Low Maintenance (NYS DEC)
  - ✓ less water
  - ✓ little to no fertilizer
  - ✓ little to no pesticides
  - ✓ less pruning
  - ✓ less of your time
- ✓ Unlikely to be invasive or overly competitive with other native plants (U.S. Forest Service)

Maintaining Urban Forest Health

Urban Forest Invasive Pest and Pathogen Resilience

- ✓ **Having an early detection/rapid response team**
  - ✓ application of insecticide or fungicide
  - ✓ tree removal
- ✓ **Selecting less vulnerable tree species**
  - ✓ In a study published in Global Ecology and Conservation (Potter et al.)
  - ✓ Species vulnerability to forest pest and pathogens was determined by:
    - ✓ severity of each tree species to major pests or pathogens
    - ✓ sensitivity to these pests or pathogens
    - ✓ ability to adapt to these pests or pathogens



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Original Research Article

Prioritizing the conservation needs of United States tree species: Evaluating vulnerability to forest insect and disease threats

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ABSTRACT

Insect and disease infestations pose major threats to several North American forest tree species. Scientists and managers from throughout the United States Forest Service developed a conservation priority-setting framework for forest tree species at risk from insects and disease and other threats. The Project CAPTURE (Conservation Assessment and Prioritization of Forest Trees Under Risk of Extirpation) framework is data-driven and guided by expert opinion, allowing the quantitative grouping of species into vulnerability classes that may require different management and conservation strategies. We applied this framework to categorize and prioritize 459 native North American tree species for conservation, monitoring, and management using trait data and insect and disease threat data for each host tree species. The categorization is based on vulnerability factors relating to each tree species' (1) insect and disease threat severity, (2) sensitivity to insect and disease infestation, and (3) capacity to adapt to insect and disease infestation. We used K-means clustering to group species into 11 classes based on these vulnerability dimensions. The three most vulnerable classes encompassed 35 species which require the most immediate conservation interventions. Two additional classes face less severe insect and disease threats and may be good candidates for resistance breeding efforts. Other groups had traits associated with high sensitivity and/or low adaptive capacity to potential future insect and disease threats, suggesting that these species need close monitoring. This assessment and classification are valuable for decision-makers determining which species and populations to target for monitoring efforts and for pro-active gene conservation and management activities.

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2351-9894/

Maintaining Urban Forest Health

Urban Forest Invasive Pest and Pathogen Resilience

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


Butternut

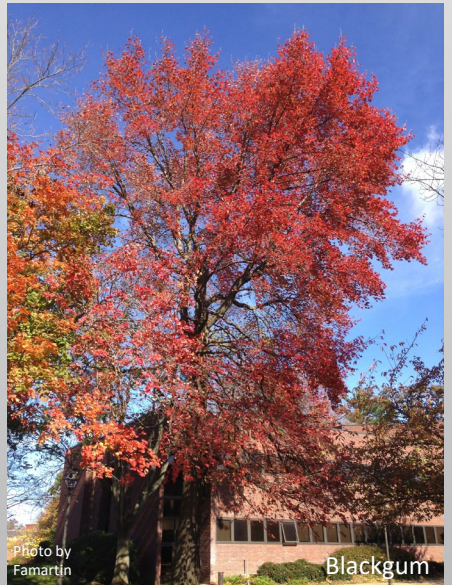

Photo by Keith Kanoti
Black Ash


Eastern Hemlock

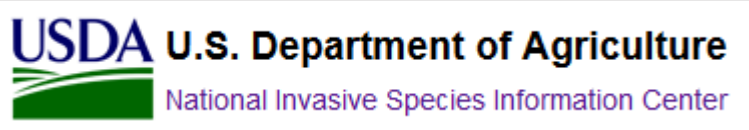
Maintaining Urban Forest Health

Urban Forest Invasive Pest and Pathogen Resilience

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



Sources for Tree Pest and Pathogen Vulnerability



www.invasivespeciesinfo.gov/

www.dec.ny.gov/animals/265.html

www.sleloinvasives.org/urbanforestsustainability/

Maintaining Urban Forest Health

Climate Adaptability

- ✓ The future climate is predicted to be:
  - ✓ warmer with greater precipitation in the winter
  - ✓ greater drought conditions in the summer
- ✓ Sustaining the urban forest through these changes will require:
  - ✓ **Increased Species Diversity**
    - ✓ mix of drought and flood tolerant tree species
    - ✓ distributes the risks among multiple species

