

URBAN FORESTRY AND THE SUSTAINABILITY PLAN

A LEAF IS A TERRIBLE THING TO WASTE



GENE HYDE, CITY FORESTER
CITY OF CHATTANOOGA

CHATTANOOGA



Southeast Tennessee
170,000 people
135 Square Miles

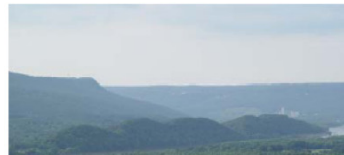
CHATTANOOGA'S
Climate Action Plan

**..... PATHWAY TO A SUSTAINABLE
CHATTANOOGA**





URBAN AND REGIONAL FORESTS



Potential Action L3: Maintain Ridges and hillsides as forested areas with limited development.

per year. The City Forester projects that the entire tree population within the city absorbs 1.81 million metric tons of CO₂ and provides the following approximate benefits: Energy savings - \$128 million; Stormwater - \$297 million; Air quality - \$31 million. It is clear that trees offer many valuable services that can now be quantified.

How? Amend the landscape ordinance to create incentives to retain existing trees rather than removing trees and replanting in new developments. (See Figure 36) Educate and encourage builders and developers to follow the procedures prescribed by the "Tree Protection Best Management Practices (BMPs) for Contractors and Builders" in order to conserve as much high quality tree canopy as reasonably possible, especially when it is technically sound to do so.

Potential Action L3: Maintain ridges and hillsides as forested areas with limited development.

Why? Tree cover on hillsides and ridges contribute to the natural beauty of this region. These green spaces also cool the city, clean the air, and reduce erosion.

How? Analyze regulations addressing clear-cutting and erosion control for these areas to determine their effectiveness.

OBJECTIVE M: Improve current WATER QUALITY and protect WATER QUANTITY.

Potential Action M1: Implement changes to Chattanooga's current codes and regulations to address current water quality issues.

Why? Human activities can result in diminished water quality. Rooftops, paved streets and parking lots lessen the natural ability of the land to absorb stormwater. Secondly, impervious surfaces receive (from human activities) pollutants such as oils, trash, and contaminated sediments. During storm events, exposed pollutants are directly transported into receiving streams if no structural control is in place for mitigation. Improper construction activities

FIGURE 35: INCREASE URBAN FOREST

Estimated GHG Reduction (metric tons)	Estimated Cost	Estimated \$ Savings	
63	\$	★	

FIGURE 36: MODIFY LANDSCAPE ORDINANCE TO RETAIN TREES

Estimated GHG Reduction (metric tons)	Estimated Cost	Estimated \$ Savings	
501	NOT CALCULATED	★	

TIMBER HARVESTING ORDINANCE





URBAN AND REGIONAL FORESTS

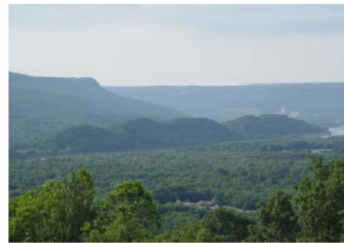


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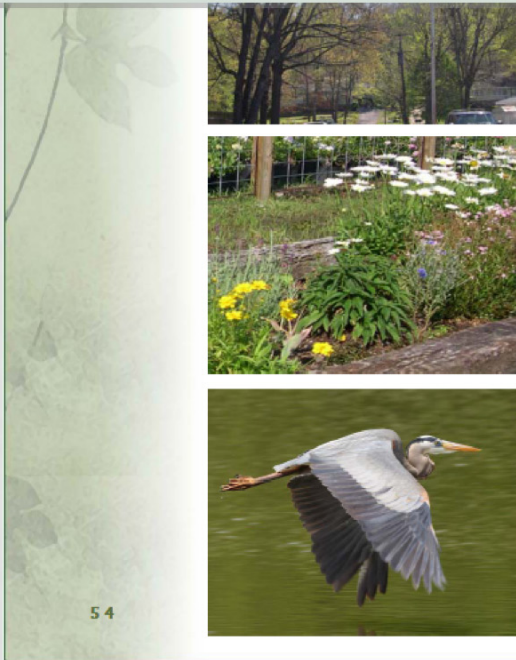
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BIODIVERSITY

Potential Action J1: Protect native wildlife and plant species.



54

OBJECTIVE J. Protect our region's natural BIODIVERSITY.

