Using urban forests to increase community resiliency to climate change

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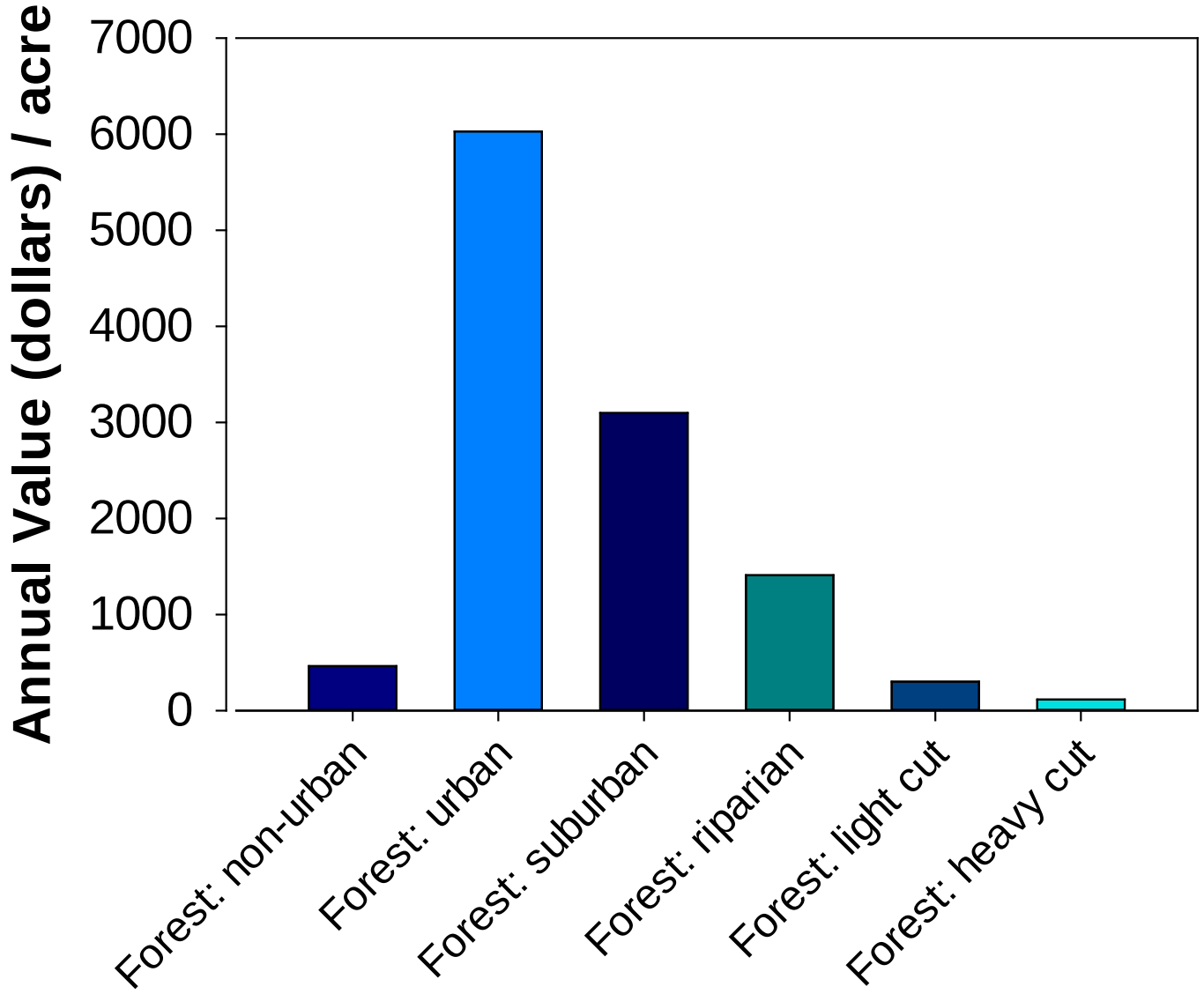
Vermont Urban & Community Forestry Council
Rutland, VT
11 June 2014

supported by a grant from the USDA Forest Service, as recommended by the National Urban and Community Forestry Advisory Council in 2010.

