



City of Charlottesville, Virginia
URBAN FOREST MANAGEMENT PLAN
May 2009



City of Charlottesville

Urban Forest Management Plan

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Executive Summary

An Urban Forest Management Plan is intended to provide a framework for ensuring that the trees and forests of our City are appropriately cared for according to our community goals. It is a guide for City staff, landowners, utility companies, developers, and residents to follow when making decisions about trees, and the land they live on and are responsible for.

The City has a vision of becoming a Green City into the future such that:

Charlottesville citizens live in a community with a vibrant forest, tree-lined streets, and lush green neighborhoods. We have an extensive natural trail system, along with healthy rivers and streams. We have clean air and water, we emphasize recycling and reuse, and we minimize stormwater runoff. Our homes and buildings are sustainably designed and energy efficient – (Charlottesville City Council Vision- 2025)

This plan discusses the benefits of trees and forests in urban areas, the current state of our forests, the people and programs that manage them, and proposed goals and actions to protect, enhance, and expand the urban forest and to promote staff, business, and citizen awareness and stewardship of this resource. The plan complements and furthers the Comprehensive Plan for the City.

Urban forests compete with many other human needs in a built environment, such as houses, sidewalks, and utility lines. It is very important to put the right tree in the right place, or the tree will either fail to thrive or create a myriad of side-effects that can be costly and detrimental to human habitation.

Basic goals of the Urban Forest Management Plan include:

- **Preservation** and **Protection** of existing forested areas and trees
- **Enhancement** and **Restoration** of forest quality
- **Expansion** of planted areas and total number of trees
- **Monitoring** and **Documentation** over time to track progress and needs
- **Education** and **Outreach** to involve the entire community
- **Sustainability** and **Maintenance** of plan and related codes and guides

The City's 2007 Comprehensive Plan established a goal of 40% tree canopy coverage for the City. This goal was based upon data that suggested the canopy coverage at the time was 31.6%. Further and subsequent analysis, which is detailed later in this plan, revealed that the City's current canopy coverage is actually much higher, at 46%. While this is good news, there are certain parts of the City that are deficient in their canopy coverage, and the overall quality of the urban forest still requires management, protection, and improvement. This plan will guide efforts to ensure that all areas of the City have the appropriate tree and forest presence based on land use and density characteristics.

Introduction to the Urban Forest Management Plan

Plan Purpose

The Urban Forest Management Plan has been developed to help improve and coordinate management of trees and forests in the City of Charlottesville. Over the years, various studies, proposals, and recommendations related to urban forestry have been made. This plan aims to consolidate these efforts into one comprehensive and cohesive document that will help ensure our management program can move forward in a planned and organized fashion based on sound science and policies. The plan is not meant to be a static report, but rather a plan that is continually updated and refreshed over time, much like the forest itself.

This plan aims to provide equitable forest benefits for all City residents, including access to forested areas for recreation and education, improved human and environmental health, and monetary savings generated by maintaining proper tree canopy levels.

Background & Linkage to Comprehensive Plan

For several years, the City of Charlottesville has undertaken a commitment to the stewardship of natural resources. The Charlottesville City Council has supported numerous initiatives in support of environmental sustainability within the community and the region. The City's 2025 Vision Statement presents Charlottesville as 'A leader in innovation, environmental sustainability, and social and economic justice.' Chapter Eight (8), Environment, of the *2007 Comprehensive Plan* for the City states in part:

“The City of Charlottesville’s environment includes a broad spectrum of elements and surroundings created by both natural and built systems. ... Charlottesville’s natural environment, which includes water, land, air, as well as its plant, animal and human inhabitants is equally important in providing a habitable City and is largely dependent on ‘green infrastructure.’ Similar to the ‘grey infrastructure’ of the built environment, ‘green infrastructure’ is the interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas, greenways, parks, and other conservation lands and forests and open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life ”

The City of Charlottesville lies entirely within the Rivanna River watershed, a part of the larger James River and Chesapeake Bay watersheds. The major waterways within the City, including the Rivanna River, Meadow Creek and Moores Creek, along with their tributaries, including Lodge Creek, Meade Creek, Pollock’s Branch, Rock Creek, St. Charles Creek, Meadowbrook Creek, Fry’s Spring, and Schenk’s Branch, flow through both public and private property and are flanked by major riparian buffer areas. These forested stream valleys contribute healthy tree canopy, improve water and air quality and provide wildlife habitat, stream temperature regulation, and food for fish and other aquatic life. However, the health of these streams is undermined by uncontrolled stormwater runoff that contributes to major stream bank erosion, destruction of mature healthy trees, and the delivery of harmful pollutants. Healthy, diverse populations of native fish and other

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aquatic life cannot survive in urban streams severely affected by urban runoff. Invasive plant seeds are also spread by floodwaters and stormwater runoff.