Maintaining Urban Forest Health

<u>Climate Adaptability</u>

- ✓ **Increased Age Diversity**
  - ✓ vulnerabilities vary with age
  - ✓ distributes the risks among age classes
- ✓ **Plant trees that will succeed in present and future conditions**
  - ✓ select species that grow in a wide variety of conditions
  - ✓ select species located at the northern extent of their distribution
  - ✓ select species tolerant to changes predicted to occur at individual sites

Maintaining Urban Forest Health

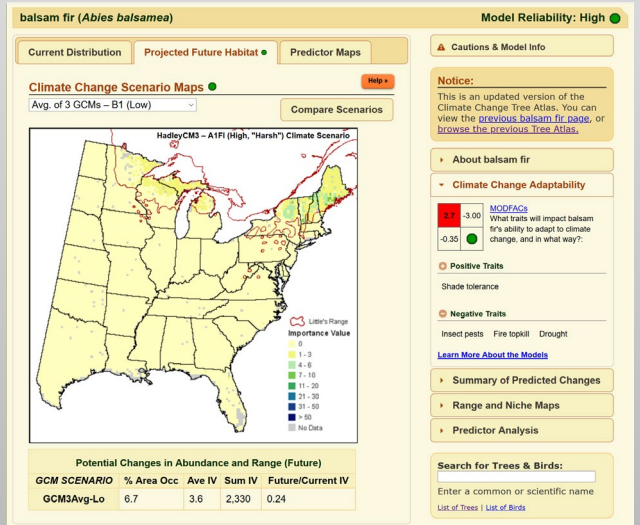
Climate Adaptability

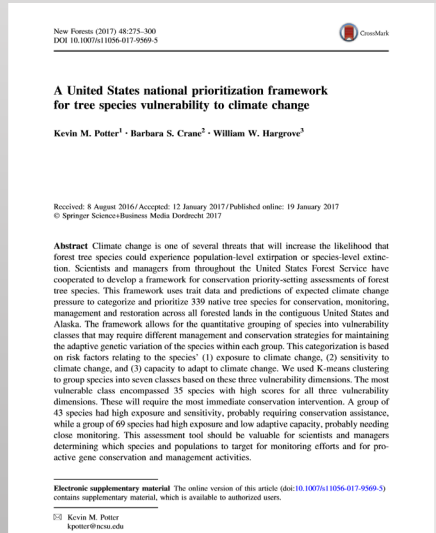
- ✓ plant and replace dead and dying trees with tree species predicted to be climate change adaptable

- ✓ Climate models that predict future tree species distribution and adaptability are available to assist municipalities:

  - ✓ climate change atlas on the USDA Forest Service website
    - ✓ https://www.fs.fed.us/nrs/atlas/

  - ✓ study published in New Forests (2017) by Potter, Crane, and Hargrove




New Forests (2017) 48:275–300
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A United States national prioritization framework for tree species vulnerability to climate change

Kevin M. Potter[1] · Barbara S. Crane[2] · William W. Hargrove[3]

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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 pro-active 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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The Benefit of Pocket Parks


Elizabeth Street Garden
New York City

- ✓ **A pocket park is:**
  - ✓ usually ¼ acre or less in size
  - ✓ serves the same function as a city park
  - ✓ often created in vacant lots by community groups, private entities or foundations for the benefit of the neighborhood
  - ✓ may be used as event space, play area, place to relax or meet friends, or for lunch breaks


Greenacre Park
New York City

The Benefit of Pocket Parks

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

Transamerica Redwood Park
San Francisco

Thank You!

Please Visit The
SLELO PRISM Website
For
Additional Urban Forest Sustainability Resources

www.sleloinvasives.org/urbanforestsustainability/

Upcoming Webinar

Friday, July 17th Take a virtual urban walk
with us to explore Watertown's arboretum, learn about what's being done to protect the beautiful trees in the city from invasive tree pests, and how you can help!


QUESTIONS?
Photo by Mike DeMarco