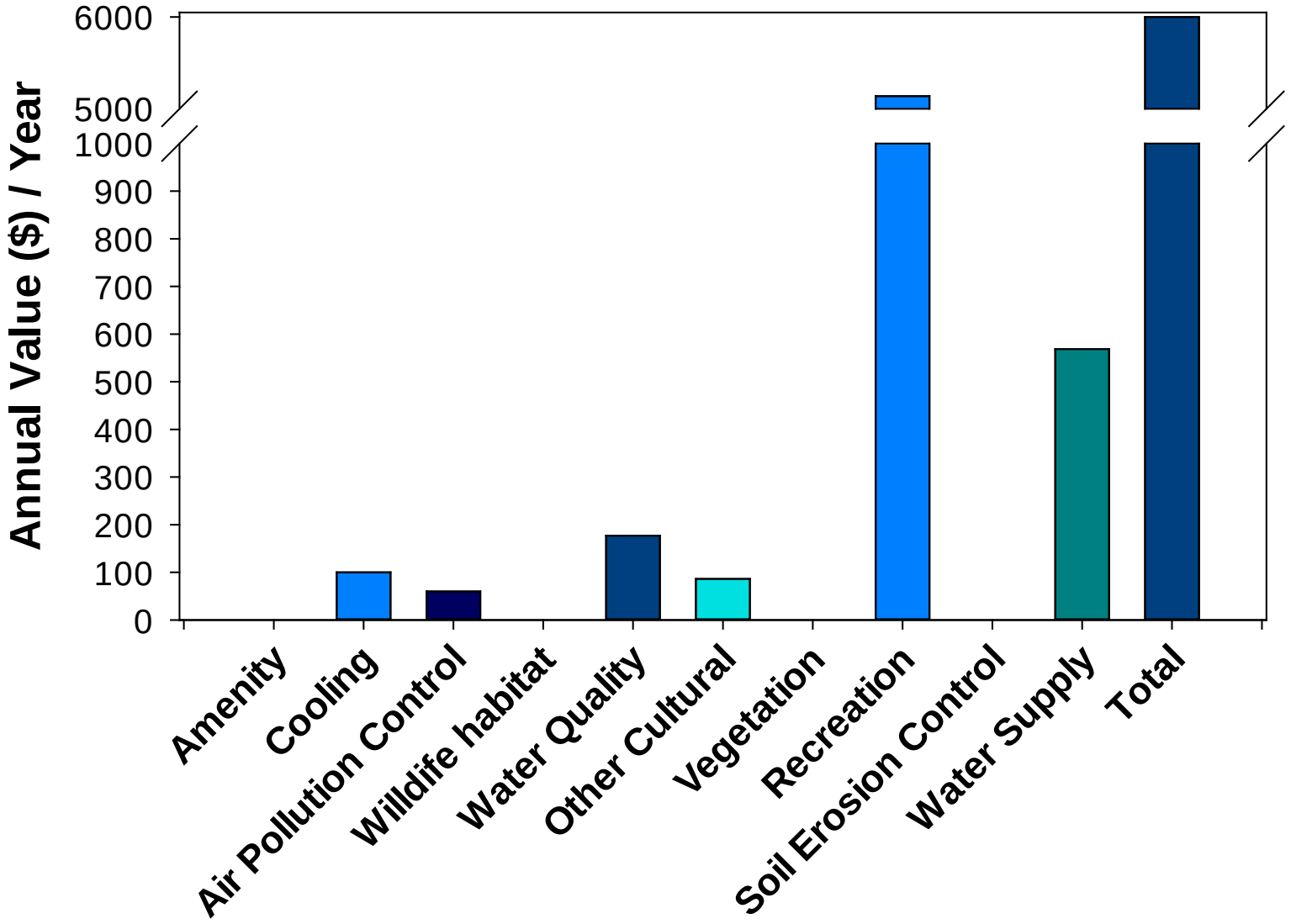
Talk Outline

- Urban forests are valuable
- Urban forests are vulnerable
- WeatherWise Checklists: Strategies for Urban Forests