Public perception of forest loss over time has led to a demand for improved tools for managing the trees in our City, both on public and private lands. The most recent Comprehensive Plan begins to address this issue, setting the stage for development of this plan. One of the four major sets of objectives in Chapter 8 of the *2007 Comprehensive Plan* focuses on the Urban Forest, with the stated Goal:

Establish and maintain a 40% minimum urban tree canopy level in Charlottesville.

Plan, develop and implement an Urban Forest Management Plan, which will serve as the City's comprehensive, long-range strategy for protecting, managing and expanding Charlottesville's urban tree canopy on public lands including streets, parks, schools and other City-owned properties as well as private lands.

To that end, staff began working in mid-2007 on formulating the elements of an Urban Forest Management Plan (UFMP). Staff from the Department of Parks and Recreation, the Environmental Office of the Department of Public Works and Neighborhood Development Services met several times to perform a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. Based upon that analysis, staff then began to prioritize identified items and create strategic elements and tactical actions for meeting the stated 40 percent tree canopy goal. (The complete results of the SWOT Analysis are included in Appendix 7).

It was clear through this analysis that the City is well positioned to undertake this effort and ensure its success. There is a clear recognition that the development and execution of this plan is a community priority and is directly aligned with City Council Vision Statements, the Comprehensive Plan and the Strategic Plan.

Current and Previous Urban Forestry Related Studies and Efforts

The City's commitment to environmental sustainability and management of green infrastructure resources is a key component in ensuring that the community's high quality of living can be maintained for years to come. Over the past several years, the City has taken the following steps that support this commitment:

1975 Street Tree Inventory

In 1975 the City developed a Street Tree Master Plan, which made general and specific recommendations on where and how to protect and expand street tree coverage in the City.

1998 Thomas Jefferson Planning District Sustainability Accords

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These Accords were developed and distilled from a large set of objectives and concerns evaluated by the Thomas Jefferson Sustainability Committee from 1994 to 1998. Taken together, these Accords create an agenda on which the community can agree. Individually, each one provides an opportunity for individual and community action toward sustainability for the region. The Accords were included as part of the 2001 City Comprehensive Plan.

2002 Street Tree Inventory

Using a Global Positioning System (GPS) unit, major streets were field checked for trees in the City right-of-way, and limited information about each tree was collected. This data resides in the City Geographic Information System (GIS) and can be compared to future tree inventories to help track the state of street trees managed by the City.

2003 Environmental Sustainability Policy

This Policy notes that Charlottesville is building a distinctive world-class small city with the vision of ensuring the quality and sustainability of the natural and built environment as part of the City's responsibility to future generations. The policy adopted four environmental stewardship principles: conservation, cooperation, environmental compliance and risk reduction, and restoration. An important element of the Policy is the commitment to the development and implementation of an Environmental Management System (EMS) based upon the ISO 14001 International Standard. The EMS aims to reduce the environmental impacts of the City's operations while fostering a safer and healthier work environment for its employees. The Parks and Recreation Department has been operating under the EMS since 2003 and the EMS continues to be implemented throughout the rest of the City in a phased approach.

2004 Water Protection Ordinance

The Water Protection Ordinance amended Chapter 34 of the City Code (Erosion and Sediment Control) and re-designated Chapter 10 as the City's Water Protection Ordinance. The ordinance, adopted in September of 2004, accomplished the following:

- Amended and updated the City's local erosion and sediment control program,
- Established a local stormwater management program,
- Established protection of 100-foot wide riparian stream buffers on properties adjacent to the Rivanna River, Moores Creek, and Meadow Creek, and
- Prohibited illicit discharges and connections to the City's storm sewer system.

2005 Water Quality Management Study

This Study conducted and incorporated the results of stream corridor assessments, collated historic information regarding the condition of urban waterways conditions, completed mapping of the streams, and includes recommendations for future strategies for the City to consider as it seeks to protect its waterways and community health.

