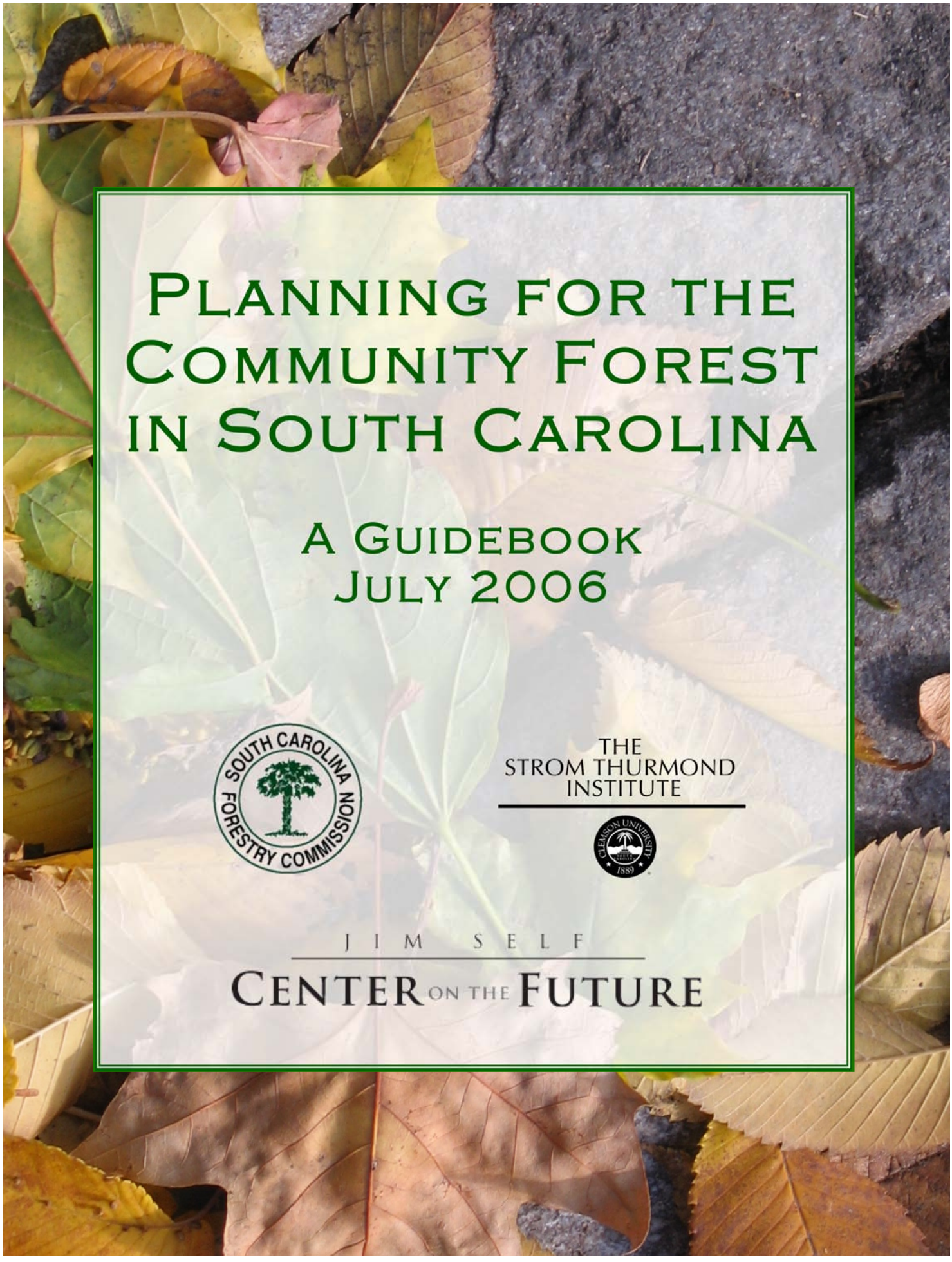

Planning for the Community Forest in South Carolina

A Guidebook
July 2006

SOUTH CAROLINA FORESTRY COMMISSION

THE STROM THURMOND INSTITUTE

CLEMSON UNIVERSITY 1889

JIM SELF CENTER ON THE FUTURE

PLANNING FOR THE COMMUNITY FOREST IN SOUTH CAROLINA

A GUIDEBOOK

BY

DONNA S. LONDON
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JULY 2006

THE JIM SELF CENTER ON THE FUTURE
STROM THURMOND INSTITUTE OF GOVERNMENT AND PUBLIC AFFAIRS
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This project was partially funded by the Urban and Community Forestry grant Assistance Supplemental Program administered through the South Carolina Forestry Commission and funded by the USDA Forest Service.

ACKNOWLEDGMENTS

The idea for developing this guidebook came from discussions that surfaced among professionals from different disciplines about the importance of the community forest to the fiscal, social, and physical health of our communities. In order to highlight the benefits of trees, to provide scientific information about their processes and physical needs, and to provide some guidance for incorporating community forestry into comprehensive plans, we have joined our respective fields of planning and urban forestry to develop this guidebook.

Through this process, talented individuals at educational institutions, private businesses, associations, and various state and local public agencies have shared time, thought, and expertise with us. First and foremost from the SC Forestry Commission, Liz Gilland, director of the Urban and Community Forestry program, and regional urban foresters Lois Edwards and Jimmy Walters provided direction, input, and support for the project. Representatives from the SC American Planning Association and the SC Urban and Community Forestry Council provided models and ideas for inclusion in the guidebook. In addition, the following students provided research which made this project possible.

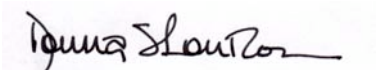
- Eileen Duffy, Planning and Landscape Architecture, Clemson University
- Courtney Craker, Planning and Landscape Architecture, Clemson University
- Keith Brockington, Planning and Landscape Architecture, Clemson University
- Tom Johnson, Forestry and Natural Resources, Clemson University
- Robert Ferguson, USC School of Law
- John Dinolfo's 2006 English 314 classes, Clemson University
- Wayne Heath's 2005 English 314 classes, Clemson University

We are refraining from specific mention of the many other contributors due to the risk of excluding someone. At the same time, they were important to this effort and we are grateful.

By necessity and design, we realize this guidebook is not totally comprehensive. We have checked the cited material but expect that some discrepancies are possible, especially with web sites and associated links that change as new information becomes available. We would appreciate your bringing this information to our attention.

We are encouraged by the widespread support that we have received for this initial effort and hope that it will provide encouragement for South Carolina's communities who are beginning to take charge of their community forest resource and the betterment of their communities. We wish you well.

Sincerely,



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I. INTRODUCTION

Community forestry is the interface between people, the built environment and trees through a dynamic interaction of forestry, horticulture, arboriculture, landscape architecture and urban planning.

The significance of our natural resources and the desire to conserve what we have is becoming increasingly important to South Carolina's citizens. Unprecedented population, development, and economic growth are generating discussion about how we provide balance to this new found prosperity. To ensure that South Carolina's growth is socially, economically and environmentally responsible, the issues and opportunities that potentially will affect community well-being must be anticipated and addressed. One of the issues that affect community well-being is the presence of tree resources. Trees provide aesthetic value but they also offer significant economic and ecological value. As part of the community infrastructure, trees have stormwater management, water and air quality, and energy conservation features. Because of their role in physically and economically healthier communities and more sustainable environs, they are the focus of this effort to include an urban and community forestry element in local government comprehensive plans.

Street trees in Georgetown, SC.
Photo by D. London.

South Carolina's cities and counties are authorized to prepare and implement a comprehensive plan within their jurisdiction under the SC Local Government Comprehensive Planning Enabling Act (also known as the Planning Act of 1994). See Appendix 1. The comprehensive plan provides a framework for the establishment of policies that support conservation, professional management, and maintenance of community trees. As one of the seven elements outlined in the Act, the natural resources element in many cases addresses the timber industry or forest lands. For the most part, however, trees in

urban settings have not been the focus of comprehensive plans in South Carolina's more populated areas or in areas transitioning from a rural to an urban status.

By incorporating urban and community forestry elements in its comprehensive plan, a community exhibits its commitment to thoughtful and strategic incorporation of trees into its surroundings. Trees bring significant benefits, ranging from health and environmental contributions to more tangible economic benefits. They do not happen magically, however, nor will they automatically be present for future generations. Communities must ensure healthy trees and a healthy community forest through intentional commitment and investment.

The SC Forestry Commission's Urban and Community Forest program partners with local governments in efforts to enhance and manage SC's trees, forests, and communities. Recognizing the central role of local government in formulating and implementing community forestry plans and policies, the Forestry Commission offers this guide to serve as a catalyst for communities seeking to integrate community forestry as a component of their comprehensive plans. This guide addresses tree physiology and the varied opportunities for the inclusion of trees in South Carolina's communities. Plan development guidance is offered which includes information on public involvement, research and analysis, plan formulation, and evaluation. References to a broad range of research conducted by experts around the country and replicable practices have been included as well.

Urban forestry is not an exact science, nor is comprehensive planning. Human actions and other conditions cause shifts over time which affect ecosystems. Planning has to be creative and adaptable when addressing these changing conditions. At the same time, the structure and direction provided by a community's fine-tuned plan can provide the foundation for a solid program and a vibrant community forest for its current inhabitants and for future generations. With education, vision, leadership, and commitment, South Carolina communities have the potential and the tools necessary for a healthy community forest.

II. COMMUNITY FORESTRY AND THE PLANNING CONNECTION

PLANNING LAW AND PROCESS

Since the early 1900s, planning in the United States has been a function of local governments. This function permits the planning and regulation of land development and use within a particular jurisdiction. In SC, planning authority originally was granted to municipalities in 1924, and for counties, it first was granted in 1942. In 1994, the General Assembly passed the SC Local Government Planning Enabling Act (Planning Act). See Appendix 1. The Planning Act consolidates all previously enacted planning legislation and repeals all SC planning programs and ordinances which do not conform to the new law.

The comprehensive plan is the cornerstone of the local government planning process because it lays out the chosen future of a community. All of the comprehensive plan elements are prepared under the legal auspices of the Planning Commission who will adopt a resolution recommending the plan or plan element to the governing body for adoption.

While the Planning Act addresses the structure and requirements that local governments must follow if they have land development or use policies, comprehensive plans in SC take varied forms depending on the community's desires and resources. According to Section 6-29-510, all planning elements must include an inventory of existing conditions, a statement of needs and goals, and implementation strategies with time frames. Generally, development of the plan follows the process outlined in Figure 1, and it includes text and maps. In the case of trees, vegetation, or civic design proposals, descriptive graphics of physical schemes for identified areas similar to the landscape plan depicted in Figure 2 are included as well.

A realistic community forest plan states what the community intends to achieve relative to its trees and what needs to be done to make this intention a reality.

The law outlines the seven elements that the plan should address. Depending on the needs of the community, other elements are encouraged either as part of one or more of the required seven elements or as a stand alone element. Community forestry sometimes is included within the natural resources, cultural resources, and community facilities elements. Other times, communities prefer that community forestry is addressed as a separate element because of its application

to a number of varied issues. Even though the individual elements focus on different subjects, the comprehensive plan is intended to integrate the different elements so that growth is orderly, public service and land development decisions are informed, and conflicts are reduced. Given that trees like other natural resources generally do not coincide with jurisdictional boundaries, it may be useful to consider some community forestry issues on a regional, watershed, or other natural boundary basis. Collaboration with neighboring jurisdictions and associated state, local and non-profit agencies also may be in order.

Figure 1. Planning Process

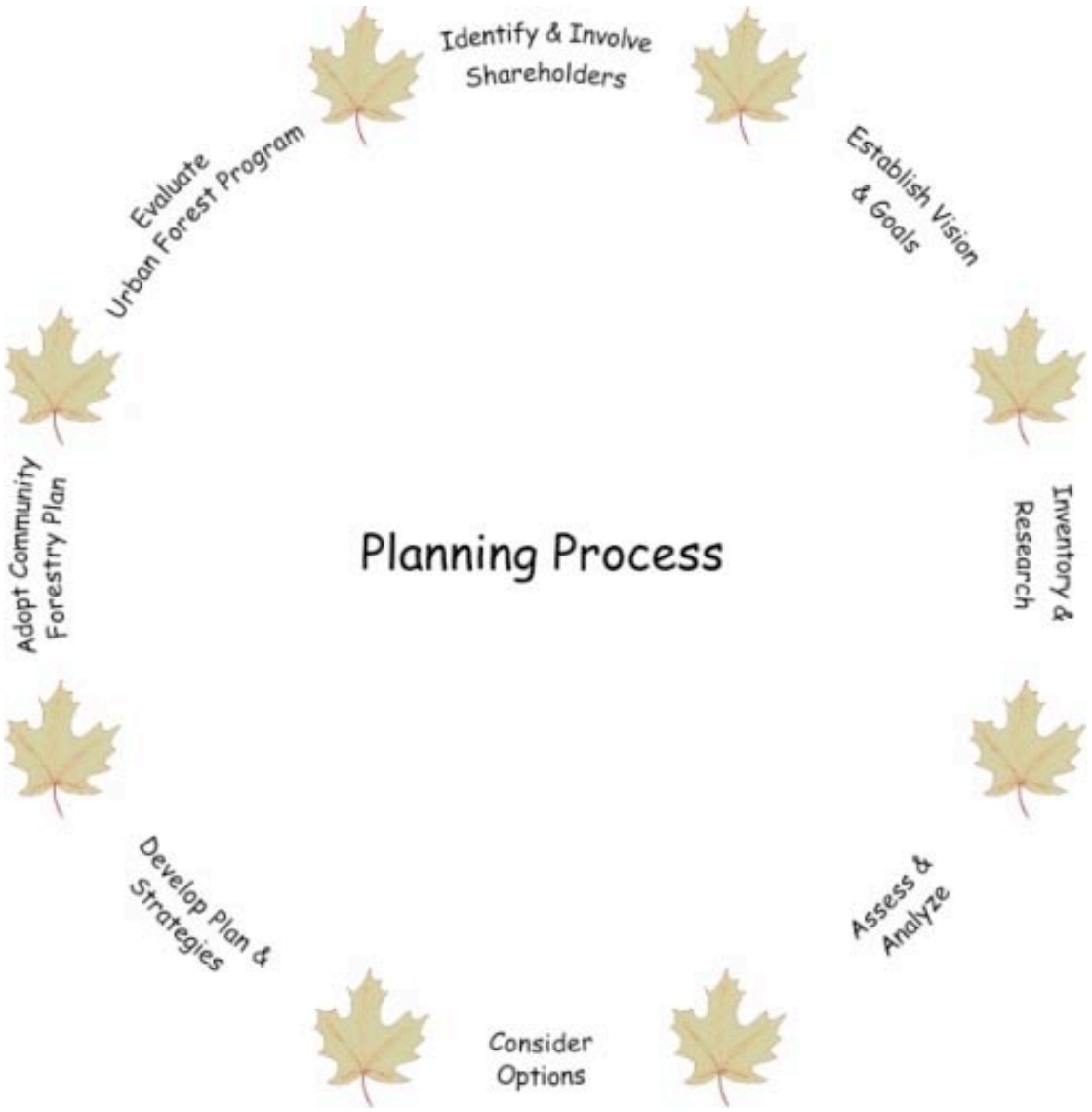
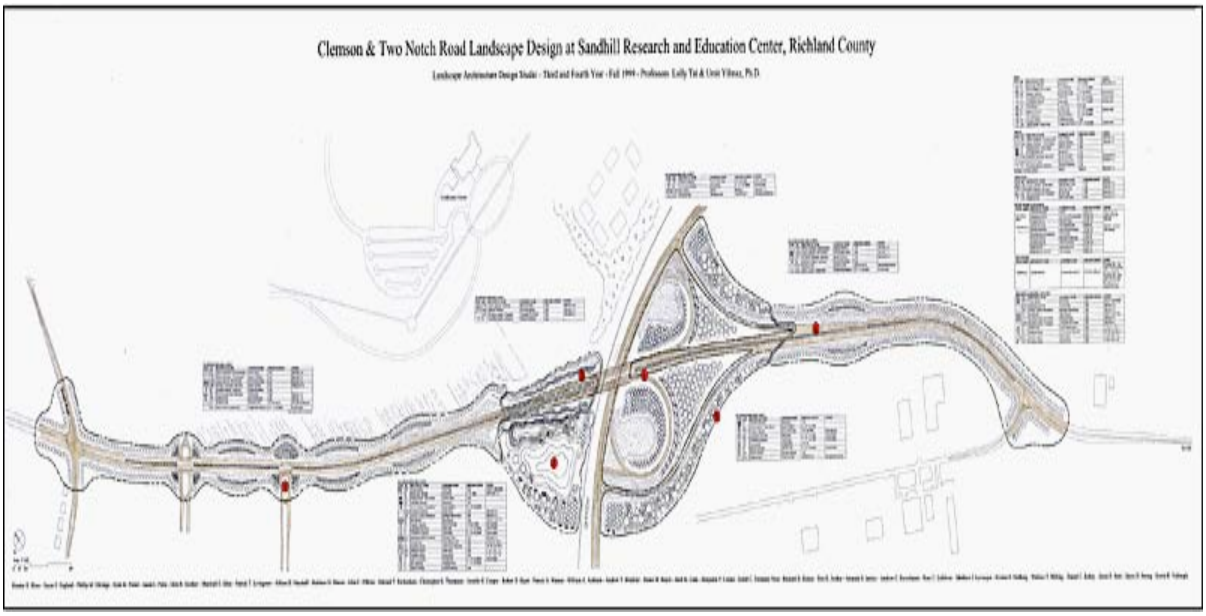


Figure 2. Landscape Design for Interchange



Landscape Plan for Clemson Road and Two Notch Road Interchange, Columbia, SC
By Clemson University Design Studio taught by Professors Lolly Tai and Umit Yilmaz

The seven plan elements addressed in a comprehensive plan are noted in Table 1 and defined in SC Code Section 6-20-510(D). The act does not specify the extent that each element must be addressed; however, there are typical components often found in each element.

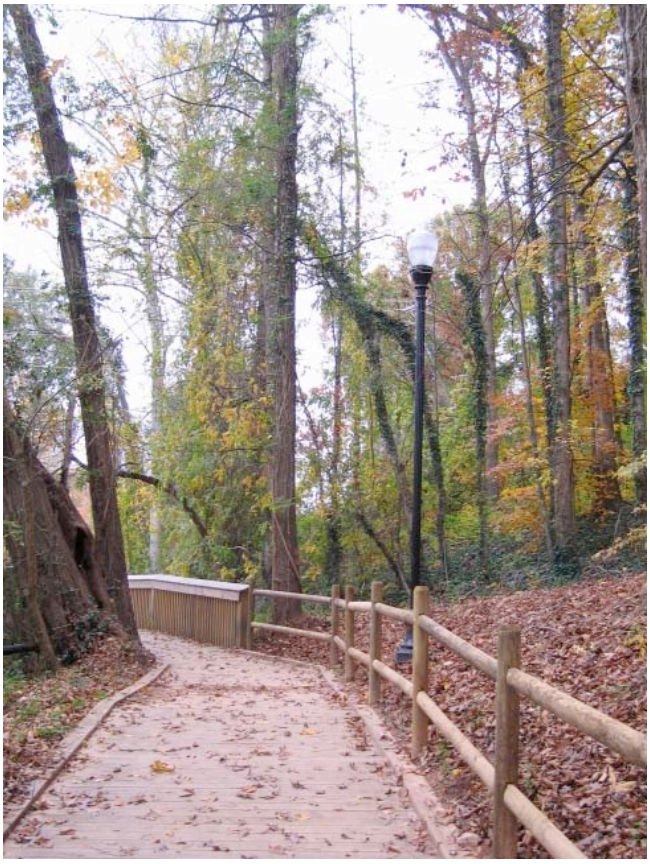
Table 1. Comprehensive Planning Elements

Element	Typical Plan Components
Population	▪ Historic trends and projections ▪ Household characteristics ✓ Age ✓ Race ✓ Sex ✓ Income characteristics ✓ Educational levels
Economic	▪ Labor force characteristics, trends, and projections ▪ Employment by place of work and residence ▪ Analysis of economic base

Element	Typical Plan Components
Natural Resources	▪ Slopes, soils and floodplains ▪ Prime agricultural and forest land ▪ Tree inventory ▪ Plant habitats ▪ Animal habitats ▪ Threatened or endangered species ▪ Scenic views and sites ▪ Wetlands ▪ Parks
Cultural Resources	▪ Historic buildings and structures ▪ Unique natural or scenic resources ▪ Archaeological resources
Community Facilities	▪ Transportation network ▪ Water supply, treatment and distribution ▪ Sewage and wastewater ▪ Solid waste collection and disposal ▪ Fire protection ▪ Emergency medical services ▪ General government facilities ▪ Education facilities ▪ Libraries ▪ Parks and recreation ▪ Other
Housing	▪ Location ▪ Type ▪ Age ▪ Condition of housing ▪ Owner/renter occupied ▪ Occupied/vacant ▪ Affordability
Land Use	▪ Existing uses ▪ Use compatibility ▪ Environmental opportunities/constraints ▪ Transportation/infrastructure influences ▪ Trip generation ▪ Development capacity ▪ Agricultural and prime land ▪ Agricultural and prime land preservation ▪ Downtown plans ▪ Neighborhood plans ▪ Redevelopment plans ▪ Future land use ▪ Annexation plan ▪ Areas not likely to develop

PLAN ELEMENTS AND HOW THEY RELATE TO COMMUNITY FORESTRY

For our purposes, the focus is on community forestry because it can provide individual and communitywide benefits. By considering community forestry in context with the other comprehensive planning elements, understanding the planned outcome, and knowing where there is conflict with the other goals, objectives and strategies, a viable outcome can be realized. Table 3 depicts examples of linkages and opportunities for community forestry inclusion in the other comprehensive plans elements.



Waterfront Park, Clemson S.C.
Photo by D. London

Table 2. Community Forestry Linkage Examples

Element	Opportunities for Community Forestry	Influencing Factors
Population	Growth	Population growth requires new or reconfigured development. Building frequently impacts the resources and the value provided by the trees. Tree canopy increases or decreases relative to population fluctuations and sentiments. Growth and potential for accompanying growth in tax base potentially allows for more diversified programs or opportunities to integrate urban forestry.
	Diversity	Some cultures place a higher value on the natural resources. Community activists may bring other perspectives to the table. Education differences may be a factor.
	Distribution	Infrastructure including green infrastructure is needed to accommodate growing population centers.
	Health and well-being	As population increases, desire for increased service levels frequently surfaces.
Economic	Recruiting efforts	Business often looks for high amenity locations. Vegetation is considered a business amenity. Tree canopy appeals to customers and employees.
	Taxes and fees	Life cycle analysis of trees not often considered. Community forestry program funds may be sacrificed for immediate concerns such as police or fire service.
	Site and design issues	New or reconstructed development may provide opportunities to include green infrastructure.
	Infill, brownfield, and industrial development	Redevelopment offers opportunities to include and/or enhance the community forest. Increasing impervious surfaces may decrease planting opportunities.