They are the most valuable forest type in NE



They provide key benefits (ecosystem services)



Climate change will affect our urban communities

- Stormwater overflows
- Drought
- Extreme heat
- More air pollution
- Road surface damage

Urban Forests and Trees

Increase temperatures	More tree pests and pathogens
Increased winter temperatures	More winter kill (freezing and thawing)
Summer drought	- Aggravated by urban soil compaction & impermeable surfaces - Urban foliage more attractive to pests and pathogens
Increased winter precipitation	Damage due to increased snow and ice loading
More frequent extreme weather	- Uproot trees - Waterlogging impacts to tree roots

Very likely that urban forests will be affected.
Timing and magnitude of change uncertain.

Forests and Trees

Spruce - fir forests	Low: widespread decline and loss. High: Loss everywhere and greatest in southern areas
Northern hardwood	Low: Some increased forest productivity. High: Reduced area across region.
Hemlock	Hemlock woolly adelgid results in widespread loss.
Oak and pine	Widespread expansion, especially of pine
Swamp	Localized but widespread decline or loss due to drought and SLR

Very likely that forests will change. Timing and magnitude of change uncertain.

…and will make it harder to maintain urban forests

- Heat stress
- Drought
- Flooding
- Severe storms (wind, ice storms, uprooting)
- Air pollution
- Insect pests
- Exotic species

Urban Forests can reduce climate change 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

How do we adapt?

- Focus on
  - Urban Forest Plan
  - Land Use Planning
  - Ordinances

Four parts: WeatherWise Checklists

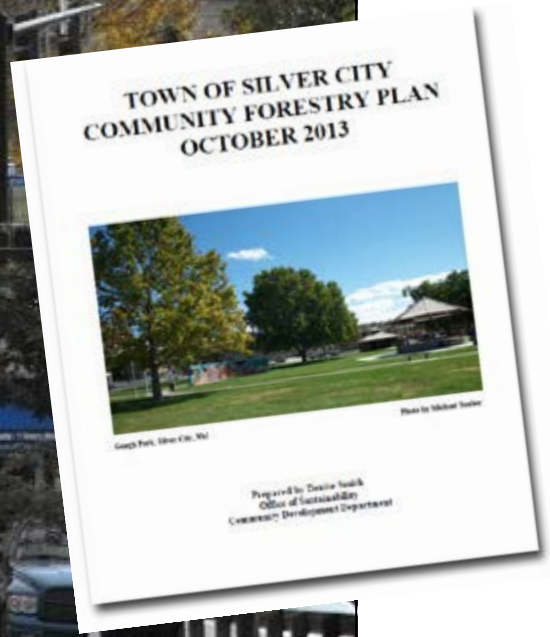
- Awareness: Get prepared
- Plan: Have a plan
- Do: Select appropriate strategies and Best Management Practices (BMPs)
- Check: Monitor progress