Potential Action J1: Protect native wildlife and plant species.

Why? The City includes a diverse community of biological resources that are sometimes overlooked and underappreciated in the urban environment. Chattanooga is truly blessed with a wonderful blend of mountains, ridges, rivers, creeks, and streams. In addition, Chattanooga's geographic location lends to the mixing of northern and southern flora and fauna. The Southern Appalachian region is well known as possessing one of the most diverse biological populations in the world. Maintaining this diversity provides habitat for native plants and wildlife as well as beauty and interest in natural settings. The promotion of Chattanooga as a livable city, a tourism destination, and a mecca for outdoor activities is greatly enhanced if we protect these biological resources.

How? Incentivize the inclusion of biodiversity assets in the existing pre-construction review of development plans. Developers should be encouraged to retain high quality trees (See Potential Action L-2). Reflection Riding, CALP, and other organizations should be engaged to educate residents on the benefits of utilizing native species where appropriate. (See Figure 32) Local nurseries should be encouraged to promote native species. Develop incentives for the use of bioretention and erosion control systems that incorporate native species instead of rip rap along rivers and streams. Encourage the use of either natural methods or benign herbicides for roadside vegetation control while discouraging the use of harsh chemicals, such as persistent soil sterilants and other herbicides listed as moderately toxic or stronger.

Potential Action J2: Initiate an urban ecosystems analysis.

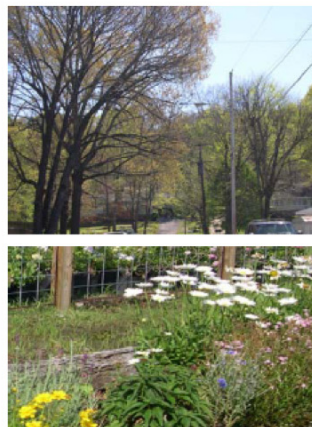
Why? In its simplest form, an Ecosystems Analysis is the cataloging of natural resources, mostly vegetation, in any prescribed geographic area. In many cases it is possible to assign monetary benefits to the services which plants and trees provide.

NATIVE PLANT SALES AND USE IN ECOSYSTEMS RESTORATION PROJECTS





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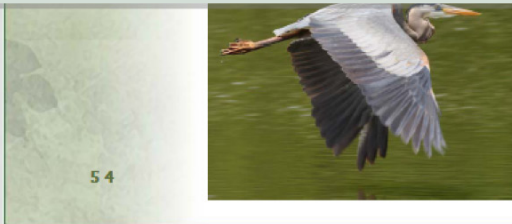
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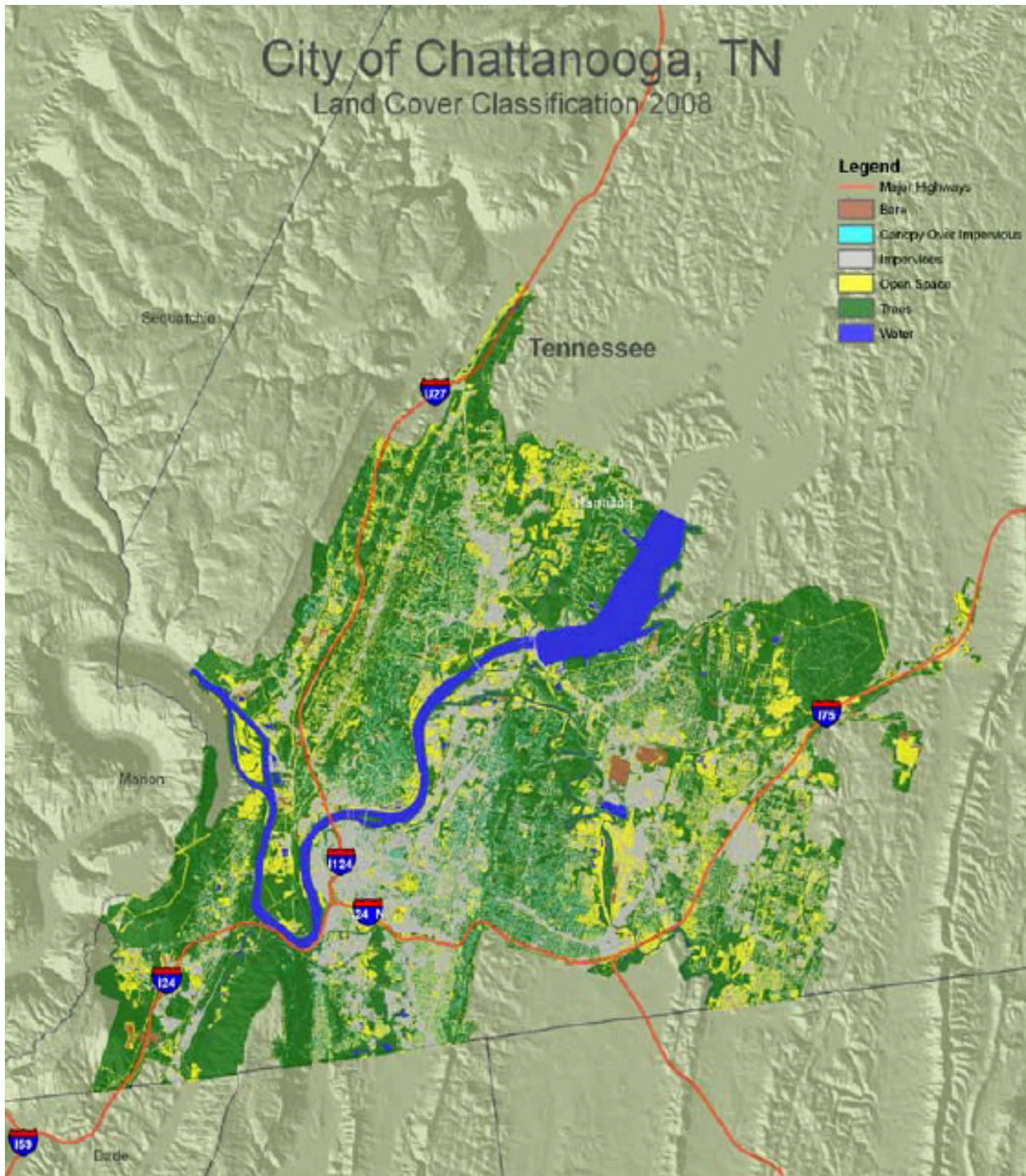
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URBAN ECOSYSTEMS ANALYSIS