Element	Opportunities for Community Forestry	Influencing Factors
		Over the long haul, long term mitigation for pollutants increases vulnerability of forest health and lifespan.
	Downtown development or revitalization	Proper tree selection, planting, location, and maintenance are important so that unintended damages do not occur. Tree planting plans should take into account potential for visibility conflicts. Trees often return vitality to lackluster commercial districts.
Natural Resources	Forest Management	Management of timber lands, forests, and community forests requires different practices and tools. Financial resources may be targeted to one sector without recognition of the entire ecosystem.
	Water/Soil conservation	Mass tree removal harms soil structure.
	Air and water quality	Climate, topography, soils, and location determine the type of trees that are optimal for an area. Larger tree stands influence the quality of other natural resources. Non-point source pollution is difficult to sequester.
	Mitigation of urban heat island effects	Urban forests sometimes are located on the periphery of developed areas rather than integrated within so that they do not actually reduce heat island effect. Impervious surfaces impact heat island effect. Pervious surfaces are increasingly under development.
	Habitat preservation	Ease, expediency, and financial benefits of construction sometimes take priority over wildlife concerns. Threatened wildlife in developing areas may pose risks to humans. Once divided, habitat corridors are difficult to reassemble.

Element	Opportunities for Community Forestry	Influencing Factors
Cultural Resources	Include community forests in preservation plans	Community support for heritage and specimen trees determines quality of preservation.
	Tree stands emphasize communal connection with nature	Stands of trees create a sense of place. Location of tree stands determines the extent that the community forest is used. Community and cultural awareness and values relative to the natural resources vary.
	Specimen or heritage trees	There are varying opinions of what constitutes a specimen or heritage tree. The value or significance of a tree may be subjective. Damaged or older trees may require more intensive management.
Community Facilities	Energy savings	Trees serve as a wind block in winter and as shade in summer.
	Stormwater drainage plan	Rainfall interception and accompanying benefits are dependent on tree species, size of tree stand, location, and planting method. Community forestry provides opportunities to remediate erosion, sediment control, and stormwater runoff. Improved and more natural stormwater retention methods sometimes conflicts with government regulation.
	Improve aesthetics of eyesore facilities	Facilities planning concerned with function may sacrifice aesthetic opportunities. The impact on trees and the functional benefits of trees frequently are not considered in facility site selection. Trees may serve as visual buffers. The location of facilities may influence the placement of trees.

Element	Opportunities for Community Forestry	Influencing Factors
	Risk management	The community forests may serve as a windbreak during storm events. Storm damaged trees require clearing, replacing, and damages funding. Communities with an experience of property destruction due to falling trees may not embrace benefits. If a community perceives a low tree risk, it may not prioritize the need for a risk management plan. Urban/rural interface increases risk from fire. Management of the forest may include prescribed burning, cutting, or unplanted areas around structures.
	Transportation, roadways and parking	Tree buffers lessen vehicle noise and air quality impacts on a community. Tree canopies help reduce storm water flow on to roads or parking lots. Tree canopies provide shade for pavement which can prolong the life of the hardscape. Trees often are disregarded to maximize space and cost efficiency. Safety and liability factors of trees are road design variables. Paths, trails and other greenways frequently are not included in transportation plans. Road infrastructure increases fragmentation of community forest lands. Greenways improve linkages between other uses and community forest corridors. Trees that are considered as an integral part during a road's design rather than after a road is designed save time and money. Trees should be considered in hazard plans. Injured trees may affect roadways, sidewalks, and parking lots.

Housing	Site selection and design	Mature trees equal higher property values and quicker resell rates. Trees sometimes are sacrificed for construction and cost efficiency.
	Density	The proximity of a community forest to residential property promotes frequent use. Cluster or dense development may allow more opportunity for tree planting. Density increases may not be permitted by current regulations. Dense development may not square with community sentiments.
	Energy savings	Proper placement of trees on residential properties increases energy efficiency.
	Management	Maintenance and associated costs of trees on private property is often overlooked.
Land Use	Zoning and development regulations	Development density affects the type and fragmentation of forestry systems.
	Preservation of trees during development	Grading guidelines and construction site tree protection standards can be effective.
	Compact and cluster development provides opportunities for additional tree planting	Structures and topography may block available sunlight needed for forest health.
	Redevelopment rather than conversion of undeveloped land	The initial convenience of building on vacant land may influence a development decision.
	Bonus or incentives to influence tree preservation	Bonus or incentive equations are spelled out in codes.

ADDITIONAL RESOURCES

Innes, J. 1996. Planning through consensus building: a new view of the comprehensive planning ideal. *Journal of the American Planning Association* 62(4). Chicago, IL: American Planning Association. [Autumn].

International City/County Management Association. 1988. The Practice of Local Government Planning. Washington, D.C.: International City/County Association.

Levy, JM. 2000. Contemporary Urban Planning, 5th Edition. New Jersey: Prentice Hall.

Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Southern Consortium of University Public Service Organizations.

S.C. Code of Laws. Title 6, Chapter 29, Article 3.
http://www.scstatehouse.net/code/t06c029.htm

III. Why Trees Are Important

Trees are architectural and engineering marvels particularly as the foundation for a community's green infrastructure. While they provide many dividends to taxpayers, visitors, and local governments, they are also a dominant feature of urban ecosystems.

Looking up the trunk of the champion loblolly pine

TREES ARE IMPORTANT TO HUMAN AND ENVIRONMENTAL HEALTH

Each year one hundred trees remove five tons of CO_2 as well as 1000 pounds of pollutants, including 400 pounds of ozone and 300 pounds of particulates. Pollutant removal is critically important for those suffering from respiratory and other diseases. Moreover, for communities that are struggling to attain the ozone clean air standard, the US Environmental Protection Agency (EPA) is encouraging innovative approaches which include increasing the tree canopy to reduce emissions. Air quality issues are serious around the country including in South Carolina's upstate, in the Charlotte metro area, and around the state's midlands. In addition to the health risk, there is a financial risk of reduced transportation funds and sanctions that would make it difficult for additional industry location and expansion if the air quality State Implementation Plan (SIP) does not strategically address and implement reduction measures.

Wal-Mart parking lot with trees.
Hilton Head Island, SC.

Shaded parking lots further benefit human health and comfort by keeping the pavement, vehicle cabin, and gas tank cooler, and by reducing the amount of volatile organic compounds released into the atmosphere. A California study by the Center for Urban Forest Research demonstrated that shaded parking lots were more than 30

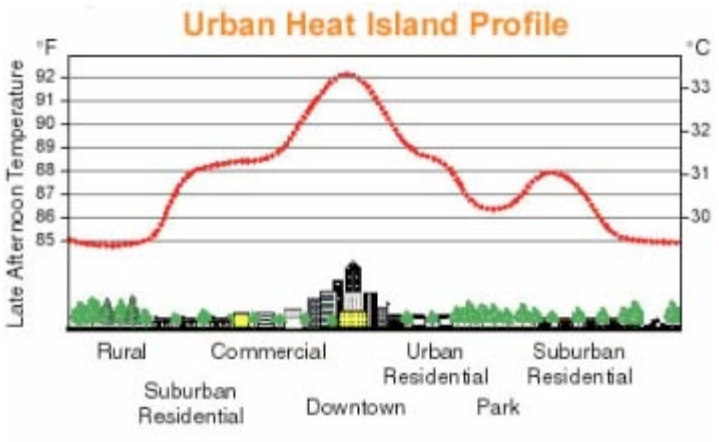
degrees cooler, cabin temperatures 40 to 50 degrees lower, and gas tank temperatures were 4 to 8 degrees cooler. With 50 percent shade, volatile organic compounds were reduced by one ton per day, inspiring EPA to adopt shading standards for the Midwest.

Birds and other wildlife are integral to our communities. In addition to enhancing our connection to nature, they also have a role in pest control. Trees provide nesting places, homes, and feeding grounds for wildlife.

TREES REDUCE THE HEAT ISLAND EFFECT

Trees also have the potential to reduce ambient temperatures in urban centers which are hotter than the surrounding areas. Existing in urban areas around the world, this condition is known as the urban "heat-island" effect and is caused by carbon dioxide, oxides of nitrogen, and other pollutants, expanses of impervious surfaces, and limited tree canopies. In Atlanta, Georgia, meteorologists measure the downtown temperature at 5 to 8 degrees higher than in the surrounding countryside. When coupled with particulate matter and gaseous pollutants, this temperature increase can affect public health. Moreover, this combination of factors can increase thunderstorm activity and potentially lead to flash flooding. Through shading and evaporative cooling by the leaves, trees help decrease the heat island effect.

Figure 3.

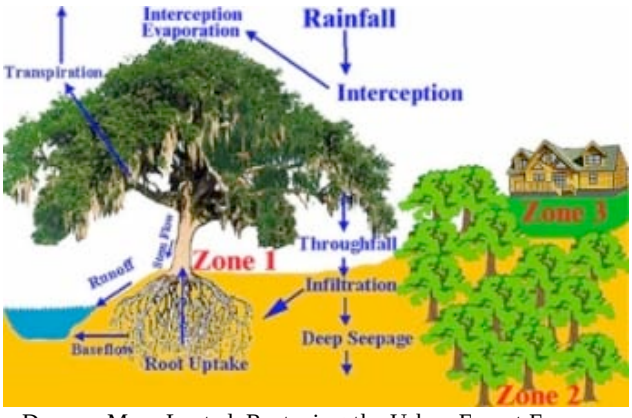


Source: *Cooling Our Communities: A Guidebook on Tree Planting and Light-Colored Surfacing.*

TREES IMPROVE WATER AND SOIL RESOURCES

Increasingly, stormwater management is a major expense for local governments. Vegetation can provide a remedy for stormwater runoff. In addition, it is a deterrent to erosion, flooding, and water pollution caused by this issue. While vegetation, in general, helps reduce stormwater runoff, trees are particularly efficient given their small footprint but relatively large canopy. The leaves, twigs, branches, and trunk play their part by trapping a quantity of the stormwater for a time until it runs off to the ground, evaporates into the atmosphere, or is absorbed by the tree canopy.

Figure 4. Influence of Trees on Rainfall and Stormwater Runoff



Duryea, Mary L. et al. Restoring the Urban Forest Ecosystem. 2000. CD-ROM. University of Florida.

Computer simulations of deciduous trees in California's Central Valley estimate that for every 1000 trees, stormwater runoff is reduced by nearly 1 million gallons—a value of almost $7000 on an annual basis. These values are clear evidence of the role trees play in reducing runoff and in reducing the need for engineered controls. While the research was conducted in California, the tree canopy interception rate of 11.1 percent of annual rainfall over an urban area with trees was close to that reported for hardwood forests typical of the eastern US.

Tree roots contribute to improved water management and quality in several ways. First, they assist in reducing runoff by increasing soil permeability. Even decaying roots provide channels that allow for a greater soil infiltration rate. Reduced runoff means less likelihood of flood events and fewer contaminants, such as petroleum and pesticides, being picked up by overland flow and moved to water bodies. Secondly, roots stabilize the soil and minimize erosion which can be a major water contaminant, especially near urban development projects. Consequently, trees not only have a function in tackling water quality, stormwater, and erosion issues, they also can save tax dollars which typically go towards engineering remedies of these issues.

Healthy trees reduce the amount of runoff and pollutants in receiving waters in three primary ways:

- Leaves, branch surfaces, & trunk bark intercept & store rainfall, reducing runoff volumes and delaying onset of peak flows
- Root growth & decomposition increase capacity & rate of soil infiltration by rainfall & reduce overland flow
- Tree canopies reduce soil erosion by diminishing impact of raindrops on barren surfaces

Is all our rain going down the drain? *Urban Forest Research Newsletter*. July 2002. Pacific Southwest Research Station, USDA Forest Service. http://cufr.ucdavis.edu/newsletter.edu

TREES IMPROVE BUSINESS

Enhancing consumer appeal for a commercial area is an ongoing challenge for business owners and developers. The presence or addition of trees to the landscape increases general street appeal, pleasant shopping environments, and expectations of a higher quality product. Research shows that trees increase business because customers shop more frequently and for longer time periods in well-landscaped business districts. Shoppers also are willing to pay more for parking and up to 12 percent more for goods and services in tree-lined commercial districts.

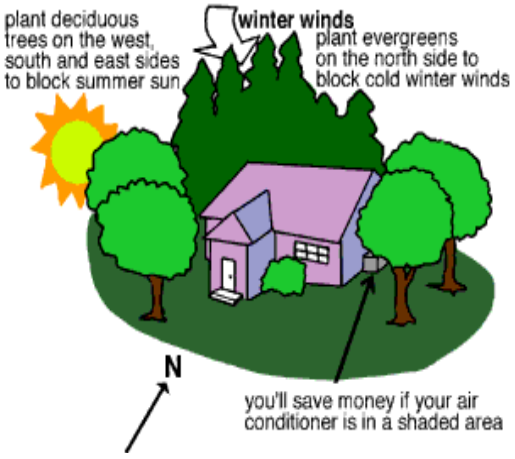
TREES ARE VITAL TO COMMUNITY WELFARE

Trees provide clean air, clean water, and psychological well-being. Furthermore, they have a positive impact on business in the community, bringing in more shoppers and more dollars. Tree protection, planting, and maintenance are long term investments. While the trees are enjoyed today, future generations will reap the benefits of the trees as well.

Neighborhoods with trees have lower levels of domestic violence and are generally considered to be safer and more sociable environments. Views of nature and trees reduce stress, as well as the amount of medication and recovery time of hospital patients. While trees do not mask loud noises, they do have a buffering quality so that noises in urbanized settings might be softened. Trees also provide some privacy or definition to properties. They can provide visual buffers to help screen service or uninviting areas as well.

Some communities use trees along with other traffic calming measures to help slow traffic and as a barrier between roadways and sidewalks. Consequently, along with added shade and beauty, the trees may provide the pedestrian a safer and more pleasant walk and the added benefit of some exercise.

Figure 5. Trees Save Energy



http://www.lpb.org/programs/forest/plantguide.html

TREES HELP HOMEOWNERS

In addition to their aesthetic benefits, trees are economically important to homeowners. Strategically placed around a home, they can provide annual savings of up to 30 percent in air conditioning costs and a 10 to 25 percent reduction in heating costs. Trees are a factor in houses selling quicker and at higher prices. Studies show that each large front yard tree adds 1 percent to the sales price, and large specimen trees can add 10 percent or more to property values.

TREES PROVIDE A SENSE OF PLACE AND CREATE A LEGACY

Trees are the largest living features of the urban environment and often define the landscape by creating an inviting and unique sense of place. In fact, several communities in SC derive their names from trees, for example, Myrtle Beach, Hickory Grove, and Isle of Palms. Palm trees at the beach, an old oak with a tire swing, or a child's tree house bring to mind memories and a general sense of contentment. Tree-lined streets and historic groves or landmark trees define many communities, and the people who help plant and maintain these trees have a special allegiance to their longevity.

TREES HAVE ASSOCIATED COSTS

Without doubt, there are costs associated with active maintenance and management of community trees. Tree planting costs can be significant but the costs vary widely depending on species, size, location, site characteristics and preparation, and labor. Selection, planting, and watering for establishment are a large portion of the initial cost. Expert advice in this area goes a long way in preventing future, potentially expensive, and hazardous situations.

Tree maintenance and removal costs generally are dependant on the species, size, and site location. As in planting, a maintenance program tended by qualified workers can minimize future economic and safety costs and increase the tree's value. A computerized inventory along with maintenance/management software allows communities to assess tree needs and changes over time and to schedule appropriate treatments. The following activities frequently are part of the maintenance responsibilities:

1. Pruning
2. Irrigation
3. Mulching
4. Pest management
5. Tree removal
6. Debris removal

There may be complaints that signage or storefronts are blocked by tree canopies or that building views are obstructed. Leaves, twigs, nuts, and berries can create debris. Limbs may fall and trees including their roots can damage sidewalks, curbs, streets, sewers, utility lines, and other structures. Of course this means the possibility of costly repairs and some risk of liability. Legal costs incurred due to damage from and to the trees can be substantial for local governments. It is important to note, however, that most damage or concerns are the result of inappropriate tree or site selection, planting, and/or lack of maintenance. Planning and management are the keys to reducing these problems and avoiding other tree related costs in the future.

The direction provided by arborists, urban foresters, city planners, and a knowledgeable workforce, as well as appropriate equipment and materials, are essential to the cost-effectiveness and survival of the community forest. Subsequently, when professionally managed, community forests are an asset, not a cost. For example, a study conducted in Washington State noted that 100 trees over 40 years are worth $225,000 in terms of typical benefits such as energy savings, air quality, health, and impacts on business. While specific costs and benefits will vary by area of the country, standard costs for planting and maintaining those trees for the same time period are approximately $82,000: a net benefit to the community of $140,000! See Table 3.

Trees Are:

Worth Our Time and Resources

- Part of community infrastructure
- Vital to community health
- Important to community legacy
- Positive impact on business and tax base
- Wise investment of community dollars

Better for Business

- In tree-lined commercial districts:
  - More frequent shopping
  - Longer shopping trips
- Shoppers spend more for parking
- Shoppers spend 12 percent more for goods

Great for Homeowners

- Save up to 30 percent on annual air conditioning costs
- Save 10-25 percent on winter heating costs
- Houses sell faster and at higher prices
- Each large front yard tree adds 1 percent to sales price
- Large specimen trees can add 10 percent, or more, to property values

Contributions to Human Health and Welfare

- Tree-filled neighborhoods:
  - Lower levels of domestic violence
  - Are safer and more sociable
- Tree-filled landscapes reduce stress
- Trees decrease the need for medication and speed recovery times

Important for the Environment

- Filter water so that it is cleaner
- 100 trees remove five tons of CO_2/year
- 100 trees remove about 1000 lbs of pollutants per year, including:
  - 400 lbs of ozone
  - 300 lbs of particulates
- Provide habitat

Beneficial for Citizens

- 100 mature trees catch about 100,000 gallons of rainwater per year resulting in reduced stormwater control costs
- Increase property values
- Contribute to community character and a sense of stability and pride

Envision Utah Toolbox. Chapter 6 Urban Forestry
http://envisionutah.org/toolbox_pdf/Chapter_6.pdf

Table 3. Estimated 40-year Total Benefits and Costs for a Street Tree Planting of 100 Trees—
50 Large Trees, 30 Medium Trees, 20 Small Trees*

Benefits	50 Large Trees		30 Medium Trees		20 Small Trees		100 TreeTotal	
	Units	$	Units	$	Units	$	Units	$
Electricity (kWh)	94,000	8,460	26,400	2,376	7,200	648	127,600	11,484
Natural Gas (kBtu)	954,000	8,740	267,600	2,448	68,800	632	1,290,400	11,820
Net Energy (kBtu)	1,898,000	14,680	531,600	4,116	136,800	19,860	2,566,400	19,860
Net CO2 (lb)	514,000	7,720	73,200	1,092	12,000	184	599,200	8,996
Air Pollution (lb)	2,000	5,620	1,200	2,268	0	776	3,200	8,664
Hydrology (gal)	1,098,000	30,500	415,200	11,544	145,600	4,040	1,658,800	46,084
Aesthetics and Other		82,680		27,888		7,920		
Total Benefits		**$158,400**		**$51,732**		**$15,264**		**$225,396**
Costs		Public		Public		Public		Public
Tree and Planting		13,768		4,356		2,904		21,028
Pruning		21,040		11,160		5,552		37,752
Remove and Dispose		4,420		2,172		1,136		7,728
Infrastructure		220		108		56		384
Irrigation		3,300		1,620		864		5,784
Clean-Up		1,340		804		536		2,680
Liability and Legal		3,240		1,596		848		5,684
Administration and Other		720		360		192		1,272
Total Costs		**$48,048**		**$22,176**		**$12,088**		**$82,312**
Total Net Benefits		**$110,352**		**$29,556**		**$3,176**		**$143,084**

* McPherson, E.G.; Maco, S.E.; Simpson, J.R.; Peper, P.J.; Xiao, Q.; VanDerZanden, A.E.; and Bell, N. *Western Washington and Oregon Community Tree Guide: Benefits, Costs and Strategic Planting*. International Society of Arboriculture, Pacific Northwest Chapter. Silverton, Oregon, 2002.

THE COMPOSITION OF THE URBAN AND COMMUNITY FOREST

All of the trees in a community should be viewed as a vital part of the community forest and, to the extent possible, managed as a population in order to maximize the benefits discussed above. The following are the major components of most community forests:

1. Street trees—Trees lining our streets and medians that are typically on publicly owned rights-of-way.

Bluffton, SC

2. Bufferyards—Trees generally located on the edges of property or between different land uses, for example between commercial and residentially zoned properties.

3. Scenic Corridors, Green Belts, and Natural Areas—Public or privately owned preserves or undeveloped lots that have remained in a natural state by choice or default. They range in size and in many cases, they will contain native vegetation. The use and management of these areas varies depending on size, location, and purpose. Sometimes serving passive recreational needs, they also may be commercial timber farms, stormwater retention areas, and/or provide habitat for wildlife. If zoned for residential or commercial use, these remaining patches have the potential to be lost to development.

4. Parks and Open Space—These areas often represent some of the largest pieces of contiguous undeveloped open space within an urban area. Parks may be kept in a natural state, or they may be landscaped. Many larger parks contain elements of both. In more urbanized areas, small pocket parks are often located in a closely confined space surrounded by buildings or other impervious surfaces.

Charleston, SC infill development.
Photo by D. London.

5. Residential or Medium to Low Density Zones—Trees in yards and landscaped areas, while on private property, typically constitute the largest portion of a community's forest. Trees in these areas may have existed prior to development or may have been planted later as a property enhancement or as part of a regulatory requirement.

6. Commercial or High Density Zones—Trees are often "engineered" into spaces surrounded by impervious surfaces. Frequently, landscape installation is required as part of the land development or zoning regulation in the form of bufferyards or parking lot landscaping. New materials and approaches along with professional planning and over-sight can increase tree success and reduce hardscape conflicts in these higher density areas.