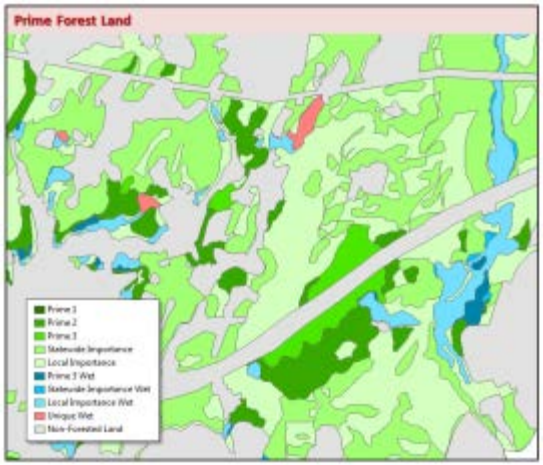
Get prepared

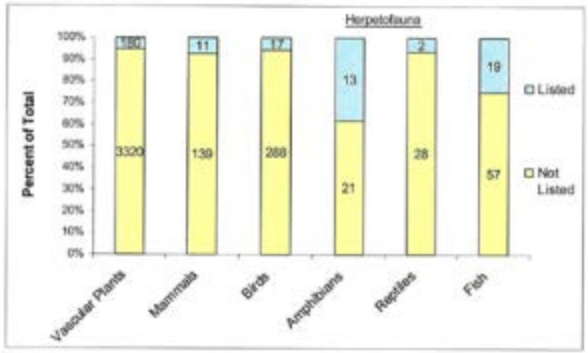
- General knowledge about climate change
- Community specific knowledge about potential threats

Checklist for Urban Forest Plan

- Goals and objectives
- Location information
- Protection and maintenance activities
- Neighborhood area descriptions and inventory







Forest Plan – i-Tree Suite

Program	Description
Canopy	Tree canopy cover, area of cover types, and key benefits in Google Earth.
Design	Tree benefits and ideal planting zones in Google Earth.
Eco	Uses your inventory data to quantify forest structure and key benefits.
Vue	Estimates cover types and some forest benefits urban, community, and private forests.

Checklist for Land Use Plans

- Vision
  - Future role of urban and community forest
- Future land use plan
  - Highlight value of urban and community forest for resiliency
  - Highlight vulnerable neighborhoods and forest areas
- Action Plan – Natural resources
  - Key attributes (highlight urban and community forests)
  - Planning considerations (climate change opportunities/threats)
  - General actions and their "actors" (what/who)
- Appendices
  - Public Facilities and Services Inventory -Highlight key urban and community forest resources and services (arborist, etc.)
  - Natural resources inventory – Highlight key climate-related vulnerabilities of urban and community forests
  - *Optional* - Climate Change Action Plan – mitigation & adaptation

Do: List of strategies & BMPs for urban forest plans

- Tree Management and Health
- Local Climate Regulation
- Air Quality and Green House Gas Sequestration
- Wildlife
- Water Quality
- Amenity Value and Recreation

Tree Management and Health

Strategy #1: Increase urban tree cover

- BMP: Provide homeowner incentives for planting and maintaining yard trees.
  - Worcester Tree Initiative
  - Chicago
  - Toronto

http://www.treeworcester.org

Tree Management and Health

Strategy #2 Maintain species, structural & age class diversity

- BMP: Diversify species mix to reduce risk of catastrophic loss of urban trees.

depew/elms.html

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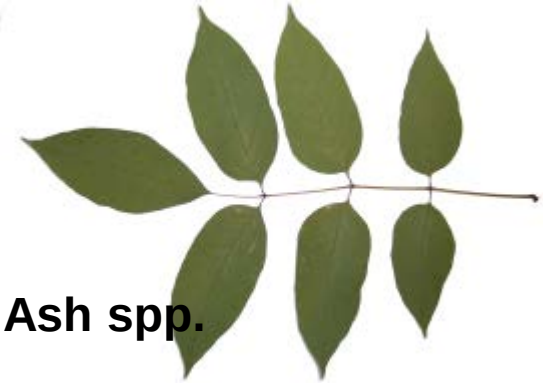
Strategy #3: Maintain & increase species that are resilient to climate change

- BMP: Plant tree species favored by warming weather

Red maple

Sweetgum

- BMP: Reduce dominance of vulnerable species



Ash spp.

Eastern hemlock

Tree Management and Health

Strategy #5: Use tree and shrub species native to the region and/or eastern North America.