Based on high
resolution NAIP
imagery

CANOPY COVER OF SELECTED CITIES

Chattanooga 51%

Charlotte 46%

Austin 34%

Baltimore 31%

Atlanta 27%

Boston 21%

Philadelphia 20%

New York 16%

Milwaukee 16%

Chicago 11%

WHAT IS THE VALUE OF CHATTANOOGA'S URBAN FOREST?

1. The 51% canopy cover provides 421 million cubic feet of stormwater detention services valued at \$1,260,000,000.
2. The trees removed 4,500,000 pounds of air pollutants valued at \$12,000,000 per year.

URBAN AND REGIONAL FORESTS

**OBJECTIVE L:** Expand and maintain healthy URBAN and REGIONAL FORESTS.

Potential Action L1: Strive to obtain ideal tree canopy cover in Chattanooga.

Why? Tree plantings have a significant impact on reducing GHGs and cleaning our air (See Figure 35). Increasing the tree canopy and forested areas of the community is an achievable goal. Many practices have been put into place including a working Tree Commission, a City urban forestry program and streetscape improvements in the downtown. However, we have room to improve and should continue the greening of our community by engaging both the private and public sectors in programs such as "Take Root" and urban forestry awards that acknowledge participation. Additional economic benefits are provided as the desirability and attractiveness of the community are enhanced with tree plantings. The following crown cover amounts are recommended by *American Forests* as a minimum for community health:

15% in the Downtown
25% in urban residential areas
50% in suburban residential areas
40% overall

How? Expand the Take Root initiative to new areas of the community. Analyze the Landscape Ordinance to increase the number of trees in new developments, renovations and parking lots. This will also require an ecosystems analysis, to be performed by the City, to determine the existing canopy cover and other metrics we can use as benchmarks to track our progress.

Potential Action L2: When new development occurs, encourage the retention of existing high quality trees rather than removing them and replanting with younger trees.

Why? According to a STRATUM Analysis conducted in 2007, Chattanooga's street tree population removes 18,143 metric tons of CO₂ from the atmosphere

Potential Action L1: Strive to obtain ideal tree canopy cover in Chattanooga.



Street trees provide shade, reduce urban heat build up, sequester carbon and increase property values.