Columbia development.
Photo by D. London

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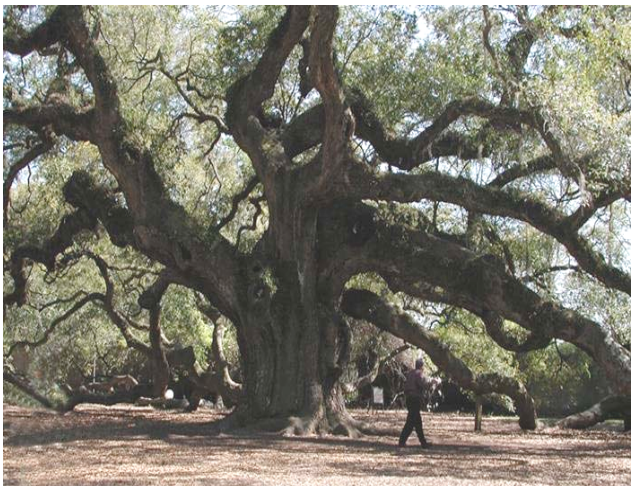
IV. HOW TREES LIVE AND DIE

WHAT IS A TREE?

A tree is a woody plant that grows to 15 or more feet in height and usually has a central stem or trunk that is more than 3 inches in diameter at maturity. Trees are often grouped into size classes (small, medium, and large) based on their mature height. While the height ranges for each class may vary with different authors, they are defined here as follows:

Small Trees:	**Less than 25 feet tall at maturity**
Medium Trees:	**25 to 50 feet tall at maturity**
Large Trees:	**Greater than 50 feet tall at maturity**

Trees are complex living organisms that function as complete systems. The main above-ground parts of a tree are the leaves and branches (collectively known as the crown of the tree) and the trunk. The roots are the underground structures. These parts do not function independently but rely on all parts of the tree system performing properly in order to maintain suitable growth and health. Similar to human health, all parts or structures are interdependent, and any disease or injury to one part of the tree has some negative impact on the entire system.



Angel Oak, Johns Island, SC.
Photo by D. Ham.

PHOTOSYNTHESIS

The crown is composed of leaves and various sizes of branches that include large support limbs, smaller support branches, and the smallest twigs. The green leaves are the power plant of the tree. They absorb carbon dioxide from the air, use water from the soil via their roots, and in the presence of sunlight, produce food or carbohydrates in a process called photosynthesis. Oxygen

is released as a by-product of photosynthesis. Some of the carbohydrates are used quickly for on-going life processes and some are stored in various parts of the tree.

Photosynthesis only occurs in green tissue, primarily the leaves. Therefore, anything such as drought, pest attack, flooding, severe pruning, or construction damage that directly or indirectly reduces the number or size of leaves will have a negative impact on the health of the tree. As a result, increased maintenance costs and safety problems can be anticipated.

RESPIRATION

All of a tree's life processes of growth, repairing injuries, flowering, and providing fruit require energy. That energy comes solely from breaking down the carbohydrates formed in photosynthesis in a process called respiration. The tree has no food or energy source other than what it can produce on its own. Fertilizers, for example, may enhance photosynthesis and other physiological processes, but they do not directly "feed" or provide energy.

A tree has two main forms of respiration. Growth respiration provides energy needed to make new tissue. Maintenance respiration provides energy to keep existing tissue alive and healthy and to respond to injuries or pest attacks. Thirty to sixty percent of the carbohydrates that a tree produces on a daily basis are used each day for growth and maintenance respiration further emphasizing the importance of keeping a tree healthy and with a full complement of leaves.

GROWTH REGULATORS

Since carbohydrate is only produced by green tissue (leaves), it must move to the tree's growing points (shoot and root tips and the cambium) and to other tissues for maintenance. Tree growth regulators are the substances that direct or allocate the flow of carbohydrates from their production sites to the areas where they are needed for growth and maintenance.

Anything that affects the leaf area, such as severe pruning, drought, or insect defoliation, will reduce the amount of carbohydrates produced and reduce their allocation to the roots. As a result, root functions like water and mineral absorption are reduced and root dieback may occur. Similarly, any activity that damages the root system such as trenching, soil compaction, or root disease triggers more carbohydrate allocation to the roots to "repair" the problem. In turn, the carbohydrate requirements of the canopy may not be met and branch dieback (and reduced photosynthesis) usually occurs. Severe or extended reduction in carbohydrate production (photosynthesis) can cause the tree's reserves to be depleted and lead to tree decline and possible death.

READ THE RINGS:

Past environmental conditions, such as drought or abundant rainfall, can be correlated with tree growth/health by measuring the width of annual growth rings in the trunk. The wider the rings, the better the growing conditions. Ring width also indicates the impact of human activity on trees.

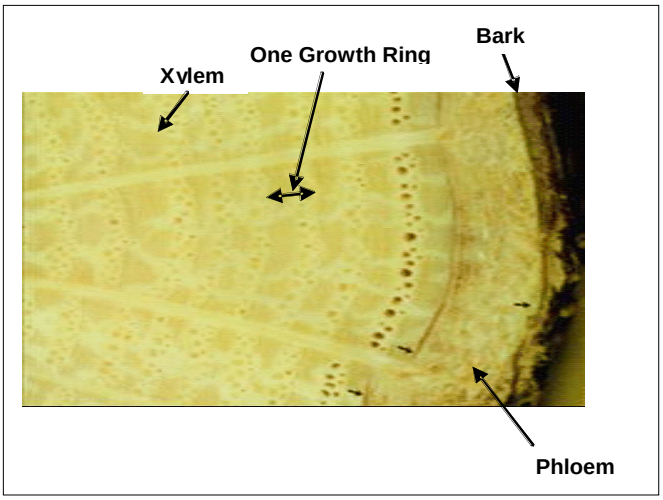
BRANCHES

Elongation growth in the crown occurs at the tips of the branches and may be as little as a few inches or as much as several feet per year depending on the tree species and growing conditions. As the crown increases in size, more leaves are produced along the length of the growing branches, increasing the photosynthetic capability.

The area of a horizontal plane through the widest part of a tree crown is defined as the tree canopy. This area (canopy projection) is the same as a shadow of the crown that would be projected on the ground if the sun were directly above the tree. As shoot growth enlarges the crown, the canopy cover increases. More shade and thermal cooling, greater air pollution absorption, increased rainfall interception, and reduced storm water runoff are the functional benefits of the canopy cover increase.

TRUNK

The trunk is the main woody stem of the tree that connects the roots to the crown and supports the crown. Most trees have a single trunk but some species are multi-stemmed. Trees are commonly referenced by their trunk diameter which is measured at 4.5 feet above ground. This measurement is called dbh or "diameter breast height."



Water moves through the outer layers of the woody trunk tissue to other areas of the tree. The same woody tissue, called the xylem, of the trunk, branches, and roots stores carbohydrates and other substances necessary for tree growth.

Small red pine (Pinus resinosa)
Photo©H.D. Grissino-Mayer

The bark is the protective layer that covers the outside of the trunk, branches, and roots. Beneath the bark is a very thin layer of specialized cells known as the cambium. Trunk, branch, and root diameter growth occurs each year when the cambium cells divide to form new cells on both sides of the cambium layer. The new cells develop into woody (xylem) tissue to the inside and the inner bark (phloem) to the outside. The phloem is the tissue that transports carbohydrates and other organic substances from the leaves to other parts of the tree. The annual formation of xylem tissue can be seen as annual growth rings, which are more visible in some species than others. The age of a tree can be determined by counting the number of annual growth rings in the trunk.

ROOTS

Tree roots, the underground structures, anchor the tree and absorb water and nutrients required for tree growth and survival. The large woody anchor roots are visible at the base of the tree. They quickly taper into rope-like structures that extend away from the trunk and hold the tree in tension. Many small, non-woody roots arise from the woody roots and grow primarily in the upper soil layers. Many of the non-woody roots develop associations with beneficial fungi to form mycorrhizae (fungus-roots), which aid the tree and the fungus in uptake of water and nutrients.

Source: Best Management Practices for Community Trees: A Technical Guide to Tree Conservation in Athens-Clarke County, Georgia.

Contrary to common beliefs, tree roots do not grow deep and are not confined to the area under the crown. Nearly 85% or more of all of a tree's roots are within the top 12 to 18 inches of the soil, making them extremely susceptible to injury by common human activity. Further, tree roots grow out from the trunk for a distance equal to at least 2 to 3 times the height of the tree.

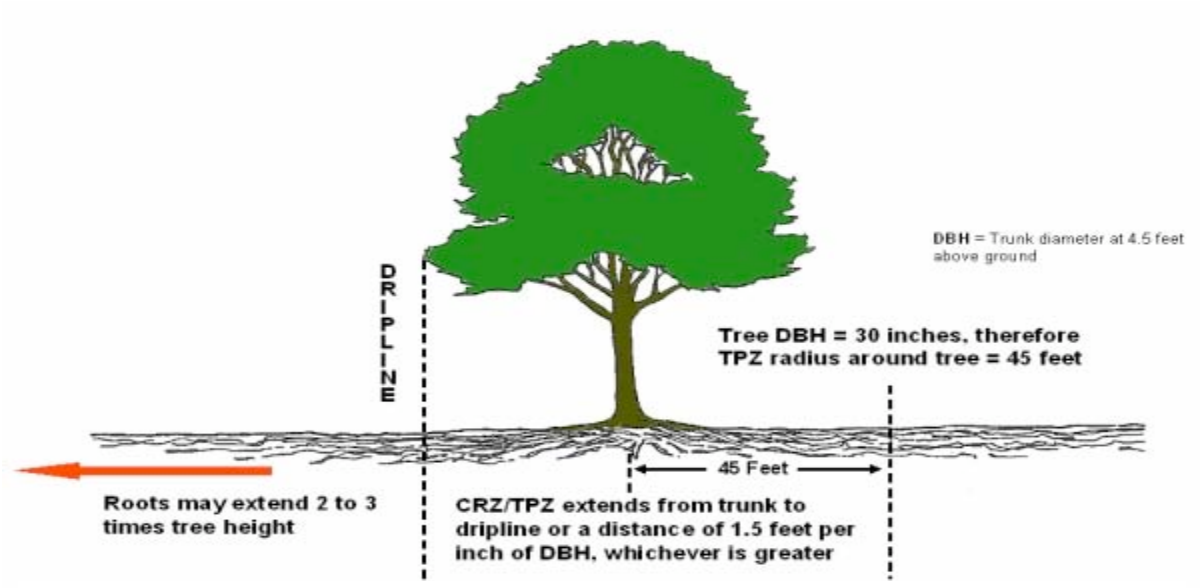
TREE HEALTH AND PROTECTION

Trees require certain basic substances and specific environmental conditions to function, survive, and grow. Each species has a range of soil moisture, soil volume, soil nutrient and pH levels, air temperature, humidity, and sunlight in which it will grow. Trees respond very directly to positive and negative changes in their environment. However, as a tree matures, it becomes increasingly intolerant to negative changes in its environmental surroundings. Under ideal conditions, trees achieve their genetic potential for size, age, and form for the species. Under less desirable conditions, as is typical in urban situations, trees grow slower, are smaller at maturity, are more vulnerable to pest attack, and exhibit various symptoms of stress and decline.

Unlike humans, trees cannot replace cells or tissues that are damaged or destroyed with new cells or tissue in the same location. Trees cannot "heal" wounds; they can only "seal" over them and attempt to grow new parts nearby if they are healthy enough to do so. Therefore, any physical damage to the roots, trunk, or crown of a tree affects it for the remainder of its life. If roots are cut or damaged, trunks wounded, or branches improperly pruned, the damage impacts the tree forever as it attempts to close wounds and/or grow new tissue. Reserve carbohydrates that were stored in the damaged or severed tissue are lost forever and other reserve carbohydrates are converted to energy to "repair" the damage, further weakening and stressing the tree.

The ability of a tree to withstand physical damage, poor environmental conditions, and pest attacks plus function effectively in the landscape is related to its ability to store reserve carbohydrates. That ability varies with tree species, age, care, and maintenance along with recent growing conditions. In general, fast growing tree species, such as silver maple, allocate most of their energy to growth and little to storage. Such species usually have shorter life spans and have more health problems than slower growing species like most of the oaks.

Figure 6. Tree Size



Best Management Practices for Community Trees: A Technical Guide to Tree Conservation in Athens-Clarke County, Georgia.

GROWING SPACE

Trees need space—above and below ground. For urban trees to be cost-effectively maintained and managed, they need to be well-matched to their location and the most critical factor is space. Having sufficient above-ground space for the tree to reach its mature size is necessary to avoid excessive pruning for overhead utilities, buildings, signs, vehicles, and pedestrians. Excessive pruning can affect the health of a tree and is an expense that can be avoided with proper tree and site selection.

A minimum amount of below-ground space must also be provided and/or protected to maintain soil health and preserve the tree root system. This area is often referred to as the critical root zone (CRZ) or, in the case of development and construction near a tree, the tree protection zone (TPZ). Traditionally, the CRZ has been defined as the area from the trunk out to the dripline of the tree. However, this space is often much too small for young trees or trees with narrow crowns. Therefore, both the critical root and tree protection zones are defined as a circular area above and below ground with a RADIUS equivalent to whichever is greater, 6 feet or 1.5 feet for

every inch of trunk diameter measured at 4.5 feet above ground (DBH). For example, a tree with a DBH of 30 inches would have a TPZ radius of 45 feet (1.5 X 30) and a diameter of 90 feet. That area is a minimum and protecting a larger area is preferable. When circumstances dictate a smaller than desirable planting space, professional arborists or community foresters should be consulted for special treatments or protective measures.

ROOT GROWTH REQUIREMENTS

Soil conditions, especially the physical soil conditions, typically determine the health and long term success of trees in our urban environments. Roots require both water and oxygen to live and grow, and oxygen is the factor more likely to become limiting. Soil is not a solid but a matrix of solid particles and open pores. The pore space is required for gas (oxygen and carbon dioxide) exchange and for water infiltration and storage. An "ideal" soil, which is seldom found in an urban situation, would have 50 percent pore or open space and 50 percent solid material.

When soil is compacted by pedestrian or vehicular traffic or by construction activities, the pore space can be reduced to a point that oxygen availability may be low enough to limit or even prevent root growth. The consequence is poor tree growth or death. Along with limiting oxygen, soil compaction restricts water infiltration, water holding capacity, and physically impedes root penetration of the soil.

Air exchange between the soil pore space and the aboveground atmosphere is reduced whenever pavement or in some cases, additional soil fill is added over the critical root zone. Low soil oxygen related to poor soil protection and management is one of primary reasons for poor urban tree growth and health.

Trees also require a minimum soil volume. This point is especially important when planning for new tree plantings along streets or other confined areas. The actual amount of soil should be calculated by measuring the area within the projected mature dripline of the tree. A general rule of thumb is to provide two cubic feet of soil for every one square foot of mature canopy projection. The minimum depth of soil required for adequate root growth is two feet or 24 inches. If a tree is expected to have a mature canopy projection area of 1000 square feet, the minimum soil volume should be 2000 cubic feet (1000 ft^2 X 2 ft deep = 2000 ft^3).

ADDITIONAL RESOURCES

A Technical Guide for Urban and Community Forestry.
http://www.na.fs.fed.us/spfo/pubs/uf/techguide/toc.htm

Florida Solar Energy Center.
http://www.fsec.ucf.edu/pubs/energynotes/en12-landscaping.pdf

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http://www.urbanforestrysouth.org/Resources/Collections/Collection.2005-06-02.0039

USDA Forest Service Center for Urban Forest Research. http://cufr.ucdavis.edu/

USDA Forest Service North Central Research Station, Natural Environments for Urban Populations. http://www.ncrs.fs.fed.us/4902/

USDA Forest Service Northeastern Research Station, Syracuse.
http://www.fs.fed.us/ne/syracuse/

V. COMMUNITY FORESTRY ELEMENT— PLANNING PROCESS STEPS

According to section 6-29-510 of the State Planning Act, at a minimum, the planning process must include an inventory of existing conditions, a statement of needs and goals, and implementation strategies with time frames for each one of the comprehensive plan elements. These requirements also are applicable to the community forestry element along with any other locally determined elements. While the law does not address the extent of detail required for the elements, additional efforts to elevate the community forestry plan to a meaningful tool can be achieved by providing useful and more comprehensive information that will produce positive policy and educational benefits.

STEP 1: IDENTIFY AND INVOLVE STAKEHOLDERS

The State Planning Act requires a public hearing before a plan's adoption. At the same time, it does not specify the extent of the involvement before the hearing. While not required by law, it helps to have a core group of citizens, local businesses and community leaders that will champion the community forestry planning effort.

The box on the next page outlines the reasons developed by The Center for Livable Communities which support a strong civic engagement component in planning. Broad-based interest and support in the plan development stages will be beneficial over time.

Political realities may surface during the planning process. This being said, it is important that the approach is non-partisan so that the community forestry program does not fall out of favor if a key figure or party is no longer in the picture. The private sector can be helpful in this regard because they recognize their stake in growth decisions. In some cases, they provide financial assistance to planning efforts.

Who Should Be Involved?

- People or agencies with an interest in the issue or geographic area
- People or agencies who will be affected by action or inaction
- Potential partners
- Potential adversaries
- Service providers
- Adjacent jurisdictions

What Is Involved?

- Identify stakeholder groups and develop strategies to get and keep them involved. Consider public and private entities as well as involved and disenfranchised citizens and organizations.
- Citizens provide the foundation for the Goals and Objectives wherein the community's ideals as well as its basic needs and desires related to growth and development are expressed.

Figure 7.

WHY IS IT WORTH THE TIME AND THE MONEY TO INVOLVE CITIZENS IN THE PLANNING PROCESS?

- ***To insure that good plans remain intact over time***.
  Plans can become politicized, subjecting them to change and revision, which ultimately defeats the desired effect. Participants in a planning process are the watchdogs of a plan to which they feel committed.

- ***To reduce the likelihood of contentious battles before councils and planning commissions.***
  An educational and interactive citizen based planning process, which is clearly articulated and open, streamlines the implementation process.

- ***To speed the development process and reduce the cost of good projects.***
  From the developer's perspective, proposals which comply with a plan based on community involvement generally will not meet with resistance. When a development project is slowed or stopped, there are costs to the community and the developer.

- ***To increase the quality of planning.***
  While professionals have the technical expertise, they are not the only ones with vision. With the guidance of the professional, informed citizens make major contributions to community planning efforts.

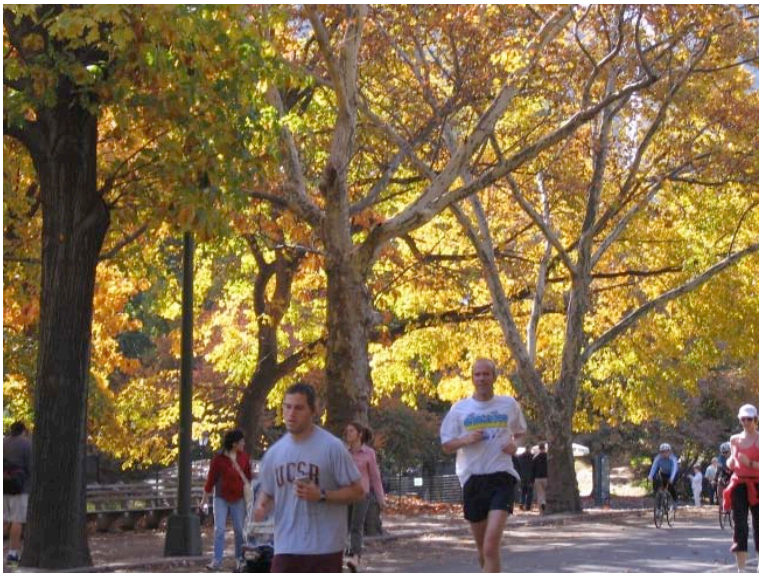
- ***To enhance the general sense of community and trust in government.***
  Significant community engagement contributes to a more trusted, open, responsive and effective government.

Adapted in part from The Center for Livable Communities. (1977). Participation Tools for Better Land Use Planning: Techniques and Case Studies. Sacramento, CA: Local Government Commission/Center for Livable Communities.

It is important that public officials, infrastructure providers, the business community, civic organizations, educational institutions, and the citizens are notified before the process officially begins. How the process is initiated, who is championing the effort, hot issues facing the community, and other circumstances will affect the success of a community forestry program.

Most public input processes rely on standard tools such as questionnaires, surveys, public meetings, or focus groups. Depending on whether the purpose of the public input is to educate, advise or solve problems related to the trees, there are additional tools and techniques that communities may consider. Since people have different styles of learning and processing information, tapping a variety of methods and venues is important. Appendix 3, Selected Techniques for Engaging the Public, provides a brief summary of civic engagement and visioning tool examples addressed in detail in Southern Growth Policies Board's Smart Choices Series.

Information on the project, project updates, and contact information should be readily accessible by the stakeholders. Web resources are helpful particularly if they display visuals of the urban forest locations, proposed plans, or have links to other relevant pages. Other avenues of communication include the local paper or cable channel along with utility bills or community status newsletters. Schools, festivals and public facilities such as libraries, recreation centers, and educational institutions also provide venues for information distribution.



Central Park, New York, N.Y.
Photo by D. London.

STEP 1
ADDITIONAL RESOURCES

Community Tool Box: Part B, Chapter 3, Section 1, Developing a Plan for Identifying Local Needs and Resources. http://ctb.ku.edu/

Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Southern Consortium of University Public Service Organizations.

Rohse, M. and Ross, K. (1992). How to Put the People in Planning. Salem, Oregon: Department of Land Conservation and Development.

STEP 2: ESTABLISH VISION AND GOALS

The visioning and goal setting process generally is one of the most short-changed components of the planning process. At the same time, it is one of the most valuable exercises leading a community towards its desired future. In local government, visioning typically combines citizen participation with comprehensive planning. Communities in SC come with varied perspectives, priorities, and resources. Basic tree care for public street trees may be the goal for communities in the early stages of a community forestry program. Other communities are looking to formalize responsibilities of public and private entities or to ensure that the significant trees are retained during the property development process. Though not widely used at this time, some communities are interested in setting specific tree canopy goals that can be measured over time. For all of these varied reasons, there is no single way to establish the goals. The goal setting process must be tailored to the particular circumstances and needs of the individual community. Some of the goals pertinent to community forestry may already have been established during the development of the other elements of the comprehensive plan.

Why Is It Important To Set Goals?

The goals define what the community wants to be in terms of trees. The philosophy and direction for the plan come from the goal setting process.

What Will Step 2 Tell Us?

- What does our community value?
- What aspects of our trees and community forest do we like or dislike?
- What do we want our trees and community forest to look like in the future?

In some communities this process will result in a set of brief statements, principles, or goals which will guide future decisions. A more detailed process may meet the needs of other communities who will develop a document setting forth a vision of the community's future with specific physical planting schemes, plans and/or strategies to reach that end. Organizations use different visioning techniques to explore their desired futures and the different alternatives that are available to reach that future. See Appendix 3, Selected Techniques for Engaging the Public.

Individual communities will need to assess their own community's needs based on the community forestry program's stage of development as well as conditions, resources and community interest. Table 4 reflects typical stages of a community's forestry program development with some goal examples.