- BMP: Plant native trees and shrubs when possible
- BMP: Track existing and emerging threats of invasive species


Buckthorn


Japanese Barberry

Other strategies

- Local Climate Regulation
- Air Quality and Greenhouse Gas Sequestration
- Wildlife
- Water Quality
- Amenity Value and Recreation

Most adaptation BMPs are practices that manage general risk not just climate change

Do: Checklist for Tree and Community Forest Ordinances

Urban ordinances can focus on:

- Reducing tree loss
  - Mandatory replacement of trees lost
  - Reduction of trees lost during construction
- Expanding tree cover
  - Planting areas with impervious surfaces
  - Planting unused grassed areas
  - Planting with new construction (energy use)
- Maintaining highway and buffer cover
  - Control exotics
  - Plant trees (air pollution)
- Maintaining native species
  - Restrict planting of exotic species on municipal land

Do: Checklist for land use

Community forest ordinances can focus on:

- Reducing forest loss
  - Incentive zoning
  - Conservation subdivisions
  - Cluster developments
  - Shore land zoning
  - Easements on public forests
  - Creation of a community forest system
- Maintaining native species
  - Establish a tree board or forestry commission
  - Education of landowners

Monitoring: Checklist for urban forest plans

- **Forest Plan: Monitor urban forests for**
  - Tree mortality
  - Pest and disease infestations
  - Tree canopy cover (neighborhoods, high-intensity areas)
- **Forest Plan: Monitor forests for:**
  - Flooding (including sea level rise) impacts
  - Habitat decline/loss
  - Pest and disease infestations
  - Exotic species
  - General changes in fire risk
- **Land use plan: Monitor forests for:**
  - Flooding
  - Forest cover loss (overall, watersheds, riparian areas)
  - General changes in fire risk

Three points (summary)

- Urban forests are key assets
- Urban forests are at risk to climate change
- Use local strategies to make urban forests more resilient, enhance their benefits, and make communities more resilient

Acknowledgements

Advice from

- Chris Cabot, Kennebec Estuary Land Trust & Brunswick-Topsham Land Trust
- Tom Hoerth, City of Bath
- Jan Santerre, Project Canopy, Maine Forest Service
- Julie Evans, Northern Forest Center
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- Amanda McHaffey, Forest Guild
- Peter Baecher, Town of Brunswick
- Rod Melanson, Town of Topsham

Funding from:

- USDA Forest Service, National Urban and Community Forest Advisory Committee
- Orchard Foundation

Urban Forests as a Hedge to a Changing World

Andy Whitman
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Annual Northeastern Society of American Foresters Meeting
Faralee, VT
March 25, 2015

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- Urban forests are vulnerable
- Urban forest can be a hedge in a changing world