Tree Canopy Cover Metrics

Area	Recommended %	Actual %
CBD	15	13
Urban Residential	25	58
Suburban Residential	50	66
Overall	40	51



TAKE ROOT

PLANT. GROW. SUSTAIN.

Take Root Operational Area



Take Root Initiative



NEW TREE LOCATIONS

BRANDING AND MARKETING



GRANTS RECEIVED

Benwood Foundation- \$100,000

Lyndhurst Foundation- \$100,000

TN Dept. Of Economic and Community Development Grant - \$126,500

Tenn. Agric Enhancement Program Grant – \$30,644

General contributions - \$19,537

TOTAL: \$376,681

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WORK WITH BUILDERS, DEVELOPERS, CONTRACTORS



**Presentations to Engineers, Homebuilders, Architects,
General Contractors**

Business Recruiting



Mr. Jacoby said environmental sustainability is a core value at Volkswagen, and Chattanooga has moved to make environmental awareness part of the city's fabric.

“Your values complement our own.”

SITE PREPARATION AT VOLKSWAGEN

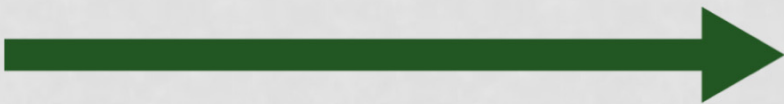




New trees in Jefferson Heights Park



New street trees in the Highland Park Neighborhood



GREEN INFRASTRUCTURE

Green infrastructure is the interconnected network of open spaces and natural areas that naturally manages stormwater, reduces flooding risk and improves water quality.

Green infrastructure usually costs less to install and maintain when compared to traditional forms of infrastructure.

FOREST BENEFITS

In urban and suburban settings a single deciduous tree can intercept from 500 to 760 gallons of rainfall per year. A mature evergreen can intercept over 4,00 gallons per year

During the growing season in Pennsylvania in a hardwood forest as much as 60% of the rainfall is returned to the atmosphere through evapotranspiration.

EXAMPLES:



Raingardens



Greenways



**Bioswales
and Trees**



**Wetlands
Restoration**

CONCRETE INFRASTRUCTURE



A LOOK INTO THE FUTURE



ENVIRONMENTAL RESILIENCE

resilience is the capacity of an ecosystem to respond to a disturbance by resisting damage and recovering quickly.

Disturbances can include events such as: fires floods
windstorms insect population explosions
deforestation the introduction of exotic and invasive
plants and animals.

HOW TO ADAPT TO A CLIMATE CHANGING WORLD?

Frank Lowenstein, Climate Adaption Strategy Leader, The Nature Conservancy has some thoughts.

Living on Earth Podcast. December 16th, 2011 . www.loe.org

Natural Ecosystems play an important role in helping us to adapt. We need to think about preserving or restoring lost or degraded ecosystems in this effort.

We need to develop an appreciation of the value of environmental services of ecosystems and to provide the right incentives for their restoration and maintenance.

ECOSYSTEMS MANAGEMENT



Q. How to manage forests in the desert sw. to reduce the risk of fire so that they deliver clean waters to cities like Santa Fe, Albuquerque, Phoenix etc.?

A. Thin the forests – fewer but larger trees to reduce risk of severe wildfire and capture more snow for adequate water.

ECOSYSTEMS MANAGEMENT



Provide a larger buffer of forests in Massachusetts to prevent erosion and sedimentation into the Quabbin Reservoir which provides clean water to Boston and other communities.