Table 4. Typical Stages of Plan Development and Goal Examples

Planning Stage and Typical Description	Goal Examples
Initiating a Program - No planning for trees - Citizens unfamiliar with community forestry as a planned program - Little or no budget allocated to trees	Public officials, community leaders, and citizens who are knowledgeable about trees and community forestry.
Developing the Program - Community has shown an interest in planting and preserving trees. - There is involvement in limited programs or events. - Budgets are allocated to purchasing or planting of trees.	The community will achieve Tree City USA status.
Sustaining the Program - The community has adopted plan components that address community forestry. - They have regulations that pertain to trees and development.	A public tree population that is attractive, safe, and healthy. Land planning activities that promote conservation.

STEP 3: RESEARCH AND ASSESSMENT

During the research and assessment phase, the trees or the tree canopy are identified and described along with other related natural and built features. The collection and review of pertinent data and trends are the primary background tasks. Initially, it is important to determine what existing data is available. An inventory of the publicly owned trees will provide the baseline data for the community forestry plan. Previous surveys, public works maintenance records, budget and expense allocations for landscape activities, pictures, and aerial photographs also contribute useful information. While some federal and state agencies may have compiled pertinent information, frequently it lacks sufficient detail for local use or is not tailored to specific local government boundaries. However, given that watersheds, floodplains, significant habitats and scenic corridors frequently cross numerous jurisdictions, local governments are advised to coordinate natural resource and community forestry efforts with adjoining jurisdictions where practical.

What Will Step 3 Tell Us?

- Who we are
- What is the current and future capacity
- Where we are headed

TREE INVENTORY

An inventory of the tree population on public property provides a foundation for a community forestry program. It provides facts about tree type, size, location, financial value, condition, and problems, along with other information that a community may desire such as future tree planting locations. In combination with the other natural resources data, analysis of the inventory data helps identify environmental-related issues and needs.

The data collected in the inventory have other important uses which ultimately protect people and property, improve management efficiency, and reduce costs. As a management tool, the data provides a structure for comparing changes in the trees. The information also is useful for developing a management plan that addresses maintenance schedules, tracking costs, and estimating financial and management needs. For physical tree planting plans, the inventory is critical because it can provide information on species to site matches, species diversity, site constraints, and character of the area.

When a community decides to undertake a tree inventory, the SC Forestry Commission regional urban foresters are helpful in providing initial direction and information. Inventories are designed based on the size, needs and resources of the community. Most of the inventory databases are now computerized, and many systems utilize handheld computers to facilitate field data collection. In making the determination on the extent and staffing for the inventory, communities should carefully consider the type of information needed for their program and how it will be used.

Generally, public tree inventories will include the following.

- **Tree type**—may include common and scientific names
- **Tree size**—diameter, height, and crown radius or diameter
- **Tree condition**—excellent, good, fair, poor, dead
- **Owner**—department or agency
- **Site location type**—for example, street, park, median, parking lot, or greenway
- **Geographic location**—including street address, GPS coordinates, named area or zone and/or other location data
- **Problems or damage**—for example, deadwood, pests, mechanical damage, construction damage, topping, or split trunk
- **Conflicts**—including signs, above- and below-ground utilities, building, streets and walks
- **Maintenance recommendations**—including tree removal, routine pruning, mulching, pest management, removing excess mulch, reinspection, watering, and fertilizing

Why Is This Information Important?

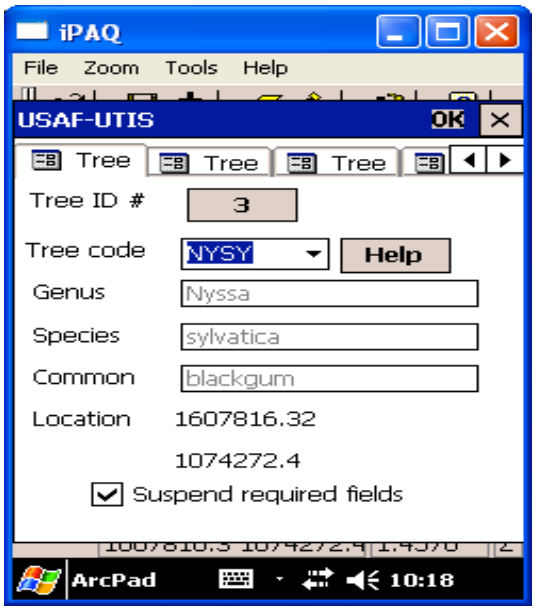
- **Type**—Species diversity helps protect the forest from devastation caused by widespread pests and environmental stresses.
- **Size**—The ideal forest will have a range of ages. Size is typically measured as diameter at 4 ½ feet above ground, also known as diameter at breast height (DBH).
- **Condition**—Determining whether a tree is healthy, in need of care, in decline, or dead gives an indication of the forest's health and long term viability.
- **Location**—This information can vary from a general area description to a site address for a specific street tree. If a maintenance program is under consideration, exact locations must be recorded.

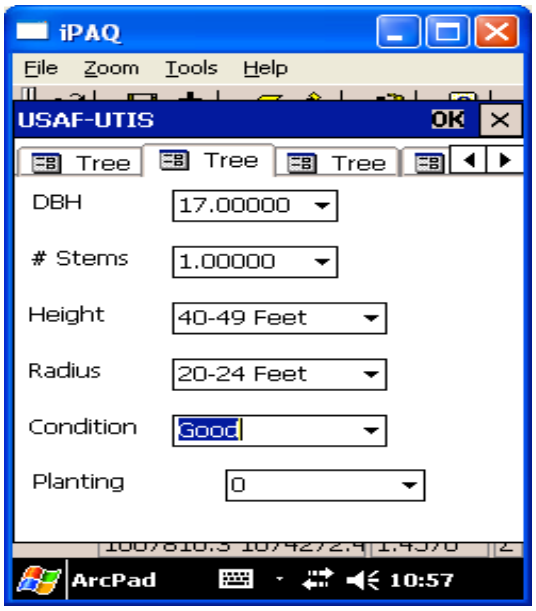
Other information can be included as desired. Some communities include digital photographs of selected trees. Photographs of tree damage or potentially weak branch structure, for example, are particularly useful in visually documenting change of the condition over time. Information on tree and location desirability as well as tree condition can also be recorded during the inventory to facilitate calculating an appraisal value for each tree.

A notes field is also useful to record special information about a tree that may not warrant a separate inventory field. Recording information about trees of special interest or historical value may be logged in the notes field.

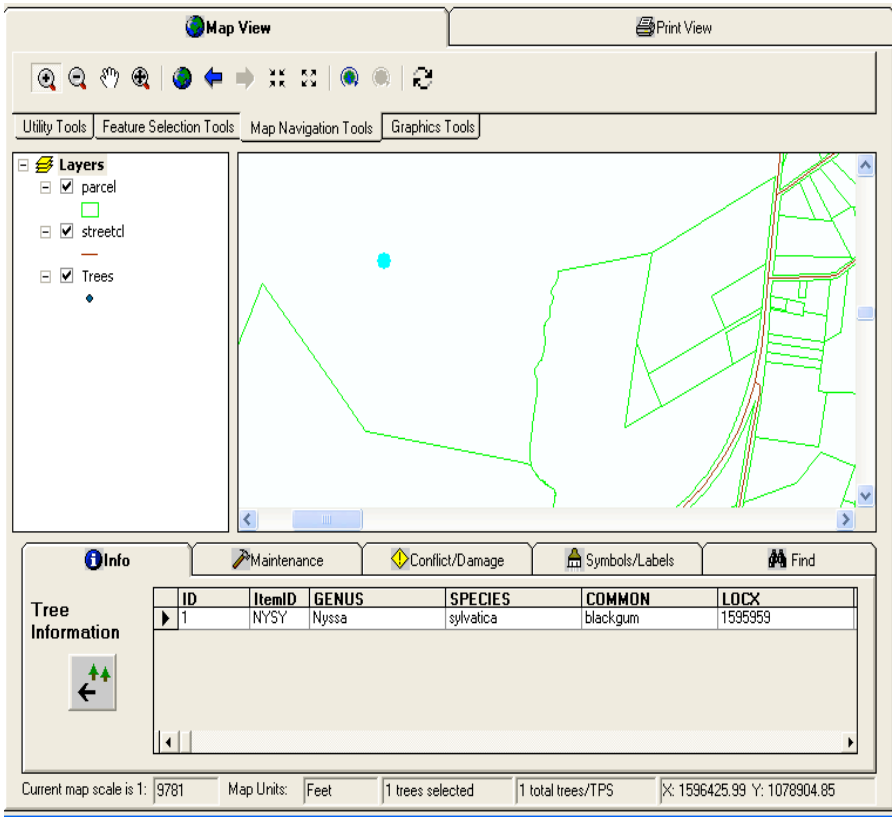
To be most useful, the tree inventory data should be stored in a tree management software program. This type of software will print summary reports and tables of tree types, condition, maintenance needs, and other pertinent information. It will also schedule and track maintenance

tasks and costs, print work orders for crews, project maintenance budget needs, keep the inventory data current, and print maps for crews.





Tree inventory systems which include a mapping component increasingly are being used to analyze and display data. Small handheld computers are also being used for collecting field data which transfers back to a system able to integrate varied data including other infrastructure, applicable regulations, and maintenance schedules. Past concerns about affordability and technical expertise are lessened by more user friendly software, accessibility to large databases, and the economical and time saving features of personal computers.



Geographic information systems (GIS) frequently are used to display tree inventory data, because they visually communicate somewhat complicated information with relative ease. To utilize GIS or the mapping capability of the inventory software, information for each tree must include longitude and latitude location (X/Y coordinates)

information. The X/Y coordinate information (the georeferenced data) is typically collected in the field using a handheld computer or data collector with global positioning system (GPS) capabilities.

Each type of georeferenced information in the GIS file sits on a layer, and users can turn on the layers according to their needs. Data can be viewed individually or, unlike a paper map, can be layered so that integrated data sets can be viewed at one time. Data can be attributed to specific locations, which along with the layering capacity provides analysis options. See: http://www.gis.com/whatisgis/index.html and http://www.state.sc.us/forest/gis.htm

Information derived from the inventory integrated with a geographic information system allows communities to set realistic tree canopy coverage goals. American Forests and other forestry advocates suggest a numeric threshold so that tree canopy can be evaluated and more importantly, maintained. The first step in this process is to identify the extent of the current tree canopy and then to assess how the current coverage meets with the community's goals and policies.

WHO WILL CONDUCT THE TREE INVENTORY?

Historically, tree inventories have been conducted with varying degrees of professionalism and success. A community's funding resources likely will have an impact on the accuracy, type and depth of the information gleaned. Volunteers can be helpful in preliminary surveys, possibly looking at tree type and size. Condition and other physical assessments are better left to an arborist or urban forestry professional. If volunteers are used in the inventory process, training is imperative to ensure that they have sufficient knowledge about the trees and about their responsibilities. Some successful programs have been conducted with the assistance of volunteers under the direction of an urban

Defining the Scope of the Tree Inventory

- What is the level of detail and analysis needed?
- What is the most useful format for the data? Does it need to be mapped? How often will the data be updated and collected? Will charts or tables from the data be needed?
- Is the person conducting the inventory knowledgeable about urban forestry, species identification, tree condition assessment, and maintenance recommendations?
- If a contract professional is under consideration, are they on the SC Forestry Commission's list of vendors?
- Are equipment and resources readily available to the person(s) conducting the inventory?
- Can technical questions be addressed by this person?
- Will the community be involved in the inventory?
- Is supervision required?
- What is the cost including equipment, personnel, liability, luncheons, appreciation plaques, and other expenses?

forestry professional. Of course, time for training, supervision, formatting, and analyzing the information must be factored into the time allocated for the inventory.

Time and resources are often constraining factors when using staff members. A staff forester or arborist will require little or no training to conduct a survey of the trees. Inexperienced staff members will need specific arboriculture training. It is important to consider that the inventory combined with other job responsibilities may call for work to be temporarily shifted to another staff member. In addition, if the study area is large, it may not be practical for only one or a few people to conduct an extensive survey. Sometimes a staff member will take on a facilitator or coordinator position, providing education, training, support and supervision to a data gathering volunteer or community group. Staff lacking urban forestry credentials may serve as the liaison between a forestry professional and the planning commission or the local government council.

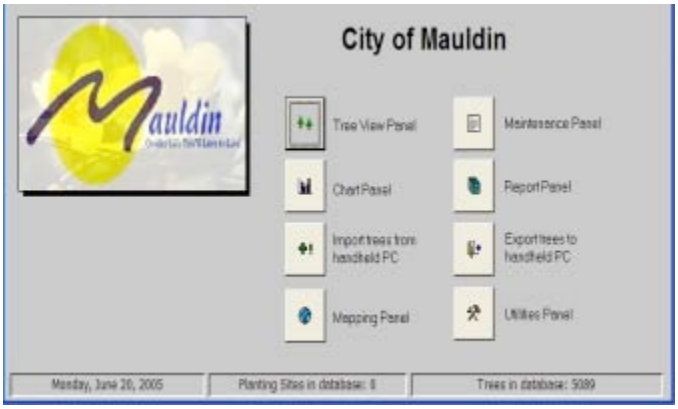
Frequently, communities contract with an urban forestry professional because of their breadth of knowledge

Potential Components of the Tree Inventory

- How diverse is the tree stock?
- Where are trees located?
- Who is providing and who is planting the new trees?
- Who is paying?
- How much do planting and maintenance cost and what is the impact of these costs on the local economy?
- Are trees on a regular maintenance program?
- Are trees healthy?
- Who is responsible for tree maintenance?
- What are the resources available for tree planting?
- Where are tree deaths occurring? (Location/reason?)
- Are there significant hazards caused by the trees in a certain area?
- Where is tree cutting occurring? Is this related to disease, building or infrastructure construction, or harvesting practices?
- What are the growth patterns and maintenance schedules in these areas?
- What are the anticipated growth trends and how will development in the anticipated growth areas impact tree canopy?
- How do costs, numbers and growth patterns compare in the state and in similar communities?
- Are these rates acceptable?
- What future plans provide potential for integration of the urban forestry project?
- What impact will this project have on the local economy?
- Who are the major players in implementing this project?
- What resources are available?

about the health, safety and physical aspects of the trees. They are able to competently assess tree health, factors influencing tree growth such as hardscape constraints and pests, safety issues related to structurally weak trees, and of course, future maintenance and management recommendations. They may be more expensive on the front end of a project, but this front-end expense generally has numerous payoffs.

Fees are charged in a variety of ways including a per tree or area basis within the study area. In most cases, professionals will have a staff that can be dedicated to a certain project so that it is completed in a condensed time frame. Data should be delivered in a digital format that will facilitate local governments using and keeping it updated. Additionally, data may also be made available in a digital, mapped format, such as a GIS overlay which, along with summary reports, is useful for community and policymaker input and education.



Analysis of the Tree Inventory Data

Increasingly, there are a number of software programs that offer a variety of tree inventory, management, and data analysis functions. They have a broad range of capabilities, technology requirements, and prices. See Appendix 4 for a sampling of available software programs.

View Site

Address	711	Suffix	
Street	FOX HILL DR	Site	1
FromStreet	KILAUEA AV	ToStreet	MAUNALOA AV
OnStreet	FOX HILL DR	Side	Front
X	567685.56	Y	39704.7
Inv_Date	April 28, 1999	Remote ID:	860
Species	Acer Red Sunset (Maple, Red Sunset)	DBH	5
Condition	Good	Height	0-15 ft
Canopy	N/A	Maintenance	Routine
Clearance	None	Utilities	None
Hardscape	None	Growtype	Parkway
Growsize	2	Staff	DR
Inspection	No		

Comments:

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The tree management software will allow communities to cost-effectively manage and maintain their community forest resources with varying amounts of outside assistance. The community forest analytical software programs all require considerably more natural resource data above and beyond the tree inventory. Generally, professional assistance is needed to collect the data and use these programs, but the information derived, such as tree canopy coverage and its impact on the community ecosystem, is valuable.

Though not widely practiced at this time, assessing and setting specific community tree canopy coverage goals is being advocated by some urban forest organizations. Based on 20 years of study, American Forests, a non-profit tree conservation organization founded in 1875, noted that most established southeast communities had over 60 percent tree canopy and based on zoning classifications and climate conditions, there was a realistic potential for a 60 to 80 percent tree canopy. Given this information, the organization recommends the minimum goal rates noted in Table 5.

Table 5. American Forests' Recommended Tree Canopy Goals for East of the Mississippi

Land Use	% Tree Canopy
Central Business	15%
Urban Residential	25%
Suburban Residential	50%
Average Cover For All Land Uses	40%

http://www.americanforests.org

In order to set numeric goals, communities need to determine their baseline tree canopy, assess applicable regulations, consider current goals, plans and strategies in place, and the needs and desires of the community. American Forests suggests that once a numeric goal is determined, it will be easier to pursue that goal with direction provided in policies, procedures, and the budget.

Regardless of the specific software used or whether a numeric tree canopy goal is pursued, by integrating a geographic information system (GIS) with other government information sources, a database can be created that shares information resources, reduces data redundancy, and increases data accuracy. Furthermore, it allows joint project analysis which might include planning, parks and recreation, public works, and finance departments. A system fine tuned to an organization's needs will ultimately increase efficiency and save time and money.

OTHER APPLICABLE RESEARCH

Table 6 reflects information typically collected that is related to community forestry management. Information collected for the other comprehensive plan elements including the demographic trends, land use, and

What Is Involved In Considering Other Applicable Research?

- Determine what has worked from previous plans or community activities and what has been implemented.
- Data gathered of present and projected status, including demographics, land use configurations, housing type and condition, natural conditions such as soils, topography, vegetation, layout of transportation routes, water and sewer lines, location of parks and other public and private facilities.
- Based on projections, a comparison is made between what is existing, what is ideal, and what can realistically be achieved.
- Consider how other entities will be affected by this community's planning efforts.

other components of the natural resources element also may be helpful for the community forestry component. Understanding where homes, businesses and services are expected to locate, tree growing conditions, and constraints to tree growth or planned projects is a critical factor in long term planning for an area. It is also important to review applicable local as well as state and federal regulations and policies which affect the community forest. See Appendix 2. Other Statutes Related To Urban Forestry.

Generally, it is advantageous to collect similar data that is similarly formatted in order to allow comparison and identification of trends. If existing data does not exist, the resource inventory will be the important baseline study and will prove useful in future analyses. Once the data is collected, it often proves useful for determining policy needs and for physical plans. It may additionally be useful for grant applications, impact assessments, and budgeting purposes.

Table 6. Urban and Community Forestry General Data Sources

Information	Description	Resources
Aerial Photographs	These pictures are taken from a bird's eye view by either plane or satellite. They provide a simple frame of reference for the viewer by allowing comparisons of tree canopy over time.	City or County Tax Assessor, Engineering, or Planning Department Local aerial photography businesses
Air Quality	Air Quality is affected by the pollution emitted from different sources such as factories and power plants and from mobile sources such as planes, trucks, and cars. Naturally occurring sources such as dust can contribute to air pollution. Trees have the ability to reduce gaseous and particulate pollutants.	SC DHEC Bureau of Air Quality http://www.scdhec.net/baq/ US Environmental Protection Agency http://www.epa.gov/region4/air/naaqs/naaqs.htm
Census Data	Tiger (Topologically Integrated Geographic Encoding and Referencing) files with streets and census tract boundaries are available for the entire US. Per capita numbers and other demographic information are frequently used for Tree City awards and by granting agencies. Additionally, capital improvements and budget allocations are dependent on demographic and trend data.	SC Budget and Control Board Office of Research and Statistics http://www.ors2.state.sc.us/census2000/census_index.asp
Climate	The average condition of the weather at a place over a period of time as exhibited by temperature, wind velocity and precipitation. Tree growing seasons and the cooling effects of trees are factors influenced by climate.	National Oceanic and Atmospheric Administration Climate http://www.noaa.gov/climate.html SC Department of Natural Resources Land, Water & Conservation Division State Climate Office http://www.dnr.state.sc.us/water/climate/sco/index.html Phone: (803) 734-9100 Southeast Regional Climate Center http://www.dnr.state.sc.us/climate/sercc/climateinfo/climate_info.html SC Precipitation Map

Information	Description	Resources
		http://www.ocs.orst.edu/pub/maps/Precipitation/Total/States/SC/sc.gif USDA, The National Arboretum Hardiness Zone Map http://www.usna.usda.gov/Hardzone/ushzmap.html
Floodplains	The channel and the relatively flat area adjoining the channel of a natural stream or river that has been or may be covered by floodwater. Floodplain consideration is important to proper planting locations. Trees have water detention and stream bank stabilization properties.	Federal Emergency Management Administration (FEMA) http://www.msc.fema.gov/ ESRI and FEMA On-Line Hazard Map http://www.esri.com/hazards/makemap.html
Geology	Study of the historic and current earth surface including rocks and faults or folds. Construction or planting suitability may be dependent on the geological character.	USGS US Geological Survey http://www.usgs.gov/state/state.asp?State=SC SC Department of Natural Resources http://www.dnr.state.sc.us/geology/
Habitat	Total of all environmental factors of a specific place occupied by an organism, population, or community. Diversity in tree species, size, location, and age contributes to habitat health.	SC Department of Natural Resources Animal and Plant Habitat http://www.dnr.sc.gov National Biological Information Infrastructure http://www.nbii.gov/geographic/us/sc-nbii.html SC Forest Inventory http://www.state.sc.us/forest/fia2000.pdf GIS Data Server at USC http://www.cas.sc.edu/gis/dataindex.html

Information	Description	Resources
Hydrology	Properties, distribution, and circulation of water are impacted by the type, size and location of the tree canopy. The complexity of water issues requires a variety of information sources including water resource maps and state agency water quality designations based on water samples. Surface water data includes stream levels, streamflow (discharge), reservoir and lake levels, surface water quality, and rainfall. Ground water data contains ground water site inventory, ground water level data, and water quality data. May include well location information such as latitude and longitude, well depth, and aquifer.	SC Department of Natural Resources Hydrology Data Layer http://www.dnr.sc.gov US Department of Interior US Geologic Service NWIS Web Data ▪ Surface Water Data http://waterdata.usgs.gov/sc/nwis/sw ▪ Ground Water Data http://waterdata.usgs.gov/sc/nwis/gw ▪ Water Quality Data http://waterdata.usgs.gov/sc/nwis/qw
Land Cover	Vegetation on the earth surface. Aerial photos and hyperspectral imagery are used to classify land by type. Information about habitats, agriculture and forestry, wetlands, and development impacts may be included.	Department of Natural Resources Gap Analysis http://www.dnr.sc.gov/GIS/gap/scgaphome.html GIS Data Server at USC http://www.cas.sc.edu/gis/dataindex.html
Soils	Soils information is used to determine land suitability and it will include names and spatial distribution of soil types. Soils will vary based on slope, depth to seasonal high water, depth to bedrock, permeability, natural drainage class, stoniness and flood and stream overflow hazard. Vegetation needs to be selected that will be healthy in particular soil types and locations. Information is used to determine land suitability. County soil reports printed on aerial photographs. Allows identification of prime lands, flooding, and erosion. Digitized maps available for some areas.	Natural Resources Conservation Service. Information about SC Soils http://soildatamart.nrcs.usda.gov/Survey.aspx?State=SC http://www.sc.nrcs.usda.gov/soils_x.html Soil Conservation Service of the US Department of Agriculture. http://soils.usda.gov SC Department of Natural Resources Soils Data Layer http://www.dnr.sc.gov State Conservationist Strom Thurmond Federal Building, Room 950 1835 Assembly Street Columbia, SC 29201-2489 Phone: 803-253-3935

Information	Description	Resources
Topography	Height of the ground surface above a designated baseline elevation. Understanding the surface area and relative elevations increases understanding of drainage, slope, and solar characteristics.	National Geophysical Data Center at NOAA Satellite and Information Service http://www.ngdc.noaa.gov/cgi-bin/seg/topo/state2.pl Shaded Relief Map http://geography.about.com/gi/dynamic/offsite.htm?site=http://fermi.jhuapl.edu/states/sc%5F0.html
Wetlands	Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds. Wetlands serve as critical habitat and recreation areas. Also, they moderate surface runoff, recharge groundwater supplies and filter pollutants.	US Environmental Protection Agency http://www.epa.gov/owow/ South Carolina Environmental Education and Nature Centers http://www.epa.gov/region4/water/wetlands/states/sccenters.html GIS Data Center at USC: National Wetlands Inventory Downloads for SC http://www.cas.sc.edu/gis/dataindex.html US Fish and Wildlife Service National Wetlands Inventory Status http://wetlands.fws.gov/regional_maps/region4.pdf SC Department of Health and Environmental Control http://web05.dhec.sc.gov/gis/

STEP 3
ADDITIONAL RESOURCES

Bloniarz and Ryan. Urban Forest Resource Inventories: A Community Based Approach with the Northeast Center for Urban and Community Forestry. Compares the data collected by community volunteers and certified arborists in two Massachusetts communities.