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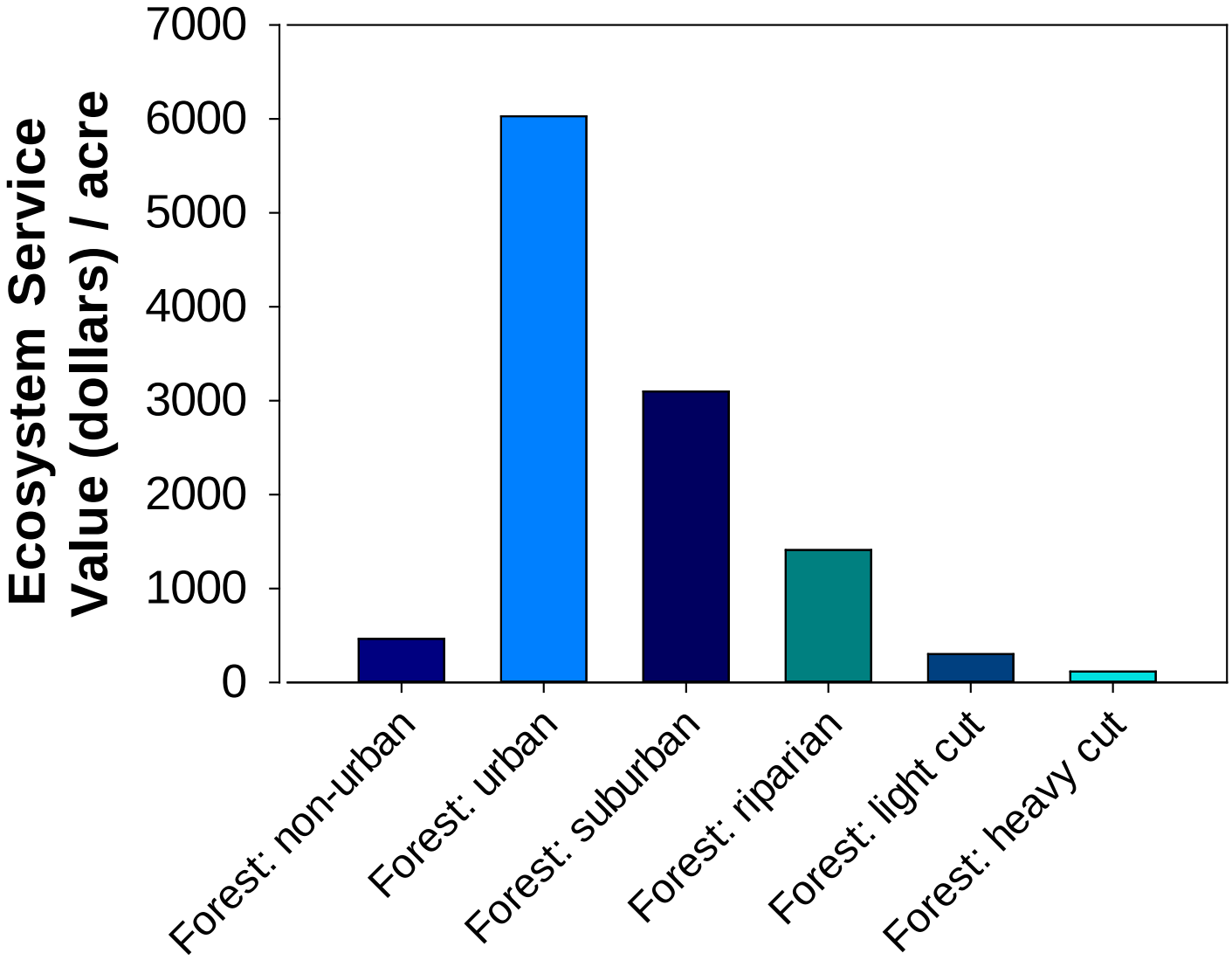