2005 Parks and Recreation Needs Assessment

This report documented the clear need and desire on the part of the citizens of Charlottesville to preserve natural environments and open space. Selected survey results indicated that:

- 81% of survey respondents were supportive of purchasing land for passive park use
- 68% of survey respondents were supportive of protecting environmental areas in the City

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- 59% of households indicate a need for natural trails/nature center
- 57% of households indicate a need for natural areas and wildlife habitat

2006 Thomas Jefferson Soil and Water Conservation District Membership

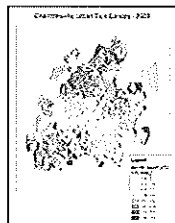
In November 2006, the Virginia Soil and Water Conservation Board approved a petition by the City of Charlottesville requesting inclusion in the Thomas Jefferson Soil and Water Conservation District (TJSWCD). The TJSWCD's mission is: "To exercise leadership in promoting natural resource protection."

2006 US Mayors Climate Protection Agreement Signatory

This agreement sets ambitious goals for improving air quality as part of the City's commitment to addressing global climate change. The City is implementing a Climate Protection Program in order to reduce greenhouse gas emissions from the community. The Mayor's office had an intern compile "Ideas for promoting tree coverage and tree planting programs in Charlottesville" in 2006, information from which was used in developing this plan.

2006 Citizen Committee for Environmental Sustainability

This Committee was charged with supporting City and regional commitment to environmental performance and stewardship, in line with the 1998 Sustainability Accords and the 2003 Environmental Sustainability Policy, and the U.S. Mayor's Climate Protection Agreement." The committee developed actionable recommendations for the City Council to consider.



2006 University of Virginia Urban Tree Canopy Study

Based on calculations made by a University of Virginia environmental planning class using CityGreen software in December 2006, it was determined that Charlottesville's urban tree canopy covered approximately 2,096 acres, or 31.6 percent of the City's total land area (6,656 acres). The canopy was estimated to absorb and filter more than 203,665 lbs. of air pollutants each year while storing up to 90,194 tons of carbon in biomass. According to the results of this analysis, the number of urban trees and extent of urban tree canopy in Charlottesville did not meet state averages or recommended national guidelines. (See Appendix 8 for full version)



2007 Tree City USA Designation

In April of 2007, Charlottesville received its designation as a Tree City USA from the National Arbor Day Foundation. This award demonstrates that the City has an urban forest program, spends

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at least \$2.00 per capita on trees, has an urban forester on staff, and has a tree ordinance. Tree City USA designation is a designation that showcases the City's appreciation and work for healthy trees and forests. The City has more work to do to improve and maintain its forests, and although this designation does not provide financial resources, the partnership with the National Arbor Day Foundation and access to the many resources the group has to offer will help Charlottesville continue to be a Tree City into the future.



2007 Invasive Plant Inventory and Management Plan

Non-native plant species (commonly referred to as 'invasives') are established and have spread throughout the City, both in developed and non-developed areas. Land Planning and Development Associates was hired to identify and map the presence of invasive plants and vines in City parks and school properties. The City is working with volunteers and staff to remove or hinder invasives and continues to monitor and restore affected lands over time to contain or eradicate these species. AmeriCorps volunteers spent six weeks of the spring of 2008 cutting vines out of trees on City lands in the areas identified as the highest priority in the Invasives Management Plan. One example of parkland in the midst of invasives management is Meadowcreek Gardens near Morton Drive. The full invasives report is too long to be included in the appendices to this report, but is available through the Parks Department, and maps are available in GIS format to assist in tracking, containment, and removal efforts over time.

State of the Urban Forest

Charlottesville's urban tree canopy is an important component of the community's green infrastructure. Our trees contribute to the City's beauty and provide a healthful environment for people, animals and birds. Forested areas provide opportunities for enjoying nature and environmental education along with numerous other environmental benefits. Within our urbanized ecosystem, trees play an important role. Amongst many associated benefits, they:

- Create shade and protection from weather and flooding
- Help improve air quality by removing significant amounts of particulate pollution from the atmosphere
- Provide areas for recreation and escape from urban pressures
- Protect water quality by absorbing and filtering stormwater runoff and recharging groundwater
- Conserve land by preventing soil erosion and decreasing the volume of stormwater run-off
- Moderate local climate by mitigating urban heat island effects
- Reduce energy demand from buildings
- Mitigate global climate change by sequestering carbon
- Provide a critical source of food and habitat for wildlife
- Buffer noise, wind, and differing land uses
- Increase real estate values
- Protect biodiversity

Urban forests can be considered in three general forms, large forested stands, smaller fragments of forest, and narrow corridors connecting fragments and stands. Individual or "specimen" trees standing by themselves in open areas are another component of the overall urban canopy. Charlottesville has examples of each type, each of which will have slight differences in uses, values, and management.