Choukas-Bradley, M. 2002. *Washington Post*. Page H06. Every Tree Counts. A D.C. Census of What Grows Where. http://www.washingtonpost.com/ac2/wp-dyn/A27548-2002May29?language=printer [May 30]

ESRI website. http://www.esri.com

GIS.com. http://www.gis.com/whatisgis/whatisgis.html

Handheld Technologies for Urban Forestry—Inventories, GIS, & More Presented at American Forests National Urban Forest Conference in San Antonio, TX, 9/17/03 by Bloniarz USDA Forest Service, Barbara Deutsch, Casey Trees Endowment Fund, Jill Mahon, USDA Forest Service and Greg Ina, Davey Resource Group. Washington, DC case study.

O'Looney, J. 1997. Beyond Maps: GIS and Decision Making in Local Government. Washington, DC: International City/County Management Association.

SC Forestry Commission. http://www.state.sc.us/forest/urban.htm

Tree City USA Bulletin No. 23, How to Conduct a Street Tree Inventory from the National Arbor Day Foundation.

STEP 4: DEVELOP PLAN AND IMPLEMENTATION STRATEGIES— HOW AND WHEN DO WE GET THERE?

Specific actions are needed to ensure that the desired community forestry goal is reached. The development and implementation component of the comprehensive plan identifies the who, what, when, where, and how. It combines the information revealed from the inventory, trends analysis, and vision and translates it into reality by recommending policy changes, developing planting or education programs, or allocating funds. The implementation component divides potential improvement strategies into steps. It further identifies specific actions, the agency, department or person responsible for overseeing the task, potential resources and realistic completion dates. The potential options and strategies for addressing the objective are weighed and eventually selected in light of the community vision, mission, goals and resources.

What Will Step 4 Accomplish?

- Clarify the implications of the goals
- Address the different action item options
- Consider the costs and impacts of the priority actions
- Identify specific policies and projects with accountability mechanisms such as departmental responsibility and timetable.

Implementation strategies will frequently require a combination of smaller efforts which add up to address the specific goal or objective. The spectrum of actions or tasks that a community might undertake to address its specific needs is quite broad. Tables 7 through 12 reflect some implementation examples, their description, and potential information sources that might assist efforts to put the plan into practice. These examples are categorized into emphasis areas of education and public relations, tree management and physical projects, research, planning and policy, operations, and funding.

Table 7. Education and Public Relations Implementation Actions and Resource Examples

Action	Explanation	Resource
Citizen Group Formation	Committees that assist tree managers. These volunteer groups provide advice to policy makers and planning commission members, lobby, and enlist community support. Resident, business, civic club, plant nursery, conservation group, and youth involvement will produce a more knowledgeable citizenry. Tree City USA requires the formation of a Tree Board or Commission.	Urban and Community Forestry: A Practical Guide to Sustainability http://www.arborday.org/programs/ucf/english.cfm Pennsylvania Urban and Community Forestry, Municipal Tree Commissions. Pennsylvania Urban and Community Forestry Council. School of Forest Resources, The Pennsylvania State University. University Park, PA. 1994 and 1995. http://www.dcnr.state.pa.us/forestry/pucfc/applications/fact02.pdf Establishing a Tree Board home.earthlink.net/~bragan78/StJohnTreeBoard/estabtreeboard.htm Virginia Urban Forest Council: Tree Steward Order Form http://www.treesvirginia.org/Forms/tree_stewards_order_form.htm Casey Tree Endowment: Citizen Forester Program http://www.caseytrees.org/programs/cfprogram.html

Action	Explanation	Resource
Acquire Educational Materials	Materials may relate to benefits to individual homeowners, business or the development community. Planting types, planting locations, maintenance, and purpose served by the planting may be addressed. Important that reading level and style are targeted to the audience.	SC Forestry Commission: Benefits of Trees http://www.state.sc.us/forest/urbben.htm SC Forestry Commission: Tree Species Guide http://www.state.sc.us/forest/urbsg04.htm Tree City USA Bulletins http://www.arborday.org/programs/treecitybulletinsbrowse.cfm International Society of Arboriculture http://www.treesaregood.com Clemson University Extension Service, Landscape Plants and Lawns http://hgic.clemson.edu/ The Forest Where We Live documentary http://www.lpb.org/programs/forest/about.html Center for Urban Forest Research, USDA Powerpoint presentations. http://cufr.ucdavis.edu/powerpoint.asp Tree Anatomy and Identification http://forestry.about.com/cs/treeid/a/tree_id_web.htm Urban Forestry South Expo http://www.urbanforestrysouth.org/ Fact Sheet #1: Benefits of the Urban Forest. Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service, Davis, CA. 1999.

Action	Explanation	Resource
Develop of Enhance Website	Opportunity to share information about the care and benefits of trees but also about on-going community projects, scheduled maintenance, and inventory results. Consider how website address will be disseminated. Links to other relevant sites increases information and education. It is important to keep website current, interesting, and accurate.	Rock Hill http://www.cityofrockhill.com/TreesForRockHill/ Myrtle Beach http://www.cityofmyrtlebeach.com/treelaws.html Hilton Head http://www.hiltonheadislandsc.gov/Depts/plng/natres/treeremv.html http://www.hiltonheadislandsc.gov/Depts/plng/natres/treeprct.html City of Charleston Urban Forestry http://www.ci.charleston.sc.us/dept/content.aspx?nid=208 Columbia, SC Forestry and Beautification Department http://www.columbiasc.net/cofc_pw_forestry.html#requests http://www.columbiascgateway.com/content/pdf_PZ/Guidelines.pdf
Develop Communications Strategy	Consider various distribution methods targeted to general and specific populations. Without warning, tree cutting may cause alarm because observers don't know if the work has been approved, how many more trees will be cut, and if the pruning or cutting standards are being observed. A communications strategy will inform the community of anticipated tree cuttings and maintenance, and provide other useful information about programs or projects.	Urban and Community Forestry Outreach Services Strategies for all Communities http://www.na.fs.fed.us/spfo/pubs/uf/outreach/ucfoutreach.htm Quick Guide for Community Forestry Advocates http://www.americanforests.org/download.php?file=/fp/quickguides/media.pdf City of Columbia, SC Project Update for Five Points http://www.columbiasc.net/fivepoints.htm

Action	Explanation	Resource
Arbor Day Celebration	Provides opportunity to educate on tree benefits, care, and conservation. Citizens enjoy participation in Arbor Day activities and it may open the door for involvement by previously unengaged citizens.	Arbor Day Foundation http://www.arborday.org/ SC Arbor Day http://www.clemson.edu/extfor/publications/forlf23/
Tree Identification Education and Signage	Visual or hands on education can benefit all ages.	Conway Riverfront Arboretum Tree ID Mounting Options http://www.peedee.org/signdisplay.html SC Forestry Commission, What Tree Is This? http://www.state.sc.us/forest/reftree.htm Virginia Tech Dendrology http://www.cnr.vt.edu/dendro/dendrology/factsheets.cfm
Recognition of Historic, Champion, or Landmark Trees	Recognizes SC's Champion, Historic or Landmark trees. Significant trees or stands of trees may be noted based on age, historic contribution, or other associated characteristics. Develop guide to local trees with individual histories or characteristics.	SC Urban and Community Forestry Council SC's Heritage Trees http://www.scurbanforestry.org/pages/760089/index.htm Clemson University SC Champion Trees Database http://www.clemson.edu/champtree/SouthCarolinaChampionTree.htm The Conservation Fund – Preserving the Nation's Outdoor Heritage http://www.conservationfund.org Tony Nash, Director of Community Affairs and Special Project, Fairmount Park, Philadelphia, Planting Trees for the Millennium. Sylvan Communities, Summer 2000. Noble Trees of the Upcountry http://www.hubcity.org/bk_nobletree.htm

Action	Explanation	Resource
Market Tree Benefits to Business/Development Community	Trees have long term potential to cut energy and stormwater management costs. They increase property value and increase emotional and health wellbeing. Customers generally pay more for goods and services in areas with trees.	SC Forestry Commission Benefits of Urban Trees http://www.state.sc.us/forest/urbben.htm University of Washington, Trees and Business http://www.cfr.washington.edu/research.envmind/consumer.html The National Arbor Day Foundation Builders and Developers Recognized with Tree Award Program http://www.arborday.org/media/pressreleases/pressrelease.cfm?id=90 Beyard, L., Beyard, M., and Fader, S. Value by Design: Landscape, Site Planning, and Amenities. Washington, DC: Urban Land Institute, 1994. Relf, D. Virginia Polytechnic Institute and State University, Market the Value in Grounds Maintenance July 1994. Crompton, J. Parks and Economic Development. Planning Advisory Service 502. Chicago, IL., American Planning Association. 2002.
Energy Saving Benefits	Energy savings from trees planted near homes and buildings range from 10 to 50 percent for cooling and 4 to 22 percent for heating. (Urban Forests. August/September 1991 issue) The energy efficiency attribute of trees is increased by consideration during the building siting phase of development.	SC Energy Office, Landscaping for Energy Efficiency http://www.state.sc.us/energy/PDFs/Energy%20Briefs/EB%20Landscaping%20for%20energy%20efficiency.pdf
Air Quality Benefits	Under EPA's Clean Air Act, nitrogen dioxide, sulfur dioxide, particulate matter, lead, ozone, and carbon monoxide are measured to determine ambient air quality. "As much as 15 times the amount of carbon can be prevented from entering the atmosphere through the energy conservation effect of an urban tree as can be retained through carbon storage alone. (Urban Forests. August/September 1991 issue.)	Virginia Cooperative Extension, Plants Actually Clean the Air http://www.ext.vt.edu/departments/envirohort/articles/misc/plntclar.html Louisiana Public Broadcasting, The Forest Where We Live http://www.lpb.org/programs/forest/carbondebt.html US Forest Service Northeast Research Station http://www.fs.fed.us/ne/

Action	Explanation	Resource
Stormwater Management Benefits	Foresters and engineers have partnered to manage stormwater in a way that minimizes concrete drainage systems and ditches and reduces cost and maintenance. Increasingly, stringent standards are being adopted requiring stormwater treatment before it reaches surface water. Rainfall interception is dependant on tree location, quantity, type and species. Historically, stormwater would sink into the soil, providing plant hydration. Overflows create wetlands. Given growth, infrastructure needs and costs, and regulation, trees' absorption and filtration characteristics are potential options for addressing stormwater diversion and treatment.	SC DHEC, Low Impact Development http://www.scdhec.net/water/lid/index.html The Low Impact Development Center http://www.lowimpactdevelopment.org Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service Davis, CA. July 2002 http://cufr.ucdavis.edu Davey Resource Group, Interactive Stormwater Management Model. December, 2003 http://www.strom.clemson.edu/primelands/trees
Heat Island Mitigation Benefits	Air circulation is an issue whereby heat from structures, pavement, or pollutants creates a dome that prevents rising hot air from being cooled at its normal rate. (M&L) Trees in urban areas affect air currents. They also have cooling and shading characteristics. These capabilities allow them to break up incidence of heat island effect.	Heat Island Group, Planting Trees Properly http://eetd.lbl.gov/HeatIsland/Vegetation/Planting.html New Jersey Tree Foundation, Cool Cities Initiative http://www.charityadvantage.com/njtf/CoolCitiesInitiative.asp Cooling Our Communities: A Guidebook on Tree Planting and Light Colored Surfacing, US Environmental Protection Agency, 1992. Superintendent of Documents, P.O. Box 371954 Pittsburgh, PA 15220-7954: Reference GPO, Document #055-000-00371-8

Action	Explanation	Resource
Water Quality Benefits	Trees provide a filter for fertilizer and other chemicals in the soil.	Athens-Clarke County Community Tree Program http://www.athensclarkecounty.com/documents/pdf/landscape_management/tcn_waterquality.pdf Cornell University, Landscaping for Water Quality http://counties.cce.cornell.edu/onondaga/002_environment/001_water_quality/000063.php SC DHEC, Low Impact Development http://www.scdhec.net/water/lid/index.html USDA, National Agroforestry Center http://www.unl.edu/nac/brochures/wtwq/wtwq.pdf US EPA, Water Quality http://www.epa.gov/waterscience/standards/ SC NEMO, http://www.scseagrant.org/scnemo/sheds/shed_fs/statewide_fs.htm
Soil Conservation/Quality Benefits	Rows of trees break the wind on flatter lands and healthy forests protect soil from water erosion on hillsides. Massive tree removal affects soil structure. Long term mitigation of pollutants increase tree vulnerability.	USDA, Natural Resources Conservation Service, Conservation Plant Identification http://plant-materials.nrcs.usda.gov/technical/plantid/woodies/index.html SC Success Stories http://www.nrcs.usda.gov/search.asp?site=SC&ct=SC&qu=trees&Go.x=10&Go.y=4&Go=Search
Wildlife Habitat Benefits	In combination with other vegetation, trees attract and support wildlife. They provide nesting sites and food for the birds and other wildlife. In urbanized area, connections between habitat areas are important. Develop strategies for reintegration of areas into urban forest as land becomes available over time. Habitat corridors are difficult to reassemble	National Wildlife Federation, Protecting Wildlife http://www.nwf.org/wildlife/ SC DNR, Heritage Trust Preserve Guide http://www.dnr.sc.gov/managed/agreement.html SC Wildlife Federation http://www.scwf.org The Nature Conservancy of SC http://www.nature.org/wherewework/northamerica/

Action	Explanation	Resource
	once divided. Increased wildlife in highly populated centers may bring some issue. For this reason, professional planting and management is important.	states/southcarolina/ SC Wildlife Habitat Incentives Program http://www.sc.nrcs.usda.gov/programs/whip.html CU, Attracting and Feeding Songbirds http://hgic.clemson.edu/factsheets/HGIC1700.htm Restoring the Urban Forest Ecosystem http://edis.ifas.ufl.edu/TOPIC_BOOK_Restoring_the_Urban_Forest_Ecosystem Duerksen, C. Habitat Protection Planning. Planning Advisory Service 470/471. Chicago, IL.: American Planning Association. 1997.

Table 8. Physical Projects Implementation Actions and Resource Examples

Action	Explanation	Resource
Increase Community Forested Areas	A healthy community forest is the result of education, planning, policy development, budgeting, and implementation. Trees are used in a variety of ways in urban designs. The appropriate planting style should be based on the suitability for the specific area as noted below. A combination of the following styles frequently is used. **Formal planting**—emphasizes predetermined spacing, particular species, and a designed pattern. Street trees generally are planted according to this concept. **Informal planting**—emphasizes irregular spacing and a variety of species. Parks, open spaces, and other large areas are easier to plant in an informal fashion. **Wildlife Habitat**—Continuity between planting areas and varying tree species and sizes are emphasized. Ground cover, shrubs, and trees contribute to habitat development. Open spaces, parks, golf courses, and cemeteries are some of the ways that habitats can be connected. Plans combining public and private initiatives seem to be particularly successful. Communities frequenttly emphasize preservation of existing trees and proper tree planting locations in combination with other healthy vegetation. Trees need care so that they remain healthy. As our communities grow, it is important that connections between forested areas, parks, and greenways are maintained or pursued to encourage their use by citizens and to ensure continuation of habitat.	TreeVitalize five county collaborative process to plant more than 20,000 shade trees. http://www.dcnr.state.pa.us/news/newsreleases/2004/0404-treevitalize.htm American Forests Global Releaf http://www.americanforests.org/global_releaf/ Spartanburg Area Conservancy—Tree Planting Project http://www.beyondpcs.net/space/PropertyPage/CottonwoodPage/trees.htm Envision Utah: Urban Planning Tools for Quality Growth http://www.envisionutah.org/plans.phtml?type=toolboxes Duerksen, C. Habitat Protection Planning. Planning Advisory Service 470/471. Chicago, IL.: American Planning Association. 1997.

Action	Explanation	Resource
Street Beautification	Improving the street's appearance in accordance with a plan by installing trees, landscaping, benches, street lighting, sidewalks, or signage can provide returns well beyond the initial expense. Street beautification projects generally occur on public property and tree plantings should be considered in light of other infrastructure and adjacent structures.	Columbia, SC Street Forestry and Beautification Department http://www.columbiasc.net/cofc_pw_forestry.html City of Spartanburg Spot of Pride Program http://www.cityofspartanburg.org/Community_Interest/Spot_of_Pride.htm# SC Forestry Commission: Tree Species Guide http://www.state.sc.us/forest/urbsg04.htm
Restoration of Brown or Grey Fields	Brownfields are abandoned or underutilized properties where redevelopment is complicated by real or perceived environmental contamination. With legislative changes and community growth, urban brownfields are increasingly popular as potential development sites. Brownfields offer opportunities to demonstrate green technology. Incorporation of native trees to improve aesthetics and provide a seed harvest for other plantings, stormwater filtering through constructed wetlands, and planting trees for energy efficiency are a few of the ways trees can be integrated as the properties are restored.	The International City/County Management Association (ICMA), Growing Greener: Revitalizing Brownfields Into Greenspace http://www.icma.org/main/ld.asp?ldid=15760&hsid=1&tpid=19 U.S. Environmental Protection Agency's Brownfields Site http://www.epa.gov/swerosps/bf/
Riparian Buffers	Lands on the boundaries of a natural watercourse or adjoining tidal lands. These undeveloped zones located along water bodies can help reduce pollutants from reaching the water. Trees in the buffer help filter as well as stabilize stream banks and temperature. Public stream restoration demonstration projects have environmental and education benefits which are transferable to private entities.	DHEC OCRM, Backyard Buffers for the SC Lowcountry http://www.scdhec.net/environment/ocrm/pubs/docs/backyard.pdf Natural Resource Conservation Service (NRCS) http://www.nrcs.usda.gov/search.asp?site=NRCS&ct=NRCS&qu=Riparian+Buffers&Go.x=18&Go.y=9&Go=Search Buffer Initiative http://www.nrcs.usda.gov/feature/buffers/ Milwaukee River Basin Partnership Center for Watershed Protection http://clean-water.uwex.edu/plan/buffers.htm Center for Watershed Protection http://www.cwp.org/forestry/index.htm The Journal for Surface Water Quality Professionals

Action	Explanation	Resource
		http://www.forester.net/sw_0203_trees.html
Transportation Plans that Include Alternative Transportation Options Incorporating Trees	Community forest inclusions should be considered during the design phase. Paths and bike trails offer transportation, recreation, and health potential Road and road improvement design standards should consider street trees and planted medians to provide continuity	University of Washington, Trees and Transportation http://www.cfr.washington.edu/research.envmind/transportation.html SC DOT Roadside Manual: Planting Guidelines http://www.scdot.org/community/pdfs/roadsidemanual.pdf SC Department of Transportation Enhancement Project http://www.railtrails.org/whatwedo/policy/2002_projectlists/southcarolina.pdf Beautification Trends: How the States Approach Them http://www.betterroads.com/articles/nov02a.htm
Urban Infill	Infill development is new development on scattered vacant sites in a built-up area. Trees can be integrated into redeveloped vacant or underused property. Space limitations and hardscape constraints must be addressed when including trees into infill projects. Urban forests in higher density areas must be located to receive sun in high-rise areas and they require more intensive management.	Haughey, R. Urban Infill Housing: Myth and Fact (Washington, D.C.: Urban Land Institute, 2001) http://www.uli.org/Pub/Media/D_Search/booksamples/U22_Infill.pdf. Redevelopment Roundtable: Smart Site Practices for Redevelopment and Infill Projects http://www.cwp.org/smartsites.pdf Traditional Neighborhood Homes http://www.tndhomes.com How Should Your Community Grow http://www.ces.purdue.edu/anr/landuse/pdf%20files/LU5b.pdf Bonham, J., Spilka, G., Rastorfer, D., Old Cities/Green Cities. Planning Advisory Service 506, 507. Chicago, IL., American Planning Association. 2002.
Utility Placement	Above or below ground utilities can impact the planting and viability of trees. Coordinated utility and government planning can reduce conflicts.	Urban Forestry South Trees and Utilities Collection http://www.urbanforestrysouth.org/Resources/Collections/Collection.2004-10-22.0537/view