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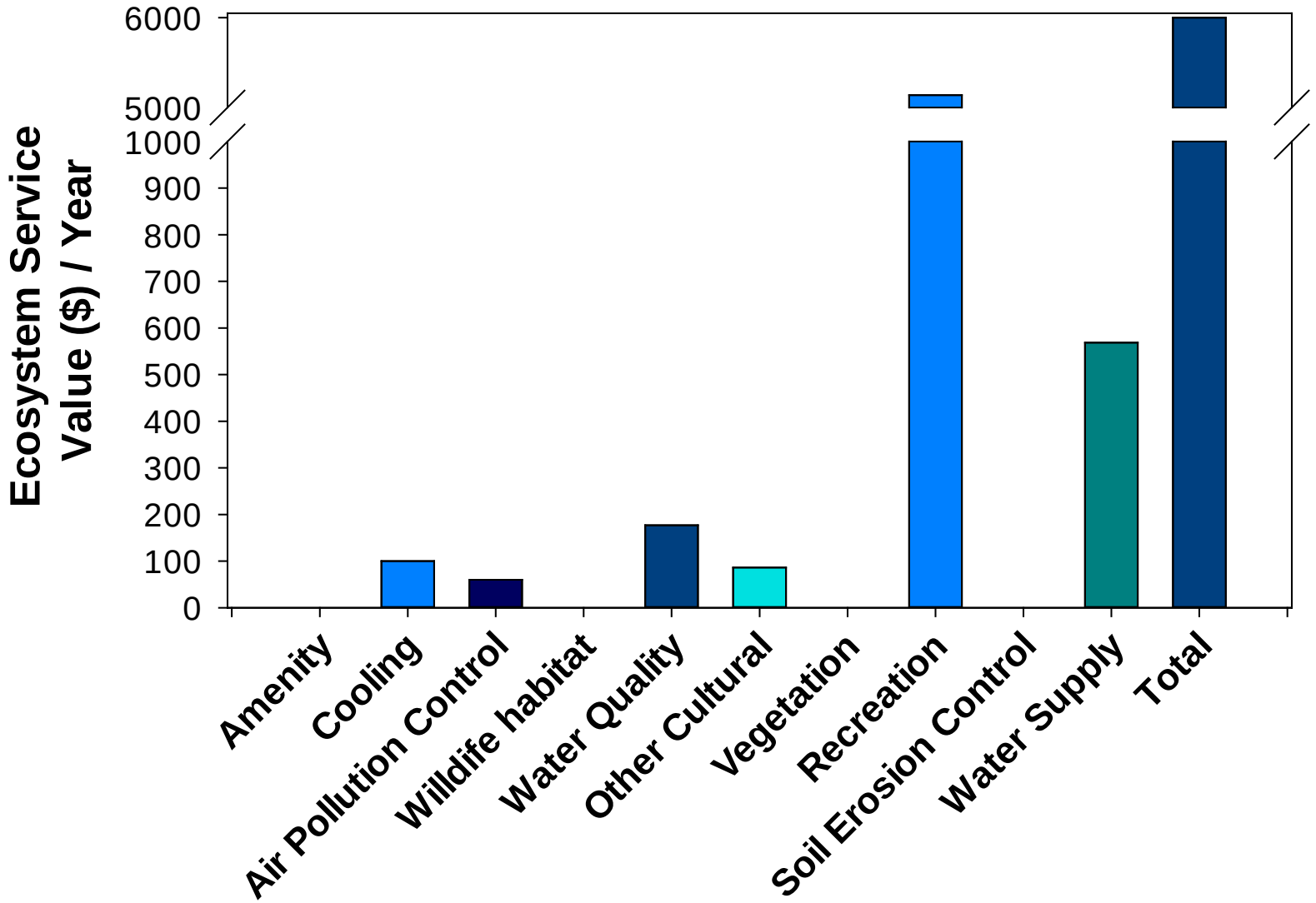

Key factors that will change our urban communities

- Variable weather (e.g. climate change)
- Exotic pest species
- Invasive plant species
- Increasing development
- Declining budgets

Urban Forests & Climate Change

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Very likely that urban forests will change.
Timing and magnitude of change uncertain.

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Pest Impacts

- Asian Longhorn Beetle
- Emerald Ash Borer
- Hemlock Wholly Adelgid

Invasive Species

- Buckthorn
- Japanese Knotweed
- ……. (the list goes on and on

Development

- Intensification
  - Urban areas more dense (less space for trees)
- Sprawl
  - non-urban areas losing forest and large blocks for timber harvesting, current use valuation, and wildlife

…and will make it harder to maintain urban forests

- Heat stress
- Drought
- Flooding
- Severe storms (wind, ice storms, uprooting)
- Air pollution
- Insect pests
- Exotic species
- Changing urbanization and sprawl

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

How do we adapt?

- Focus on
  - Urban Forest Plan
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Five steps

- Get organized: Learn locally
- Get involved: enlist support
- Get organized: Have a plan
- Do: Keep track of your trees and apply appropriate strategies and Best Management Practices (BMPs)
- Check: Monitor progress

Get organized

Meet with

- relevant municipal staff
- Local volunteers
- your state district forester
- State urban forest staff
- tree committees from nearby towns

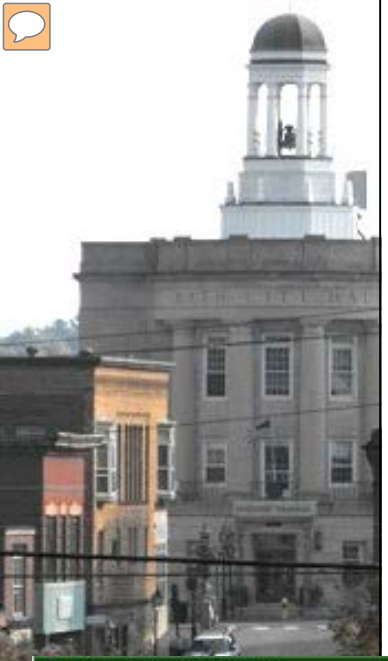
Get involved

Enlist supporters:

- conservation commission
- parks groups
- School groups
- garden clubs

Get organized with a plan

- General knowledge about change
- Community specific knowledge about potential threats



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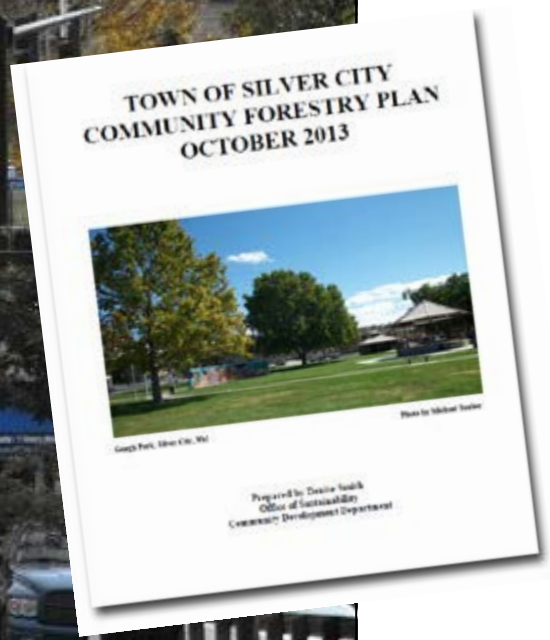

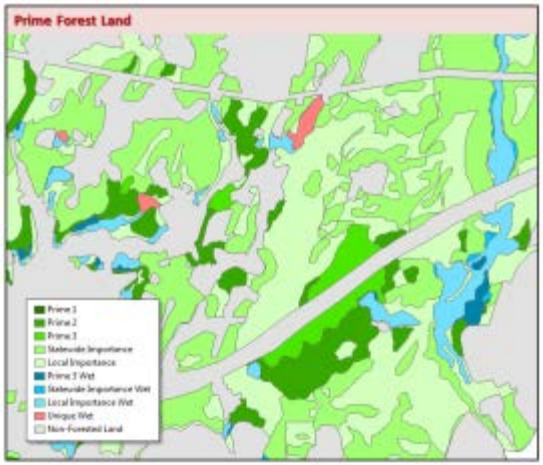

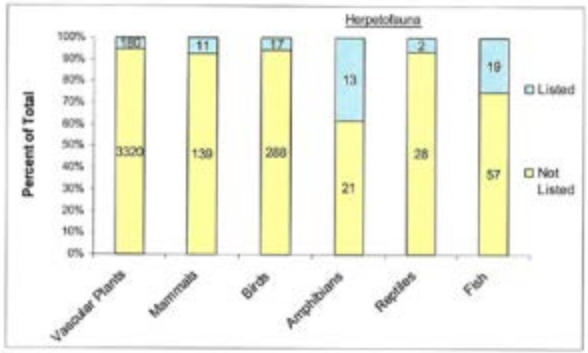

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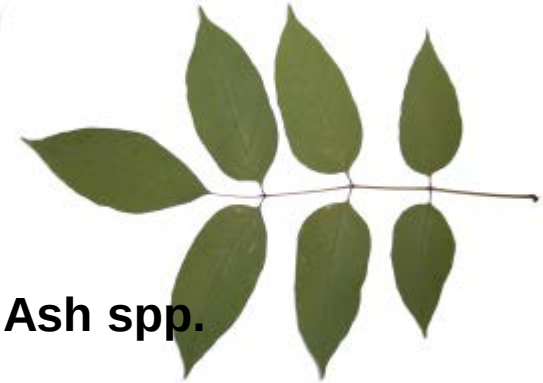

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