There are a number of large, particularly beautiful and/or historic trees within the City. These might be called "Champion", "Heritage", "Remarkable", or other names which imply their importance to residents. Charlottesville already has some trees included on state lists, such as the large white oak at Forest Hills Park. Protection of these special trees is of great concern to our citizens.

Charlottesville's forests have a lot of friends. The general public plays a major role in decision making and physical work involved in protecting and managing the urban forests of Charlottesville. Citizens have long been a voice in support of the forests, helping the City achieve the results it has thus far in protecting and expanding our urban canopy. There is a "Funds for the Forests" public account that people and organizations can donate to in support of City tree planting and urban forest management. Individuals and groups often spend time keeping the forests clear of invasives and litter, and helping to plant new trees. Private businesses are also supportive of the public efforts to retain a healthy forest canopy.

Urban Forest Analysis and Data Collection



2008 Urban Forest Assessment

The Parks and Recreation Department hired Environmental Services, Inc. to identify and analyze all trees on City owned lands including parks, schools, City Hall and other built properties, street medians and other known street tree locations, and cemeteries. The study provided GPS location, number, species, variety, DBH (size), condition, monetary value, and other data on all trees for which the City has maintenance responsibility. For large forested areas, plot samples were taken and extrapolated to determine the general inventory and condition of trees. This data is critical in determining the species and age diversity of the trees, amount of invasive trees, and known maintenance needs for publicly managed trees and forests. The data is in GIS format, providing improved management and maintenance decision making tools regarding the urban forest in a format that has the ability to be updated, maintained and integrated into other City mapping and planning efforts. Future inventories will be helpful in tracking the management needs of the City's trees over time. Improvements to the GIS layer for parcels will enable more precise distinction between public and private street trees. (*See Appendix 2 for full draft*)

Diversity - Species diversity stabilizes the urban forest and helps protect against insect and disease infestations that could decimate large scale monoculture plantings. The diversity chart (Figure 2 in Appendix 2) shows a good level of mixed species throughout the urban forest as a whole (Pie Chart). Our most numerous species is 14% of the total (genus: cornus). Planning for tree plantings should always consider species diversity as a critical component.

Diameter Distribution (chart) – The diameter distribution chart (Figure 1 in Appendix 2) shows a relatively young urban forest, which is consistent with development and increased tree planting on Parks and School grounds over the past 30- 40 years.

Estimated Appraised Value – The value of the trees in non-forested areas is approximately 34.1 million dollars. This figure is significant and justifies budgeting for maintenance and management to protect this resource.

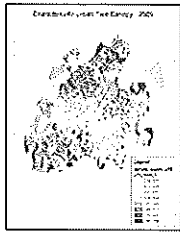
Condition Rating and Risk/Hazard Assessment - These attributes provide information regarding an individual tree's health and its potential risk to people and nearby infrastructure based on its location and surrounding land use. This information is helpful in prioritizing inspections for maintenance.

Potential Planting Spaces – These locations will serve as a guide for future planting possibilities.

Forested Plot Data – Data shows the overall condition and diversity of the wooded portions of schools and parks is healthy and that the density varies with the age of the stand.

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2009 Urban Tree Canopy Assessment

Working in cooperation with the Virginia Department of Forestry and Virginia Tech, the City conducted an analysis of the overall tree canopy for the land within the City limit, whether public or private. Aerial photography was taken with the leaves on the trees and included infrared and multi-spectral images for ease of analysis. GIS was used to analyze the photography and determine how much of the City has canopy coverage. Charlottesville was one of five localities in the Chesapeake Bay watershed to receive this analysis in order to refine the process in preparation of studying much more of the watershed in a similar manner.

Data is in GIS format to facilitate analysis and allow easy integration into other City mapping and planning efforts. Canopy coverage can be mapped by individual parcels, zones, or by land owner and other categories to create various reports and to determine which areas may be lacking in desired canopy coverage.

The data from the analysis shows that the City has an overall canopy coverage of 46.6%. This is higher than the 2007 Comprehensive Plan goal of 40%. The City will also be identifying different target canopy goals for different areas of the City, such as residential and business districts. With these new data in hand, we can see which neighborhoods have higher or lower canopy coverage than the target goal for their land use. Forest management efforts can then focus on expansion areas lower than desired, whereas preservation and/or enhancement might rank higher in areas already above the desired goal. All management methods will be used in all areas of the City at varying level, and these data are very helpful in setting priorities for action.

The City has a copy of the GIS model used to analyze the air photos. This will allow the City to run its own future models with the most current and best data available to track our progress. (*see Appendix 3 for full draft*)