Table 9. Research Implementation Actions and Resource Examples

Action	Description	Resource
Conduct Inventory	A mapped inventory that identifies natural features and sensitive areas will provide baseline information for evaluating progress of an urban forestry program.	*Developing a Street and Park Tree Management Plan and Community Tree Inventory: Data Collection* Northeast Center of Urban and Community Forestry, University of Massachusetts, Amherst, MA July 2002 http://www.umass.edu/urbantree Tree Inventories http://www.umass.edu/urbantree/factsheets/3treeinventory.html http://www.umass.edu/urbantree/inventorywhitepaper.pdf Davey Resource Group, Tree Inventory http://www.davey.com/cgi-bin/serveFile.pl/Chemical_Abstracts_Service.pdf?type=adventure&fieldname=pdf&id=124 Tree City USA Bulletin No. 23, How to Conduct a Street Tree Inventory from The National Arbor Day Foundation. http://www.arborday.org/programs/treecitybulletinsbrowse.cfm US Air Force Urban Forestry Management Plan. How To Conduct An Urban Forest Inventory http://www.afcee.brooks.af.mil/dc/dcd/land/ldg/s17UrbanForestry/c03ManagementPlan.html USDA Forest Service, Guide to Street Inventory Software (1997) http://www.na.fs.fed.us/spfo/pubs/uf/streettree/toc.htm

Action	Description	Resource
Establish Tree Canopy Goal	Tree canopy goals lay the foundation for cataloging growth or loss of forest relative to population or area. The tree inventory will help determine appropriate targets and provide a baseline for trend research and projection calculations. The goal provides direction for activities. To achieve the goal, communities may specify number, size, species, or location planting requirements. To ensure their viability, irrigation may be required in some locations. Limits on removals may also be specified.	US Forest Service, Percentage of Tree Cover in SC http://www.fs.fed.us/ne/syracuse/Data/State/downloads/RPA/s_carol.PDF#xml=http://www.fs.fed.us/cgi-bin/texis/searchallsites/search.allsites/xml.txt?query=Assesing+the+Nation%27s+Urban+Forests&db=allsites&id=424c11140 American Forest http://www.americanforests.org/graytogreen/treedeficit/ American Forests, Money in the Tree Bank http://www.americanforests.org/productsandpubs/magazine/archives/2004spring/communities.php City of Vancouver Canopy Target Goal http://www.vbjusa.com/index.php?option=com_content&task=view&id=770 Hilton Head Minimum Standard of Tree Coverage http://czo.duncanplan.com/hilton-head//acc/codeTextAcc.asp?Keyword=&Search=1&Section=006.004.006
Data Development To Support Claims Of Trees' Infrastructure Benefits	Unbiased, scientific research is needed to understand capabilities of trees.	USDA Forest Service—Southern Urban Forestry Technical Service Center http://www.urbanforestrysouth.org/search?SearchableText=urban+forest+benefits+research&x=14&y=8&searchType=normal&review_state=published American Forests http://www.americanforests.org American Planning Association http://www.planning.org/search/?q=Tree+Infrastructure+Benefits&x=23&y=9 US Forest Service, Urban Forest Research http://www.fs.fed.us/cgi-bin/texis/searchallsites/search.allsites/?db=allsites&query=+Urban+&submit=Submit

Action	Description	Resource
		USDA Forest Service, PSW Research Station, Urban Forest Benefits http://cufr.ucdavis.edu/research/index.asp Urban Land Institute http://www.uli.org Kathleen Wolf, Human Dimensions of Urban Forestry http://www.cfr.washington.edu/research.envmind/

Table 10. Policy and Regulation Implementation Actions and Resource Examples

Action	Description	Resource
Pursue Tree City USA Status	Tree City USA is a recognized community improvement program for communities that exemplify urban forestry principles. Requires policy actions including: 1. Adopted public tree ordinance; 2. Someone designated by ordinance to be responsible for tree care; 3. Community forestry budget of at least $2 per capita; and 4. Arbor Day observance & official proclamation.	Tree City USA http://www.arborday.org/programs/treeCityUSA.cfm South Carolina Forestry Commission Tree City USA http://www.state.sc.us/forest/urbantc.htm
Develop Tree Ordinance	Tree ordinances provide the legal framework to enable, authorize, and implement policy related to the community forest. Based on the comprehensive plan, ordinances are applied in a uniform manner so that the development playing field is level. Factors to consider are citizen sentiments relative to the community forest and the role of government, history of regulatory efforts, and current economic and market forces. **Tree Preservation Ordinance**—Tree preservation may be based on size, species or historical significance. Limits the number and types of trees that may be removed. Replacement also may be mandated. Tree preservation on private property is generally addressed in land development or zoning ordinances.	Tree City USA Bulletin No. 9, How to Write a Municipal Tree Ordinance from The National Arbor Day Foundation. http://www.arborday.org/programs/treecitybulletinsbrowse.cfm Beaufort County http://www.municode.com (§106-1907) Code of Laws of South Carolina, 1976, Title 50, Chapter 2, §50-2-10 to §50-2-50 Forest Management Protection Act. http://www.scstatehouse.net/code/t50c002.htm Columbia, SC §17-794 http://www.columbiascgateway.com/content/pdf_PZ/Guidelines.pdf Fact #3: Making Parking Lots More Tree Friendly. http://cufr.ucdavis.edu International Society of Arboriculture. Guidelines for Developing and Evaluating Tree Ordinances. http://www.isa-arbor.com/publications/ordinance.aspx

Action	Description	Resource
	To minimize the negative impacts of construction on trees, protective measures are frequently included in these ordinances along with limitations on the trees that may be removed and replacement schedules. **Street Tree Ordinance**—Street tree ordinances generally relate to trees on public property. Species, spacing and maintenance are often included in the provisions. It is important to know where easements and right of ways are located, and to coordinate with public service providers on planned improvements. **View Protection Ordinance**—Protects specified areas including scenic highways or road corridors by tree addition and removal standards. These standards generally are enacted under the zoning authority and may be integrated into Board of Architectural Review Standards. **Landscaping Ordinance**—Requires vegetation as part of the development plan. Without a tree protection element, landscaping ordinances alone generally do not prohibit tree removal. Often these ordinances include bufferyard or parking lot landscaping provisions. The bufferyard ordinance provides transition between dissimilar land uses to protect abutting properties from potential negative impacts, to preserve property character and value, and to provide a sense of privacy. In a parking lot ordinance, trees are used to break up parking spaces into seemingly smaller parcels. Planting location, space, species, and other elements should be addressed in the site location and plan development phase to lessen conflicts between trees and built environment. **Timber Harvesting Ordinance**—Timber harvest ordinances generally apply to forestry operations which are eligible for the timberland property tax	London, D.; Duffy, E. (2003). Status of Tree Ordinances in South Carolina. http://www.strom.clemson.edu/primelands/trees/status.pdf SC Forestry Association http://www.scforestry.org SC Forestry Commission http://www.state.sc.us/forest/ Swiecki, T.J.; Bernhardt, E.A. (2001). Guidelines for Developing and Evaluating Tree Ordinances. International Society of Arboriculture: Tree Ordinance Guidelines http://www.isa-arbor.com/publications/ordinance.aspx Urban Forestry South http://www.urbanforestrysouth.org Beaufort County http://www.municode.com (§106-1907) Cubbison, J. Contributing Writer, Tree Ordinances Grow in Popularity. GSA Business March 22, 2004, p. 14. Duerksen, C., Tree Conservation Ordinances. Planning Advisory Service 446. Chicago, IL.: American Planning Association. 1993. Herberger, Jr., R.A. (1989). Timber Cutting and the Law. In Shading Our Cities, Moll, G. & Ebenreck, S., eds. Washington, D.C.: Island Press. Martus, C.E., Haney, Jr., J.L., & Siegel, W.C. (1995). Local Forest Regulatory Ordinances. Journal of Forestry, 93(6), 27-31. Martz, W., Preparing a Landscaping Ordinance. Planning Advisory Service 431. Chicago, IL.: American Planning Association. 1990. Municipal Tree Ordinance Manual

Action	Description	Resource
	value assessment. The purpose of the regulation is to avoid environmental damage and effects on surrounding properties. Buffers, setbacks, permits, and forest road standards are commonly used regulatory tools. **Clear Cutting Ordinance**—Generally refers to indiscriminate removal of trees, shrubs, and undergrowth with the intention of preparing real property for nonagricultural development. Sometimes clear cutting is addressed land development and erosion and sediment control ordinances.	International Society of Arboriculture PO Box 908 Urbana, IL 61801
Tree Protection During Construction Ordinance	On-going communication between all development partners (arborist, architect, builder, engineer, landscape architect, planner, etc.) is important in the site selection, design, and implementation phases of development. Some communities have a permitting process to assure that the decisions are backed by information and analysis relative to the trees.	International Society of Arboriculture, Avoiding Tree Damage During Construction http://www.treesaregood.com/treecare/avoiding_construction.aspx Clemson University, Tree Protection During Construction http://hgic.clemson.edu/factsheets/HGIC1002.htm SC Forestry Commission, Tree Care During Construction http://www.state.sc.us/forest/refcons.htm Trees, Developers and Development http://www.urbanforestrysouth.org/Resources/Collections/Collection.2004-07-26.3254/view Martus, C.E., Haney, Jr., J.L., & Siegel, W.C. (1995). Local Forest Regulatory Ordinances. Journal of Forestry, 93(6), 27-31.

Action	Description	Resource
Cluster Development or Conservation Type Ordinance	Cluster zoning (also known as open space or conservation zoning) allows development to be concentrated on a portion of the site, leaving the rest of the site as natural or recreational space. For example, rather than building 50 homes, each on one-acre lots, a developer may be permitted to cluster the 50 homes on half-acre lots, reserving 25 acres in the subdivision for a naturally vegetated area. Cluster zoning is used most often for residential development; it can also be used in industrial and commercial districts. Forestry expertise is needed during the site planning phase to determine existing tree viability and significant stands of trees.	Greenville County, SC cluster zoning ordinance http://www.greenvilleplanning.com (Section 6:18) Arendt, R. Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks (Washington, D.C.: Island Press, 1996). Order online at http://www.planning.org/bookstore Arendt, R. "Open Space Zoning: What It Is & Why It Works." Planning Commissioners Journal, Issue 5, July/August 1992. http://www.plannersweb.com/articles/are015.html. Arendt. R. Growing Greener. Washington, DC: Island Press. 1999. Bassert, D. "Cluster Development: An Old Concept Gains New Followers," Land Development (Washington, D.C.: National Association of Home Builders, Winter 1991).
Overlay Zones	Overlay zoning involves placing additional requirements over all or part of an underlying zoning district. Property located in an overlay district is subject to the requirements of both the underlying and overlay zones. Overlay zoning is often used to protect environmentally sensitive or rural areas or to add special design requirements in certain areas without making wholesale changes to its base zoning ordinance. Tree protection or enhanced tree planting requirements may be included in an overlay district. A less common use of overlay zones is to provide incentives or waivers designed to encourage certain types or styles of development.	Garvin, E. "Making Use of Overlay Zones," Planning Commissioners Journal, No. 43 (Summer 2001). Order online at http://www.plannersweb.com/. Pace University School of Law. Overlay Zoning. http://www.pace.edu/lawschool/landuse/boverlay.html

Action	Description	Resource
Incentive Policies	Incentives are a positive way to achieve goals. Examples include reduction in total vegetation requirements for retaining non-required trees or deed-restricting natural areas. In some cases, a significant wooded area may be dedicated to the community in lieu of park dedication or fee requirements. Of course, the incentives must be beneficial to the developer if they are going to be used.	York County, South Carolina http://www.yorkcountygov.com Menasha, Wisconsin Forestry Incentives and Rebates http://www.cityofmenasha-wi.gov/content/departments/parks_&_recreation/(4)forestry/(4)incentives_&_rebates.php Conservation Incentives Partnership http://www.biodiversitypartners.org/state/sc/incentives.shtml
Tree Survey Incorporated Into Development Review Process	Lot by lot reviews of the canopy can be assessed if tree survey is required when developing or redeveloping a property. The review allows assessment of the tree canopy's physical development.	Wilson, A. et al. Green Development: Integrating Ecology and Real Estate. NY, NY: John Wiley & Sons, Inc. 1998. Randolph, J. Environmental Land Use Planning and Management. Washington, DC: Island Press. 2004 Steiner, F. The Living Landscape. 2nd Edition. Boston, MA: McGraw-Hill, 1999.
Conservation Easements or Purchase of Development Rights	Legal agreement between a landowner and a qualified conservation organization which allows protection of special lands for conservation purposes without the necessity of outright ownership by a conservation organization. Restrictions are permanent and run with the land. The agreement will note the specific permanent limitations (outlined to suit the owner and the trust) on how and/or to what extent a property is developed in order to protect its conservation values. The land owner retains ownership and also is eligible for tax benefits.	National Trust for Public Lands, Conservation Easement Handbook http://www.tpl.org/tier3_cd.cfm?content_item_id=19577&folder_id=175 Palmetto Conservation Foundation Conservation Easement E-message http://www.palmettoconservation.org/index.php?action=website-view&WebSiteID=127&WebPageID=4496 Upstate Forever http://www.upstateforever.org SC Conservation Bank Act, Title 48, Chapter 59 SC Code of Law http://sccbank.sc.gov/ Spartanburg Area Conservancy, Inc. Conservation Options http://www.spartanburgconservation.org

Action	Description	Resource
		Beaufort County, Purchase of Development Rights http://www.municode.com Planners Web – Search Purchase of Development Rights http://www.plannersweb.com
Transfer Of Development Rights	Governing body sets up districts and legal mechanism where there is a desire to limit development in environmentally significant areas and to encourage development in other areas. Owners of sending area properties are able to sell their development rights (which should be quantifiable) to receiving area property owners. At this writing, TDR programs are still somewhat new to SC but they have proven popular in other fast growing areas where natural resources are threatened.	Upstate Forever, Transfer of Development Rights in the Upstate http://www.upstateforever.org/Newsletters/Dec%2703Newsletter/ATDRDec_03.html Roddewig; Ingraham. "Transferable Development Rights Programs: TDRs and the Real Estate Market Place." Planning Advisory Service Report No. 401. Chicago: American Planning Association, 1987. Pruetz, R. Saved by Development: Preserving Environmental Areas, Farmland and Historic Landmarks With Transfer of Development Rights (Burbank, CA: Arje Press, 1997). http://www.plannersweb.com/wfiles/w370.html Planners Web – Search Transfer or Development Rights http://www.plannersweb.com
Violations	Trees are cut and land is sometimes cleared without first getting the proper permits. After the damage is done, fines are assessed but frequently at relatively low cost to the offender and great cost to the community. Paying a small fine becomes a cost of doing business. Stricter fines and tree replacement regulations are measures communities may consider.	Cho, D. Washington Post. May 24, 2001, Page B01, Trimmed Tree Law May Still Face Ax In Falls Church. http://www.washingtonpost.com/ac2/wp-dyn/A67725-2001May23?language=printer ISA, Mitigating Tree Loss http://www.isa-arbor.com/publications/tree-ord/mitigation.aspx Hilton Head, Tree Protection Violation http://czo.duncanplan.com/hilton-head/main.asp

Table 11. Operations Implementation Actions and Resource Examples

Action	Description	Resource
Hire Arborist	ISA (International Society of Arboriculture)—Certified Arborists have a minimum of three years experience in some aspect of tree care and have passed an exam developed by an international panel of experts. The exam extensively covers every aspect of tree care and the individuals must have an acceptable level of knowledge in all areas of arboriculture. Arborists are knowledgeable about tree health and are trained and equipped to provide proper care. Proper tree care is an investment which can lead to substantial returns. Well cared for trees are attractive and can add considerable value to property values. Poorly maintained trees can be a significant liability. Pruning or removing trees, especially large trees, is dangerous work and proper training and equipment are necessary.	SC Forestry Commission. Selecting a Tree Care Professional http://www.state.sc.us/forest/urbanpr.htm SC Tree Service Companies with Certified Arborists on Staff http://www.state.sc.us/forest/treeservice.pdf International Society of Arboriculture Why Hire An Arborist; Find a Certified Arborist http://www.isa-arbor.com/findArborist/findarborist.aspx University of Florida, How to Hire an Arborist http://www.agen.ufl.edu/~foodsaf/dh100.html How to Find A Consulting Arborist http://www.asca-consultants.org/why_how.html
Provide Training Opportunities For Employees	Selection, Planting, Pruning/Maintenance Training programs are important. Coordinate efforts with state agencies, adjoining local governments, land owners, and conservation organizations.	SC Forestry Commission: Community Forestry Education Programs http://www.state.sc.us/forest/edu.htm Society of Municipal Arborists http://www.urban-forestry.com/mc/page.do http://www.urban-forestry.com/mc/page.do?sitePageId=2806 International Society of Arboriculture http://www.isa-arbor.com/certification/municipal.aspx ISA Southern Chapter 213 Apollo Drive Mt. Airy, NC 27030 Fax: 336-789-0202

Action	Description	Resource
Require Professional Accountability Standards for Tree Service Employees and Contractors.		International Society of Arboriculture http://www.isa-arbor.com/certification/certification.aspx Licensing of Private Tree Care Firms http://phytosphere.com/treeord/ordprt2d.htm#28.%20Licensing%20of%20private%20tree%20care%20firms
Ensure That Vegetation is Selected, Planted, and Maintained for Maximum Tree Health and to Suit the Intended Purpose.	Healthy trees provide benefits whereas unhealthy trees likely will die or become a risk.	SC Forestry Commission, Urban Tree Species Guide: Choosing The Right Tree For The Right Space http://www.state.sc.us/forest/urbsg04.htm SC Forestry Commission, Survival Strategies for Newly Planted Trees http://www.state.sc.us/forest/urbsurv.htm Successful Strategies for Sustainable Streetscapes http://www.umass.edu/urbantree/publications/pits.pdf National Arbor Day Foundation, Planting The Right Tree In The Right Place http://www.arborday.org/trees/righttreeandplace/ Trees and Utility Lines http://www.arborday.org/programs/treelineusa.cfm
Prepare Budget That Covers Urban Forestry Capital and Operations Costs	Adequate funding is needed to implement a sustainable urban forest. All costs should be considered but it should be noted that the early stages of a management program likely will be more expensive. As trees stabilize, costs for inspection and maintenance will become more routine. Even still, costs for hazard trees should be included.	The Urban Forestry Manual. http://www.urbanforestrysouth.org/Resources/Library Northeast Center for Urban and Community Forestry, University of Massachusetts http://www.umass.edu/urbantree/factsheets/index.shtml Bowyer, R., Capital Improvements Programs. Planning Advisory Service 442. Chicago, IL.: American Planning Association. 1993

Action	Description	Resource
		Computing Costs and Benefits International Society of Arboriculture PO Box GG Savoy, IL 61874-9902 (217) 355-9411
Firewise, Storm Damage, Disease, and Hazard Tree Plan and Policy	Develop plan to address storm damage, general risk, and emergency situations. Hazard plans are helpful responses to storms or other natural disasters. The plan should include contact information for staff, policy makers, media, other stakeholders and volunteers; policies; mutual aid agreements; contractor agreements and contacts, and inventory data. Fire resistant plants, planting techniques, and building siting practices should be consulted as the urban edge penetrates rural and wooded lands.	SC Forestry Commission Fire and Burning Information http://www.state.sc.us/forest/fire.htm SC Forestry Commission: SC Firewise Plants http://www.state.sc.us/forest/scplants.pdf Burban, L., Anderson, J. Storms Over the Urban Forest: Planning, Responding and Regreening - A Community Guide to Natural Disaster Relief http://www.na.fs.fed.us/spfo/pubs/uf/sotuf/sotuf.htm Morris, J. Communities at Risk: Wildfire and the Urban Interface. The Acorn Spring 2004 Volume 13, No. 1. SC Urban and Community Forestry Council Prioritizing Risk Trees in a Community http://www.umass.edu/urbantree/publications/hazardarticle.pdf Managing Storm Damaged Trees http://www.umass.edu/urbantree/factsheets/16stormdamagedtrees.html Schwab, J., Meck, S., Planning for Wildfires. Planning Advisory Service 529. Chicago, IL.: American Planning Association. 2005.

Action	Description	Resource
Establish and Maintain Partnerships	Community forestry needs broad based community support. Elected officials, staff, service and infrastructure providers, stakeholders, citizens, and affected parties are potential partners in community forestry efforts. Sometimes it is helpful to recruit a core group that serves as ambassadors for the effort.	Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Southern Consortium of University Public Service Organizations.