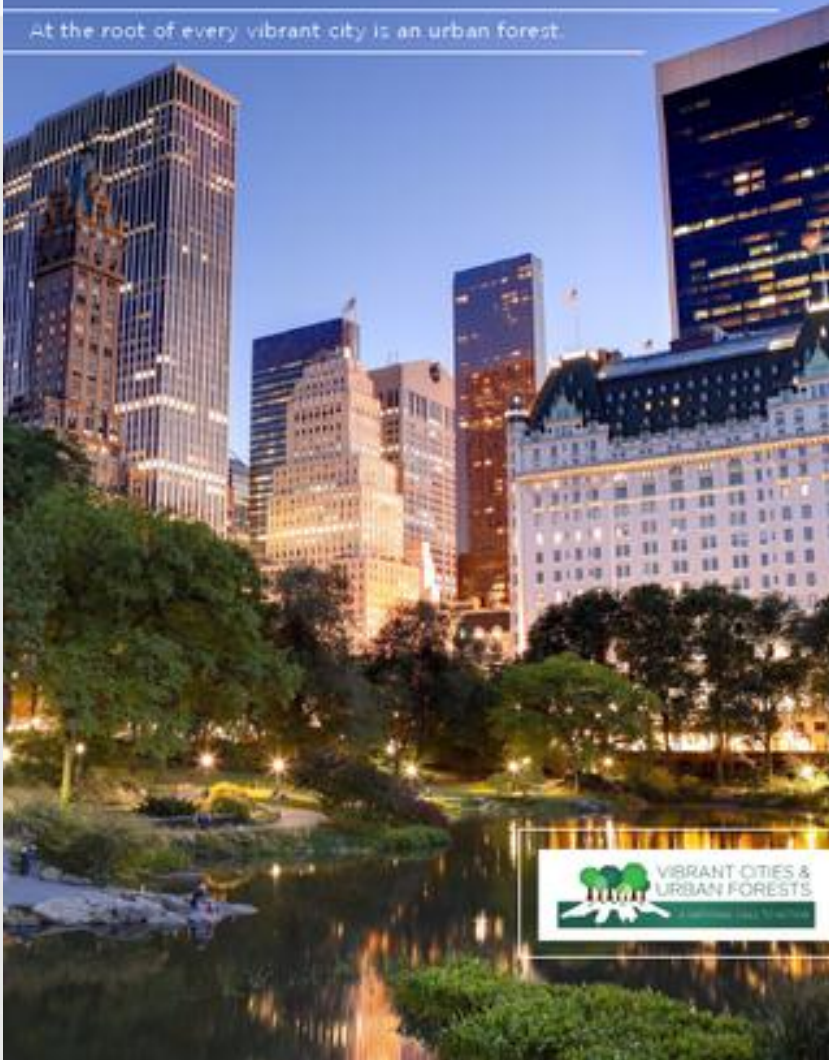
ECOSYSTEMS MANAGEMENT



Shift in the location of wildlife as climate changes. Some animals can't easily move. Reduce ecological contrasts in forests. Incentivize naturalization of farm and forest so animals can diffuse into a larger forest block.

VIBRANT CITIES AND URBAN FORESTS

At the root of every vibrant city is an urban forest.



The New York Restoration Project.

The US Forest Service.

Sustainable Urban Forests Coalition.

The National Urban and Community Forestry Advisory Council.

25 experts across multiple disciplines
Identified emerging trends
Established a vision for urban areas

12 RECOMMENDATIONS

- Integrate federal agencies' green infrastructure goals.
- Establish energy efficiency programs that emphasize the use of trees.
- Ensure equitable distribution of resources.
- Support urban ecosystem-focused, collaborative research.
- Encourage open access to and use of social assessment tools.
- Establish national Vibrant Cities Standards.

The point is: Change thinking from silo based to systems based. You can build kingdoms or build bridges.

12 RECOMMENDATIONS

- Create a national education and awareness campaign.
- Foster urban forestry and natural resources stewardship and volunteerism.
- Create sustainable jobs in urban forestry and green infrastructure.
- Cultivate partnerships between public and private sectors.
- Develop new public administration models for urban ecosystems.
- Create comprehensive, multi-jurisdictional Urban Regional Natural Resource Plans.

CREATE COMPREHENSIVE, MULTI-JURISDICTIONAL NATURAL RESOURCE PLANS

These plans are the result of community collaboration and public engagement of both the public and private sectors, academia, and NGOs. The plan will ensure the better integration of built and natural environments.

These regional plans will provide substantial public health, social, environmental, and economic benefits including the creation of green jobs and the mitigation of and adaption to climate change.

Example: Chicago Wilderness - a collaboration of over 250 organizations

CW is part of the Metropolitan Green Spaces Alliance

CHICAGO WILDERNESS



Their initiatives are designed to:

1. restore the health of local nature.
2. implement the Chicago Wilderness Green Infrastructure Vision
3. mitigate climate change,
5. leave no child inside—

These ideals reflect CW's commitment to using science and emerging knowledge, a collaborative approach to conservation, and a caring for both people and nature, to benefit all the region's residents.

LAST THOUGHT



The Little Engine
that could

I think I can

I think I can

CONTACT INFO

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