USDA Forest Service

Urban Forest Connections

webinar series

Second Wednesdays | 1:00 – 2:15 pm ET
www.fs.fed.us/research/urban-webinars

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NUCFAC HIGHLIGHTS: CLIMATE CHANGE IMPACTS AND ADAPTIVE STRATEGIES

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Manomet’s *WeatherWise* Workbook

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Ethel Wilkerson

USDA Forest Service
UrbanForest
Connections

*webinar series*

July 13, 2016
Brunswick ME
Urban areas drive the economy\(^1\)

- 81% of population, increasing faster rural areas
- 12% of land area
- 65% of jobs
- 75% of GDP
- >75% of infrastructure

\(^1\) U.S. Census. 2010.
NE Urban forests have high value²

Key Threats to urban/community forests

- Variable weather (e.g. climate change)
- Exotic pest species (e.g. EAB, ALB, HWA)
- Invasive plant species
- Increasing development (e.g. intensification and sprawl)
- Declining budgets

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### Urban forest and climate change

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased temperatures</td>
<td>• Greater numbers of tree pests and pathogens</td>
</tr>
<tr>
<td>Increased winter temperatures</td>
<td>• More frequent winter kill (freezing and thawing)</td>
</tr>
<tr>
<td>More frequent summer drought</td>
<td>• Aggravated by urban soil compaction &amp; impermeable surfaces</td>
</tr>
<tr>
<td></td>
<td>• Urban foliage more attractive to pests and pathogens</td>
</tr>
<tr>
<td>Increased winter precipitation</td>
<td>• Damage due to increased snow and ice loading</td>
</tr>
<tr>
<td>More frequent extreme weather</td>
<td>• More uprooted trees</td>
</tr>
<tr>
<td></td>
<td>• Root damage from waterlogging</td>
</tr>
</tbody>
</table>

**Change Very likely - Timing and magnitude is uncertain.**

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### Community forest & climate change

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Impacts under low and high emission scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spruce - fir forests</td>
<td>Low: Modest widespread decline and loss. High: Decline everywhere and greatest in southern and central Maine</td>
</tr>
<tr>
<td>Northern hardwood</td>
<td>Low: Some increased forest productivity. High: Some decline widespread.</td>
</tr>
<tr>
<td>Hemlock</td>
<td>Hemlock woolly adelgid results in widespread loss.</td>
</tr>
<tr>
<td>Oak and pine</td>
<td>Widespread expansion, especially of pine</td>
</tr>
<tr>
<td>Swamp</td>
<td>Localized but widespread decline or loss due to drought and SLR</td>
</tr>
</tbody>
</table>

*Change Very likely - Timing & magnitude is uncertain.*

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Urban Forests can reduce impacts

• Moderate storm damage/impacts
• Moderate temperatures (e.g., for homes, heat island effect)
• Reduce peak water flows & flooding
• Absorb air pollution
• Keep sediment out water bodies
• Maintain community attractiveness
• Altered composition and ages to increase resiliency to pests
• Soften visual impacts of intensification and sprawl
• Provide wildlife habitat

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The WeatherWise Workbook

Five worksheets for:
- Urban forest plans
- Land use planning and ordinances
- Land trust & community forest plans
- Suburban & rural landowners

WeatherWise Worksheets

**4 Steps to Make Local Communities More Resilient to Climate Change**

**01** 
**STEP 1 Preparing for Change**
Integrating adoption into your existing efforts

**02** 
**STEP 2 Plan for Change**
Selecting and applying practical BMPs for adaptation

**03** 
**STEP 3 Apply Key Strategies & Best Management Practices**

**04** 
**STEP 4 Monitor & Adjust**
Tracking and improving your management

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1. Prepare for Change

- General knowledge about climate change
- State and local information about potential threats
2. Plan for Change

• Management goals and objectives
• Location information
• Protection and maintenance activities
  – e.g., identify at-risk protection and maintenance
• Area descriptions and inventory
  – e.g., identify vulnerable parks, neighborhoods and stands
## Planning tools – i-Tree Suite

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canopy</strong></td>
<td>Tree canopy cover, area of cover types, and key benefits in Google Earth.</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Tree benefits and ideal planting zones in Google Earth and mitigate threats.</td>
</tr>
<tr>
<td><strong>Eco</strong></td>
<td>Uses your inventory data to quantify forest structure, key benefits, and threat impact.</td>
</tr>
<tr>
<td><strong>Vue</strong></td>
<td>Estimates cover types and some forest benefits urban, community, and private forests.</td>
</tr>
</tbody>
</table>

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6 [www.itreetools.org/](http://www.itreetools.org/), e.g., Whitman, A. and R. Wynne. 2014. Using i-Tree Canopy to Rapidly Assess the benefits of Local Forests: A Case Study from Bath, ME. Manomet, Brunswick, ME
3. Apply Key Strategies & BMPs

Examples:

- Forest Health and productivity
  - Plantings or regenerate (saplings) of climate “winners”
- Wildlife Habitat
  - Maintain forest habitat connectivity
- Carbon storage
  - Minimize stand damage when harvesting timber
- Water Quality
  - Minimize disturbance to water bodies & wetlands
- Human safety and health
  - Manage wildfire risk appropriately
- Recreation
  - Monitor and repair trails after large storms
4. Monitor and Adjust

• Have simple and effective ways to monitor forest health
• Have an efficient monitoring system for Infrastructure
• Adjust management strategies to respond to existing and emerging threats
Key workbook themes

- Focus on goals & objectives
- Prepare for greater uncertainty and more frequent, extreme events
- Increase forest resiliency
  - Exotic species mgt.
  - Roads and stream crossings
  - Likely climate change “winners” and “losers”
- Adjust to changing conditions
- Use no-regret BMPs (apply good forestry)
Summary

• Urban forests are key assets
• Urban forests are vulnerable
• The *WeatherWise Workbook* can help communities use urban forests to increase their resiliency in a changing world

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Acknowledgements

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