Table 12. Funding Implementation Actions and Resource Examples

Action	Description	Resource
Budget	Community trees are a local responsibility and should be included in the local government budget. Grant funds support a number of local efforts but these monies generally are available on a one time or short term basis. Sustainable community forestry programs generally rely on local tax revenues.	Pennsylvania Urban and Community Forestry, Annual Budgets for Community Tree Programs. The Pennsylvania State University, University Park, PA. 1995. Tree City USA Bulletin No. 34, How To Fund Community Forestry http://www.arborday.org
Capital Projects Sales Tax	By referendum and ordinance, a county may impose a 1 percent sales and use tax for up to seven years for capital projects. Trees may be included if designed as part of the capital project.	SC Code of Laws §4-10-300 http://www.scstatehouse.net/code/t04c010.htm
Fundraising Programs	Individuals are a major source of private donations. Generally, one of the most effective fundraising strategies is the face to face solicitation followed by personal phone calls and letters. Community service organizations are also notable for their in-kind contributions such as materials or labor and their financial assistance. In some communities trees are planted in honor or memory of certain people or occasions. A register of donations or in some cases, a plaque will note the dedication. Benefit bake sales, garage sales, or firewood sales have supported one time expenses and planting projects. In 1996, the senior class at Penn State endowed the university with $125,000 to use towards the preservation of the elm trees.	National Arbor Day Foundation Trees in Celebration, Trees in Memory http://www.arborday.org/join/tictim/registry.cfm Fazio, J. Urban and Community Forestry: A Practical Guide To Sustainability. The National Arbor Day Foundation. 2003 Funding Opportunities http://www.fundsnetservices.com/Default.htm

Action	Description	Resource
Local Option Sales Tax	Grants are useful as supplemental and stimulus funding. Frequently they are useful leveraging tools and fund projects that support the long term viability of the community forest. Most of the federal funds for urban forestry are administered by the SC Forestry Commission and provided through the Cooperative Forestry Assistance Act of 1978 and the Farm Bill legislation. Periodically other federal agencies have funding for community forestry. The US Department of Transportation is providing funding for planting in conjunction with roadways. Administration of these programs differs from state to state. The Natural Resources Conservation Service is a partnership between the US Department of Agriculture and local conservation officials. Community forestry is one of their interests and periodically they will partner on grants. The US Environmental Protection Agency has provided funding for competitive vegetation projects that meet their objectives. Some corporations are interested in funding community forestry projects that will benefit the community and provide some publicity. It is important to know the company's policy for accepting proposals. Foundations generally have particular interest areas that they are willing to fund. Whatever the funding source, it is important to follow their procedures and to be sure the proposal is clearly developed and straightforward. Funders will want to know how the proposal meets their objectives.	Treelink, Tutorial For Writing Grant Proposals. www.treelink.org/grants On-line index of federal, state, and community grants http://www.grants.gov Southern Research Station www.srs.fs.usda.gov/researchnews/grants.htm SC Forestry Commission http://www.state.sc.us/forest/urban.htm The Foundation Center http://fdncenter.org The Grantsmanship Center http://www.tgci.com US Department of Transportation http://www.transact.org/library/reports_pdfs/funded_projects/south_carolina.pdf USDA, Natural Resources Conservation Service http://www.nrcs.usda.gov/ US EPA http://www.nrcs.usda.gov/ National Tree Trust: Finding Funding http://nationaltreetrust.org/index.cfm?cid=44604 SC Council of Governments, Grant Writing Assistance http://www.state.sc.us/cogs/index.html

Action	Description	Resource
Hospitality Fees	If approved by the voters in a county, a one cent tax may be levied on sales. Seventy-one percent of these revenues are used to decrease taxes in the particular county. The use of the remaining funds is left to the discretion of the local government.	SC Code of Laws §4-10-10 to 4-10-600 http://www.scstatehouse.net/code/t04c010.htm
Accommodations Tax	A tax on the sale of prepared food and drink may be imposed by locally established ordinances. Proceeds of the tax are used for local government capital costs.	SC Code of Laws §6-1-700 http://www.scstatehouse.net/code/t06c001.htm
Funds for Alternative Compliance	A tax on accommodations may be imposed by local ordinance. The tax is used for costs created by visitors but also for tourism promotion and facilities.	SC Code of Laws §6-1-500 http://www.scstatehouse.net/code/t06c001.htm
Impact Fees	In some communities, the developer is unable to comply with requirements, the unmet requirements may be satisfied with compensation to a fund. The City of Columbia requires a payment of 125 percent of the estimated material and installation cost.	Columbia, SC Code of Ordinances, Alternative Compliance: Columbia Landscaping and Tree Fund Section 17-416 http://www.municode.com Beaufort County See Forestation Fee in Zoning Ordinance http://www.co.beaufort.sc.us
Municipal Capital Projects Sales Tax	Impact fees on new development can be used towards the capital cost of maintaining the level of service impacted by the development. Trees may be a component of a capital or infrastructure project.	SC Code of Laws §6-1-910 http://www.scstatehouse.net/code/t06c001.htm
Tax Increment Finance District	The Municipal Improvement Act of 1999 allows municipalities to assess property owners in defined districts for improvements and services in that area.	SC Code of Laws §5-37-10 to §5-37-180 http://www.scstatehouse.net/code/t05c037.htm

Action	Description	Resource
Volunteers	Tax Increment Finance (TIF) Districts are used to stimulate private development in depressed areas by providing public improvements. These improvements may include trees in the enhancements. The increased tax revenue over the before rehabilitation revenue baseline is applied to capital improvements in a designated area.	SC Code of Laws TIF for Redevelopment §31-6-10 http://www.scstatehouse.net/code/t31c006.htm TIF Counties 6-33-10 http://www.scstatehouse.net/code/t06c033.htm TIF Counties 31-7-10 http://www.scstatehouse.net/code/t31c007.htm Strom Thurmond Institute. Local Governments and Home Rule in SC. Revenues, Finance, page 11 http://www.strom.clemson.edu/publications/ulbrich/home_rule.pdf
	Volunteers can be a step in gaining citizen support for a comprehensive community forestry program. With proper supervision and training, volunteers can be helpful with education, public relations, advocacy, building capacity, planting, and maintenance programs.	Cornell University, Community Forestry Education Project Citizen Tree Workers http://www.cce.cornell.edu Lipkis, A.; Lipkis, K. The Simple Act of Planting A Tree. 1990. http://www.treepeople.org Bloniarz, DV. Use of Volunteers In Conducting Inventories. Journal of Arboriculture. 2004 http://www.urbanforestrysouth.org/Resources/Library/Citation.2004-09-29.1004/view

It is helpful to ask some pointed questions to ensure that the implementation options seriously considered meet the intended objective and that they are assessed in light of the other comprehensive plan elements. The US Environmental Protection Agency offers the following questions which will help in this assessment.

Questions To Consider For Selection and Prioritization of Action Planning Projects

- Do the projects conflict or overlap?
- Does the project fulfill the community's vision?
- Does the community have the resources or might the resources become available?
- Does the project have community support?
- Does the project have elected and appointed official support?
- Who will champion the project?
- Can it be implemented?
- Is the project cost effective?
- Will the project address identified barriers?
- What are the project impacts from a social, economic, and environmental perspective?
- Is the project sustainable?

US Environmental Protection Agency. *Region III Green Communities: How Do We Get There? Community Involvement Tools.* http://www.epa.gov

IMPLEMENTATION STRATEGY

The Comprehensive Plan implementation strategies provide the basis for the community's work plan. For accountability purposes, the work plan will include the responsible party, anticipated budget, and project timeline. See Table 13. In determining the accountable party, it is helpful to assign responsibility to someone who has some on-going affiliation with the local government. If tasks are assigned to a volunteer that potentially may move away or lose interest in a project or to elected officials who may not be elected for another term, momentum may be lost in the transition periods. A staff position may serve as a liaison to policymakers, respond to questions, provide updates, and keep the official records and progress reports in a publicly accessible location.

Time frames are attached to each implementation strategy or action item. It is helpful to strategize for several years out in order to capture grants, funding for the next planting season or project, and community commitment. Distinguishing the immediate action needs from the long term strategies will provide some priority and budget focus. For plan flexibility, general time frames rather than specific dates and priority status are often preferred. General terminology allows

some give in case there are emergency priorities such as a natural disaster, short term policy holdups or budget shortfalls. High or low priority, short or long term action, and/or a range of years such as year 1 or during years 1 to 2 are acceptable time or priority notations. It is helpful to note that according to the state code, the plan is reviewed every five years and updated every ten years.

For plans that include a physical planting project, timing is a critical factor and does not necessarily correspond with the prime retail marketing period. Again, general time frames are preferable. In South Carolina, the best time to plant trees is in the dormant period, usually December through February. Trees then have time to establish a root base before the growing season begins in March and April.

Goldenview Neighborhood Park Design Study, Clemson, S.C.
Designed by Clemson University Professor Umit Yilmaz's 2001 Landscape Architecture class.

STEP 4
ADDITIONAL RESOURCES

York County, SC Implementation Schedule
www.yorkcountygov.com/planning/comprehensive%20plan/Implementation%20Schedule.PDF.

Table 13. Sample Implementation Strategy for Goal

Vision: The city is abundant with tree cover, consequent tree benefits, and healthy natural resources which are managed in an equitable and sustainable manner.

Goal 1: A public tree population that is attractive, safe, and healthy.

	Action	Action Detail/Comments	Assigned To:[2]	Schedule[1]	Budget
1.1.1	Inspect trees and remove hazards	Determine if staff resources are adequate to complete this project over the next few years. If not, have staff research other avenues of getting assistance and provide cost estimate.	Arborist (L) Public Works Planner	O	General Funds
1.1.2	Assess species diversity and plant for a diverse population	Ensure that Arborist is trained for these assessment purposes. If not, secure training.	Arborist (L)	S	General Funds
1.1.3	Research hardy tree specimens and planting locations for lower maintenance requirements or higher benefit	Consult with urban forestry program contacts and the SC Forestry Commission.	Arborist (L)	S	General Funds
1.1.4	Propose a computerized street and public tree inventory	Contact other nearby local governments to determine what inventory tools they are using. SC Forestry Commission, consulting arborists, or websites may provide. Weigh advantages/ disadvantages of computerized system and determine full costs for implementation.	Arborist (L) Internet Services Director (L)	M	Increased funding will be needed for startup costs. Consider grant opportunities for start up.
1.1.5	Plant trees to replace trees lost to storm damage	Use information gleaned from Strategy 1.1.3 to determine the proper tree for the proper location.	Arborist (L) Public Works	O	Mitigation Funds: $8,000

[1]Time Frame Key: S=High Priority/Short Term Actions (0-2 Years)
M=Mid-term Actions (2-5 Years)
L=Long-term Actions (5-7 Years)
O=Ongoing/Continuing Actions

[2](L)= Primary contact/assignment

STEP 5: PLAN ADOPTION — HOW DO WE ENSURE THAT THE PLAN IS LEGALLY ENACTED?

As noted in Sections 6-29-520 and 6-29-530, the SC Planning Act outlines the following procedural requirements for adoption of the comprehensive plan or amendments to the plan.

1. By a majority vote of the entire commission, the Planning Commission adopts the plan by resolution that recommends that the governing body adopt the plan or an element of the plan. The resolution must include reference to specific maps or other descriptive materials which form the plan. See §6-29-520 (B). See Appendix 5, A Sample Resolution Adopting the Community Forestry Element of the Comprehensive Plan.

2. The Planning Commission minutes must reflect adoption of the resolution.

3. The plan adopted by the Planning Commission is sent to the City or County Council with the request that they adopt the plan.

4. The plan is also sent to other public agencies or jurisdictions that are affected by the plan. See §6-29-520 (B).

5. Notice of time, date and place of a public hearing on the plan is published in the community's general circulation newspaper at least 30 days prior to the hearing. An advertised public hearing is conducted on the recommended plan.

6. The City or County Council adopts the plan by ordinance after two or three readings depending on the jurisdiction. Check local ordinances.

7. The plan must be reviewed at least every five years and updated every ten years.

STEP 6: EVALUATE AND SUSTAIN THE COMMUNITY FOREST PROGRAM — IS IT WORKING?

The success of the community forestry plan and program is dependent on the process of engaging the citizens and sustaining commitment. Interest will be higher during the first few years after the plan's adoption but then active involvement often wanes. As the slate of political leaders changes or the process becomes more detail oriented, some of the earlier enthusiasm may be lost. To keep the plan on target, communities will want to evaluate their efforts and encourage ongoing citizen engagement.

Georgetown, S.C. Streetscape.
Photo by D. London.

EVALUATION

Monitoring and recording the activities and the policy decisions which impact the trees and the community forest will illuminate shortcomings in the system, provide a basis for budget purposes, and assess whether the community is accomplishing its goals. It is possible that conditions have changed due to a natural disaster, a major surge in business activity, or some other event. For these reasons, goals may need to be fine tuned or the management strategy may need adjustment. Evaluation techniques will vary based on the goal being evaluated, and with specific indicators or quantifiable goals in place, the evaluation process will be simpler to conduct. Keeping up to date and accurate summaries of activities will provide basic assessment data which will be helpful in gauging success and determining needs. Table 14. Sample Data Needs for Evaluation of the Community Forest Plan and Program reflects some of the information that communities will want to collect and review in light of the goals and strategies.

Table 14. Sample Data Needs for Evaluation of the Community Forest Plan and Program

Vision: The city is abundant with tree cover, consequent tree benefits, and healthy natural resources which are managed in an equitable and sustainable manner.					
		Year 1	Explanation	Year 2	Explanation
Planting					
	# Of Trees Planted				
	# Of Each Species Planted				
	Size at Planting				
	Location Planted				
Maintenance					
	# of Trees In Care Of Jurisdiction				
	# Survival Rate				
	# Trees Pruned				
	# Trees Repaired				
	# Trees Removed				
Financial Investments					
	Staff				
	Other Service				
	Materials				
	Grants or Other Funding Secured				
Hours Invested					
	Staff				
	Volunteers				

Continuation of Sample Data Needs for Evaluation of the Community Forest Plan and Program					
		Year 1	Explanation	Year 2	Explanation
Citizen Communication					
	Requests				
	Compliments				
	Complaints				
Education Events					
Awards					
Decisions Affecting Trees					
	Council				
	BAR				
	BZA				
	PC				
	Staff				
Are implementation tools adequate? Year 1: Year 2:					
What is the public perception of implementation? Year 1: Year 2:					
How have implementation tools affected the community? Year 1: Year 2:					

Additionally, it is important that some of the questions are tailored to specific goals. For example, use the goal "The commercial vitality of Maple Street will improve with implementation of the tree planting plan." Comparison of before and after tree planting data will provide an indication of goal achievement. In addition to the general data noted in Table 14 Sample Data Needs for Evaluation of the Community Forest Plan and Program, reasonable assessment data may also include responses to the following questions.

Grocery Store Parking Lot.
Litchfield Beach, S.C.
Photo by D. London.

- How many businesses are there compared to before tree planting?
- What are the sales figures before and after tree planting?
- Has there been new or enhanced business activity?
- Do we know the reasons why activity has increased?
- How many businesses closed? To what can the closure(s) be attributed?
- What do the store owners say?
- What do the customers say?

Understanding the current situation before the implementation was enacted by defining benchmarks and then combining the assessment information over time will provide a reasonable appraisal of the success of the strategies. The evaluation provides an opportunity to change the course of events if it is determined that a strategy is not working, is infeasible, or if events have changed. Table 15 provides a sample status report and evaluation of whether a strategy is meeting intentions.

Public Space. Asheville, N.C.
Photo by D. London.

Table 15. Example of Community Forestry Evaluation

Goal	Indicator or Benchmark	Action	Baseline Data	Year 1 Review	Action Status	Revised Action
Protect Scenic Significant Tree Stands	Tree inventory updated and criteria developed for determining significant tree stands.	Budget item approved to cover inventory costs and update inventory. Collect criteria information from other sources.	Inventory last completed in 2003. No criteria to determine significance.	Council did not approve budget for 2004-2005 inventory software upgrades.	On-going	Collect and disseminate data on tree stand benefit and potential cost savings in urban settings. Include an arborist in on 2005-2006 budget deliberations.
	Clustered development so that the option to preserve significant tree stands exists.	Investigate cluster development regulatory options and incentives.	Clustering of residential uses not allowed.	PC developed and Council adopted Ordinance #CC-05-03, §19-302 adopted on 2-7-05 allowing clustered, single –household detached dwellings as a special exception in R districts and as a use of right in RM districts.	Completed	To date, no developments have applied this option. Ensure that development community is aware of the authorizing legislation and find opportunities to relay benefits and case studies.

KEEPING THE COMMUNITY FORESTRY PLAN ALIVE

Once a community forest program is underway, interests and priorities may shift to other more pressing issues. It is important, however, that the vision of the community forest program is kept in the public eye so that the program and plan can continue to provide benefits.

Cities and counties in South Carolina have a variety of attributes and resources to facilitate urban forestry efforts. The majority of South Carolina's local leaders are faced with limited financial means and the need to balance competing interests and priorities. These challenges present opportunities for the forestry, planning, design, building, and engineering professions to be more involved in sustainable solutions. Trees and other vegetation offer prospects for addressing some of the troubles that face communities which now find that they are threatened by unplanned development or misguided growth management. In addition to providing visual and sound buffers, research shows that the contributions of properly selected, sited, and managed trees are significant in addressing stormwater runoff, heat island effects, heating and cooling costs, illness recovery times, economic vitality, and property value increases. Informed leaders and citizenry that embrace a vital forestry program will play a major role in enhancing the physical and economic well-being of their communities.

Indicators of Effective Tree Care Programs

- Tree care agency or at least a person responsible for tree care.
- An identified budget derived from several sources.
- A well-managed and maintained publicly owned tree resource.
- Trained tree workers and arborists in public and private tree care.
- A workable tree ordinance or regulations and guidelines.
- Annual work plans for public tree care.
- Developing or working under a master plan that involves all major city infrastructure.
- Initial and continuing participation in new developments and growth areas.
- Inventories or assessments of the tree resource.
- Education and outreach to citizens, school children, teachers, and political and city leaders.
- Citizen and leader participation in planning and implementing tree care programs and events.
- Media involvement and coverage of forest conditions, tree care activity and citizen involvement and recognition.

From http://www.na.fs.fed.us

STEP 6
ADDITIONAL RESOURCES

Evaluation Techniques: http://www.isa-arbor.com/publications/tree-ord/ordprt3a.aspx

Hilton Head Comprehensive Plan: Natural Resources Element. Plan addresses results of implementation. http://czo.duncanplan.com/plans/hilton%2Dhead/

Mt Pleasant, S.C. Comprehensive Plan: Natural Resources Element.
Town of Mount Pleasant Municipal Complex, 100 Ann Edwards Lane, PO Box 745,
Mount Pleasant, SC 29464.

Rock Hill, SC Website of Activities Related to Community Forestry.
http://www.cityofrockhill.com/TreesForRockHill/forestry.asp

Trees Virginia Website with Mission and Goals on Home Page.
http://www.treesvirginia.org/

Elmendorf, Cotrone, Mullen. ©July 2003. Trends in Urban Forestry Practices, Programs, and Sustainability: Contrasting a Pennsylvania, U.S., Study. *Journal of Arboriculture* 29(4).
http://www.treelink.org/joa/2003/july/07Elmendorf.pdf

U.S. Forest Service's National Report on Sustainable Forests. http://www.fs.fed.us/research/sustain/. The report focuses on 67 indicators with seven criteria that indicate the health and longevity of trees and the forest.

Vancouver, WA Website with Successes Noted.
http://www.ci.vancouver.wa.us/vccv/successaudit.htm

Clemson University Professor Mary Haque and Landscape Design Class plant seedlings as part of a stream restoration project and in celebration of Arbor Day and Senator Thurmond's 100th birthday.
Photo courtesy of M. Haque.

APPENDICES

APPENDIX 1.
COMPREHENSIVE PLANNING ACT OF 1994

South Carolina Code of Laws
(unannotated)
Current through the end of the 2004 Regular Session

Disclaimer

This statutory database is current through the 2004 Regular Session of the South Carolina General Assembly. Changes to the statutes enacted by the 2005 General Assembly, which will convene in January 2005, will be incorporated as soon as possible. Some changes enacted by the 2005 General Assembly may take immediate effect. The State of South Carolina and the South Carolina Legislative Council make no warranty as to the accuracy of the data, and users rely on the data entirely at their own risk.

Title 6 - Local Government - Provisions Applicable to Special Purpose Districts and Other Political Subdivisions

CHAPTER 29.
SOUTH CAROLINA LOCAL GOVERNMENT COMPREHENSIVE PLANNING
ENABLING ACT OF 1994

ARTICLE 3.
LOCAL PLANNING—THE COMPREHENSIVE PLANNING PROCESS

SECTION 6-29-510. Planning process; elements; comprehensive plan.

(A) The local planning commission shall develop and maintain a planning process which will result in the systematic preparation and continual re-evaluation and updating of those elements considered critical, necessary, and desirable to guide the development and redevelopment of its area of jurisdiction.

(B) Surveys and studies on which planning elements are based must include consideration of potential conflicts with adjacent jurisdictions and regional plans or issues.

(C) The basic planning process for all planning elements must include, but not be limited to:

(1) inventory of existing conditions;
(2) a statement of needs and goals; and
(3) implementation strategies with time frames.

(D) A local comprehensive plan must include, but not be limited to, the following planning elements:

(1) a population element which considers historic trends and projections, household numbers and sizes, educational levels, and income characteristics;
(2) an economic development element which considers labor force and labor force characteristics, employment by place of work and residence, and analysis of the economic base;
(3) a natural resources element which considers coastal resources, slope characteristics, prime agricultural and forest land, plant and animal habitats, parks and recreation areas, scenic views and sites, wetlands, and soil types. Where a separate board exists pursuant to this chapter, this element is the responsibility of the existing board;
(4) a cultural resources element which considers historic buildings and structures, commercial districts, residential districts, unique, natural, or scenic resources, archaeological, and other cultural resources. Where a separate board exists pursuant to this chapter, this element is the responsibility of the existing board;
(5) a community facilities element which considers transportation network; water supply, treatment, and distribution; sewage system and wastewater treatment; solid waste collection and disposal, fire protection, emergency medical services, and general government facilities; education facilities; and libraries and other cultural facilities;
(6) a housing element which considers location, types, age and condition of housing, owner and renter occupancy, and affordability of housing; and
(7) a land use element which considers existing and future land use by categories, including residential, commercial, industrial, agricultural, forestry, mining, public and quasi-public, recreation, parks, open space, and vacant or undeveloped.

(E) All planning elements must be an expression of the planning commission recommendations to the appropriate governing bodies with regard to the wise and efficient use of public funds, the future growth, development, and redevelopment of its area of jurisdiction, and consideration of the fiscal impact on property owners. The planning elements whether done as a package or in separate increments together comprise the comprehensive plan for the jurisdiction at any one point in time. The local planning commission shall review the comprehensive plan or elements of it as often as necessary, but not less than once every five years, to determine whether changes in the amount, kind, or direction of development of the area or other reasons make it desirable to make additions or amendments to the plan. The comprehensive plan, including all elements of it, must be updated at least every ten years.

SECTION 6-29-520. Advisory committees; notice of meetings; recommendations by resolution; transmittal of recommended plan.

(A) In the preparation or periodic updating of any or all planning elements for the jurisdiction, the planning commission may use advisory committees with membership from both the planning commission or other public involvement mechanisms and other resource people not members of the planning commission. If the local government maintains a list of groups that have registered an interest in being informed of proceedings related to planning, notice of meetings must be mailed to these groups.

(B) Recommendation of the plan or any element, amendment, extension, or addition must be by resolution of the planning commission, carried by the affirmative votes of at least a majority of the entire membership. The resolution must refer expressly to maps and other descriptive matter intended by the planning commission to form the whole or element of the recommended plan and the action taken must be recorded in its official minutes of the planning commission. A copy of the recommended plan or element of it must be transmitted to the

appropriate governing authorities and to all other legislative and administrative agencies affected by the plan.

(C) In satisfying the preparation and periodic updating of the required planning elements, the planning commission shall review and consider, and may recommend by reference, plans prepared by other agencies which the planning commission considers to meet the requirements of this article.

SECTION 6-29-530. Adoption of plan or elements; public hearing.

The local planning commission may recommend to the appropriate governing body and the body may adopt the plan as a whole by a single ordinance or elements of the plan by successive ordinances. The elements shall correspond with the major geographical sections or divisions of the planning area or with functional subdivisions of the subject matter of the comprehensive plan, or both. Before adoption of an element or a plan as a whole, the governing authority shall hold a public hearing on it after not less than thirty days' notice of the time and place of the hearings has been given in a newspaper having general circulation in the jurisdiction.

SECTION 6-29-540. Review of proposals following adoption of plan; projects in conflict with plan; exemption for utilities.

When the local planning commission has recommended and local governing authority or authorities have adopted the related comprehensive plan element set forth in this chapter, no new street, structure, utility, square, park, or other public way, grounds, or open space or public buildings for any use, whether publicly or privately owned, may be constructed or authorized in the political jurisdiction of the governing authority or authorities establishing the planning commission until the location, character, and extent of it have been submitted to the planning commission for review and comment as to the compatibility of the proposal with the comprehensive plan of the community. In the event the planning commission finds the proposal to be in conflict with the comprehensive plan, the commission shall transmit its findings and the particulars of the nonconformity to the entity proposing the facility. If the entity proposing the facility determines to go forward with the project which conflicts with the comprehensive plan, the governing or policy making body of the entity shall publicly state its intention to proceed and the reasons for the action. A copy of this finding must be sent to the local governing body, the local planning commission, and published as a public notice in a newspaper of general circulation in the community at least thirty days prior to awarding a contract or beginning construction. Telephone, sewer and gas utilities, or electric suppliers, utilities and providers, whether publicly or privately owned, whose plans have been approved by the local governing body or a state or federal regulatory agency, or electric suppliers, utilities and providers who are acting in accordance with a legislatively delegated right pursuant to Chapter 27 or 31 of Title 58 or Chapter 49 of Title 33 are exempt from this provision. These utilities must submit construction information to the appropriate local planning commission.

APPENDIX 2.
OTHER STATUTES RELATED TO URBAN FORESTRY

REGULATORY STATUTES

SC Water Pollution Control Act (Title 48, Chapter 1, Pollution Control Act)
Controls pollution of water bodies through implementation of Best Management Practices (BMPs) in Forestry. Administered by SC Department of Health and Environmental Control (DHEC).

Resource Conservation and Recovery Act (42 USC Sec. 6901 et seq.)
Prohibits disposal of solid waste outside of an approved solid waste facility.

Critical Area and Navigable Waters Permits (Title 48, Chapter 39, Tidelands and Wetlands)
Requires a SC DHEC permit for activities in State's coastal zone including bridges, cables, or silviculture activities in State navigable waters. Administered by SC Department of Health and Environmental Control (DHEC).

Endangered Species Act (16 USC Sec. 1532 [19])
Protects threatened and endangered species and their habitat.

Clean Water Act (33 USC 1251 et seq.)
Regulates and reduces source and nonpoint source pollution, includes prescribed Best Management Practices (BMPs) for reducing nonpoint source pollution. (1972, 1982)

Coastal Zone Act Reauthorization Amendments (Title 48, Chapter 39, Tidelands and Wetlands)
Intended to strengthen state efforts to reduce non-point source pollution in expanded coastal zone.

Prescribed Fire Act (1994)(Title 48, Chapter 35, Precautions Law)
Requires prescribed burning plan preparation and submittal to SC Forestry Commission prior to burning.

The Home Rule Act of 1975 (Title 6, Chapter 7, Planning by Local Governments)
Provides municipalities with greater uniformity as well as the freedom and flexibility to control local affairs. (1975)

Local Government Comprehensive Planning Enabling Act of 1994 (Title 6, Chapter 29, South Carolina Local Government Comprehensive Planning Enabling Act Of 1994)
Establishes the organization and power counties and municipalities can use in their planning efforts. Relative to tree management, under Section 6-29-340 of the Act, the Planning Commission has the power to develop a landscaping ordinance setting forth required planting, tree preservation, and other aesthetic consideration for land and structures. (1994)

Zoning (Title 6, Chapter 29, South Carolina Local Government Comprehensive Planning Enabling Act Of 1994)
Under Section 6-29-720 of the Comprehensive Planning Act, the governing body is authorized to regulate different aspects of the site plan development including tree preservation, landscaping, and buffers. (1994)

Land Development Regulations (Title 6, Chapter 29, South Carolina Local Government Comprehensive Planning Enabling Act Of 1994)
These land development regulations govern the conversion of raw land into subdivided lots for the construction of buildings. These regulations also control site design, street layout, and provisions for water and sewer service. County council may adopt land development regulations when the community facilities element of the comprehensive plan has been adopted. (1994)

South Carolina Conservation Easement Act (Title 27, Chapter 28, South Carolina Conservation Easement Act of 1991)
Allows landowners to voluntarily preserve important natural and cultural sites, while allowing (in some cases) landowners to maintain current practiced uses of the land.

The easement may prevent the conversion of valuable property from future real estate development, industrial use, and commercial use. Also reduces the amount of property taxes that the owner would have to pay and a 25% income tax deduction will be given to landowners who sell their conservation easement to a state or non-profit land trust. (1991)

South Carolina Conservation Bank of 2002 (Title 48, Chapter 59, South Carolina Conservation Bank Act)
Established a dedicated funding source that will be used to preserve natural and historic lands in the state. A percentage of the real estate transfer fee is used to purchase land or conservation easements from willing sellers. The Act awards grants on a competitive basis to state agencies, local governments and non-profit land trust who purchase unique and special places. Land purchased outright will be used for parks, green space, public hunting areas and historical sites. (2002)

Heritage Trust Program of 1976 (Title 51, Chapter 17, Heritage Trust Program)
Created to preserve natural features and cultural remains. Seeks to inventory, evaluate and protect those sites considered to represent state heritage. Funded by appropriations, the Endangered Wildlife Fund, the Endangered Species License Plate, and a portion of the real estate documentary stamp tax. (1976)

Right-to-Farm (Title 12, Chapter 43, County Equalization and Reassessment)
Currently, South Carolina has a statewide right-to-farm law and differential tax assessment rates for agricultural land.

NON-REGULATORY STATUTES

SC Forestry Best Management Practices Act (Title 48, Chapter 36, South Carolina Forest Best Management Practices Act)
Establishes Best Management Practices Related to Forestry.

APPENDIX 3.
SELECTED TECHNIQUES FOR ENGAGING THE PUBLIC

Technique	Purpose	Method	Resource
Brainstorming	To generate, clarify and evaluate ideas, problems, or issues.	In group setting, participants verbally express ideas which are displayed. The ideas stimulate other ideas.	*Community Toolbox*. http://ctb.ku.edu/ Nine Counties. One Vision. http://www.discoveret.org/nc1v/
Buzz Groups	Clarifies the issues and options.	In group setting, participants' questions are recorded. Then resource people respond to the questions.	"Small Group Process" in Towards Managing Growth in Washington: A Guide to Community Visioning. State of Washington, Department of Community Development, Growth Management Division (1991). Cogan, E. (1992) Successful Public Meetings. San Francisco: Jossey-Bass Publishers.
Multiple Issue Stations	Consensus building.	Several tables are assigned an issue. Participants move from table to table for a fixed period of time. Each table is staffed with a resource person, facilitator, and a recorder. Ideas flow and participants meet in a large group to work towards consensus.	See Arlington, VA Urban Walkway. http://www.commuterpage.com/bike.htm
Rotating Experts	Consensus building.	Resource people rotate among small groups. The smaller groups can alleviate some of the intimidation participants might feel when speaking in a large group setting. A facilitator convenes a larger group to discuss and work towards agreement.	Cogan, E. (1992) Successful Public Meetings. San Francisco: Jossey-Bass Publishers.

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
Community Fair	Educate and Advisory.	In a large open space such as a gymnasium or cafeteria, booths set up with varied information, possibly including a video or slide show, information about the project, a place to ask questions of project directors, and provide opinions.	Birmingham, Alabama, Region 2020, Inc. http://www.region2020.org Cogan,E. (1992.) Successful Public Meetings. San Francisco: Jossey-Bass
Tours	Educate.	Tours of particular areas of concern acquaint participants with existing conditions. First hand view of an area in a group setting followed by discussion can help raise awareness of concerns and opportunities. Maps, photographs, or tour guidebooks are helpful orientation material for tours.	See The Center for Livable Communities. (1999.) Participation Tools for Better Land Use Planning.
Community Mapping	Acquaints participants with their community.	Participants are provided written instructions, a map legend including symbols and/or color codes noting different features, and sometimes a base map. Following a loosely constructed version of Kevin Lynch's 'cognitive mapping' pioneered over 40 years ago, participants are provided no more direction than the instructions and legend mentioned above with the expected product in a map form that reveals what community features are important to the participant. Another method of community mapping asks participants to collect data on specific topics such as significant trees. The information provides an inventory of community resources. Results from community mapping may be difficult to interpret if they are subjective features. The inventory aspect of community mapping can be helpful but needs review if used for authoritative or scientific data. The method	Kent Anderson and William Kelley, "Trails to the Future: Communicative Action in Small town Planning, *Proceedings from the 2000 American Planning Association Conference.* Mary English, Jean Peretz, and Melissa Manderschied, *Smart Growth for Tennessee Towns and Counties: A Process Guide.* (Knoxcille, Tenn.: Waste Management Research and Education Institute, Energy, Environment and Resources Center, University of Tennessee, 1999). http://eerc.ra.utk.edu/smart/title.htm Local Government Commission, "Participatory Land Use Mapping," including tips for organizing and conducting a community mapping exercise. http://www.lgc.org/freepub/land_use/participation_tools/landuse_mapping.html

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
		requires a significant time commitment. Resulting information serves as the basis for group discussions about the physical community.	
Community Leader Interviews	Effective in getting a reading of community opinion on sensitive or controversial topics.	Interviews with key community leaders add a personal perspective to idea and solution gathering. The interviews are effective for hearing ideas and suggestions and potentially creating "buy-in" into a plan.	Susan Gulick, "Citizen Interviews Listening to Key Leaders in Your Community," *Proceedings from the 1998 American Planning Association Conference.* University of Kansas, *Community Toolbox* http://ctb.ku.edu/
Voting Dots	Indicates participants' level of concern or interest in an issue.	Facilitator poses a question to participants who are encouraged to respond briefly. The facilitator writes down each response on a large piece of paper. With the agreement of the participants, similar responses are combined. Participants are given small colored adhesive dots, usually around five dots, which are then used to vote for the responses which are the most important to them. The responses are ranked according to the number of dots they receive.	Jefferson and Shelby County Region 2020. http://www.region2020.org/about_us.html

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
Nominal Group Technique	Clarifies opinions and helpful in developing group recommendations.	The same question is posed by a facilitator to each of the groups or the group. Participants respond in writing to each of the questions. Each one in the group is called upon to state one response from their list until all responses are covered. Responses are written verbatim and displayed. Each item is discussed, clarified, and numbered. On index cards, participants rank their priority items. Cards are collected and votes for each item are tallied. Group discusses the results, particularly the top group ranked items. Participants individually rank the top items, using the same procedure. Participants formulate their own ideas, then the information contributes to the group discussion	See Nominal Group Technique. https://www3.secure.griffith.edu.au/03/toolbox/display_tool.php?pk1=55 See Langford, B. (1994.) *Nominal Grouping Sessions*. American Marketing Association Journal. http://www.fgcu.edu/cob/mkt/langford/nominalg.htm
Questionnaire		Facilitators ask participants to complete a short questionnaire which can become the basis of another discussion.	University of Kansas, Community Toolbox http://ctb.ku.edu/
Citizen Survey	Useful to assess policy and needs in a community	Information is gathered about feelings, opinions, preferences, behavior patterns, and personal or household information. Data is collected in a systematic manner.	Houten, T. and Hatry, H. (1987,) How To Conduct A Citizen Survey. Planning Advisory Service, Report Number 404. Chicago, IL: American Planning Association. Miller, Thomas I. Citizen Surveys: Taking Your Community's Pulse. November 2, 2000. http://www.plannersweb.com
Design Simulation	Increases understanding of how	Computer modeling and photography are combined so that photo details can be added or	Dube, Matthew and Smith, Russell. "Don't Dream It, See It: Desktop Simulation Comes to Main Street," Planning

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
Land Development Simulation	Allows viewer to visualize what community will look like based on different development choices or policies.	Geographic information systems combine data and physical images. Information such as census tracts or water and sewer lines are presented in layers on maps. Layers can be added or removed.	Strom Thurmond Institute at http://www.strom.clemson.edu/teams/dctech/urban.html
Citizen Photography	Facilitates understanding of different perspectives and shared community values.	Participants, equipped with disposable cameras, photograph features of the area that they like or dislike. Photographs are evaluated so that majority consensus items can be addressed. The process is two pronged including the photography and explanation of the likes and dislikes by the citizens followed by an evaluation of the results.	Strom Thurmond Institute of Government http://www.strom.clemson.edu Ashley River Road Corridor Management Plan http://www.strom.clemson.edu/publications/hawkins/ashleyriver.pdf

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
Charrette	An intense, collaborative process whereby participants develop a physical plan or solutions to specific problems.	After a listening session and envisioning the possibilities, preferred options are addressed with drawings or putting concepts on paper. Charrettes can be design and/or policy oriented and involve professional and/or citizen interaction.	Arlington Urban Walkway a.k.a. 9th Street Greenway http://www.commuterpage.com/walk/walkable/walkarlington.pdf "Community Planning That Works," *Planning Commissioners Journal, Issue 8 Article Excerpts.* http://www.plannersweb.com/wfiles/w578.html Victor Dover, *Charrettes for New Urbanism*, Dover, Kohl & Partners http://www.doverkohl.com/writings_images/charrettes_for_NU_in_FL.htm Segedy, J.A. and Johnson, B. The Neighborhood Charrette Handbook: Visioning and Visualizing Your Neighborhood's Future. Louisville, IN: Sustainable Urban Neighborhoods, University of Louisville. (http://www.louisville.edu/org/sun/planning/char.html)
Image Preference Survey	Useful in the planning and design stages but works well in plan implementation, particularly ordinance development.	Slides of alternative design, land use and transportation patterns and details are presented. Within a few seconds time period, participants rate each slide from –10 (undesirable) to +10 (desirable). Participants' first responses to the visual images are evaluated. Patterns of community preferences emerge.	A. Nelessen Associates, Inc. http://www.nelessen.org The Center for Livable Communities. (1997.) *Participation Tools for Better Land-Use Planning*. (Sacramento, CA: The Center for Livable Communities, 1997)..
Scenario Building	Fosters an understanding of realistic options and alternatives.	Stories are developed around carefully constructed, basically consistent, and a realistic future. Stories presented to participants so that they understand the available options and are able to make better decisions about the future. Strategies are developed to address each of the scenarios.	Envision Utah http://www.envisionutah.org/index.php?id+NDk5 The Visions Project: Choosing A Future For Growing

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

Technique	Purpose	Method	Resource
			http://www.elpc.org Myers and Kitsuse, *Constructing the Future in Planning: A survey of Theories and Tools, Journal of Planning Education and Research*, 19, 221-231. 2000 Association of Collegiate Schools of Planning. Nelson, A., Dagenhart, R., and McKinney, E. *Preserving Small Town Character in the Path of Urbanization: How One Small Georgia Town Preserved Its Character and Welcomed Urban Development*. 1997 American Planning Association San Diego Conference Proceedings, 1997.

Source: Hoke, L., Cumberland, J., London, D., and Whisnant, R. (2001.) Choices for a Growing South: Tools for Achieving Your Community's Vision. Southern Growth Policies Board and the Sourthern Consortium of University Public Service Organizations.

APPENDIX 4.
SAMPLE OF SOFTWARE PROGRAMS USED FOR INVENTORY AND/OR ANALYSIS

Program and Description	Resource
ArborVue • Integrated GPS/GIS Urban Tree Inventory Software • GIS-based application that integrates GIS, GPS and database technologies to streamline the urban tree inventory and tree management process.	The Laurus Group Phone: 864-653-4048 http://www.laurusgroup.net/
ARC/INFO and Arc View ▪ Commonly used ESRI products featuring geographic information system (GIS) software. ▪ Frequently serve as the operating system for other integrated software packages.	ESRI (Environmental Systems Research Institute) http://www.esri.com
CITYgreen™ ▪ Windows based GIS software based on ArcView has the capability to analyze stormwater runoff, air quality, energy savings, carbon storage and avoidance, and tree growth. ▪ Intended to calculate the stormwater runoff as well as the dollar value of trees and vegetation.	American Forests http://www.americanforests.org/productsandpubs
Mobile Community Tree Inventory (MCIT) and STEMS (Street Tree Electronic Management System) ▪ MCIT is comprised of three components which build on the previous level. The three levels include a paper tally sheet template, a desktop inventory program, and a hand held computer. ▪ STEMS is designed to fully integrate with the MCIT software. It uses a graphic interface to manage complaints, work orders, and maintenance schedules.	USDA Forest Service Northeast Center for Urban and Community Forestry http://www.umass.edu/urbantree/mcti/
Natural Resource Technologies, LLC ▪ TreeScape uses GIS to allow landscape professionals to map and manage job sites and incorporates individual property characteristics. ▪ Urban Forest Inventory System (UFIS) is designed for urban forest professionals which performs inventory and work order functions.	Natural Resource Technologies, L.L.C. Phone: 888-848-2146 http://www.nrtech.com/

Program and Description	Resource
STRATUM (Street Tree Resource Analysis Tool for Urban Forest Managers) ▪ Street tree inventory, management and analysis tool for urban forest managers ▪ Uses tree inventory baseline data to quantify the value of environmental and aesthetic benefits: energy conservation, air quality improvement, CO2 reduction, stormwater control, and property value increase.	Center for Urban Forest Research PSW Research Station USDA Forest Service Phone: 530·752·7636 http://cufr.ucdavis.edu/stratum.asp
TreeKeeper products ▪ TreeKeeper 7 - Comprehensive tree management software which includes call management, work orders, and flexible reporting with internet, intranet, and desktop capabilities. ▪ Asset Manager v4 - A GIS based management system to manage drains, irrigation lines, turf areas, trees, and other infrastructure needs. Has queries capabilities, reports, work histories, and map printing.	Davey Resource Group Phone: 1-800-447-1667 http://www.davey.com/cgi-bin/displayContent.pl?type=section&id=387
Urban Forest Effect Model (UFORE) ▪ Calculates the structure, environmental effects and values of urban forests. ▪ Software is in the public domain and available at no cost to individuals and organizations. ▪ For an overview, see The Urban Forest Effects (UFORE) Model. The model currently operates in SAS®, but is being recoded to operate in a Windows platform on PCs. It focuses on samples of large areas of the urban forest and the non-managed forest as opposed to street or park trees. Its functions include analysis of land use impact on the forest, the impact of the forest on air quality by tree species, management impacts, and scenario analysis.	United States Department of Agriculture (USDA) Forest Service, Northeastern Research Station in Syracuse, NY. http://www.ufore.org/

APPENDIX 5.
SAMPLE RESOLUTION RECOMMENDING COMPREHENSIVE PLAN

A RESOLUTION OF THE City or County PLANNING COMMISSION RECOMMENDING THE COMMUNITY FORESTRY ELEMENT OF THE City or County COMPREHENSIVE PLAN FOR ADOPTION BY THE City or County COUNCIL

Whereas, the **City or County** Council adopted the **City or County** Comprehensive Plan on **Day/Month/Year**;

Whereas, the Comprehensive Plan includes all of the planning elements required by Chapter 29 of the South Carolina Local Government Comprehensive Planning Enabling Act of 1994;

Whereas, the **City or County** Planning Commission finds it necessary and appropriate to address community forestry in **City or County** because of the loss of trees due to increasing development as well as damage from storms;

Whereas, the **City or County** undertook an intensive public participation process including residents, civic groups, development groups, business leaders, environmental leaders, and elected officials;

Whereas, numerous public information meetings were conducted by the various **City or County** departments throughout **City or County**;

Whereas, the efforts of the stakeholders and the staff of **City or County** have resulted in an innovative and achievable Community Forestry Element to be adopted as part of the **City or County** Comprehensive Plan to guide future growth and activities;

Whereas, the **City or County** Council will consider the adoption of the Community Forest Element, to be included as part of the coordinated and comprehensive plan of the long-term goals, objectives, and priorities of **City or County**;

Whereas, the minimum public hearing requirements will be met and exceeded;

Whereas, in order for the Comprehensive Plan to remain responsive and relevant to changing conditions, it will be amended from time to time; and

Whereas, the Planning Commission finds that the **City or County** Community Forestry Element of the Comprehensive Plan and maps included therein are critical, necessary, and desirable to guide the development and redevelopment of its area of jurisdiction.

Now, therefore be it resolved by the **City or County** Planning Commission that, having met the requirements of Chapter 29 of the South Carolina Local Government Comprehensive Planning Enabling Act of 1994, the Community Forestry Element be hereby recommended to the **City or County** Council for adoption.

Be it further resolved that this Community Forestry Element of the **City or County** Comprehensive Plan shall be utilized by the **City or County** Council, the **City or County** Planning Commission and all **City or County** departments, agencies and officials as the official guide in making decisions concerning the growth and development of **City or County**

City or County PLANNING COMMISSION

BY: _____
Chairman

THIS _____ DAY OF _____, _____.

ATTEST _____

APPENDIX 6.
SUMMARIES AND NOTES OF COMMUNITY FOREST PLAN—
COMPONENTS FROM SELECTED SOUTH CAROLINA COMMUNITIES

Note: The information below is simply a compilation of notes from some of the plan reviews. It is not the actual plan and there is no rating as to quality. Although efforts were made to be as accurate as possible, jurisdictions may have adopted, amended, or repealed plans since this review.

AIKEN COUNTY

North Augusta
Comprehensive Plan Natural Resources Element - DRAFT
http://www.northaugusta.net/Dept_Serv/EconComDev/CompPlan/8%20-%20Natural%20Resources.pdf.
See Pages 8-9

BEAUFORT COUNTY

Bluffton Design Guide
http://czo.duncanplan.com/plans/hilton%2Dhead/

Similar to the policy component of their Comprehensive Plan, the Design Guide sets general policy applicable to development proposals in the town of Bluffton.

The Goal Of This Design Guide Is To Preserve The Island Character By Directing Development To:

- *Preserve significant existing site features, trees and vegetation.*
- *Treat the Landscape As A Major Element Of The Project.*
- *Provide Landscaping Of A Scope And Size That Is In Proportion To The Scale Of The Development.*
- *Design And Maintain Landscaping In Its Natural Shape And Size.*

Site Design

…a complete analysis of the site conditions. . . . will be the basis for determining how to design a project so that the result will compliment, not detract from, its surroundings

Existing Vegetation & Significant Trees

Two of the most important site features that need to be identified are existin vegetation and significant trees. These are extremely important elements to be addressed in the placement of structures and other site features. In some cases the location of a specimen tree will be the dominant determining factor in the site design as well as the architecture of the structures. Existing vegetation that can be preserved, especially in the buffers, adds significantly to the project's Island character as well as reducing the cost of new landscaping.

The Landscape

The landscape (the site's existing and new vegetation) plays an essential role in creating the Island character. Its design and maintenance must therefore by given prominent attention starting at the conceptual phase of a project. Great care should be taken to preserve a variety of existing natuive trees and shrubs. Landscaping (planting of new vegetation) is to be used to supplement this existing vegetation and provide for a harmoniuous setting for the site's structures, parking areas or other construction. The landscape will contain three basic elements: <trees, shrubs, groundcovers>

Trees

Tree removal and replacement requirements are established in Article IV of Chapter 6 of the Town's LMO. While these minimum requirements must be adhered to, there are additional aesthetic considerations that must also be implemented when a tree removal or landscape plan is submitted. These include:

- *Preserving smaller under-story trees;*
- *Requiring larger size replacement trees or additional trees depending on the size or number of existing trees or relationship to building mass and height;*
- *Selection of particular species of replacement trees within a required category for screening or visual effect.*

Top priority for the location of existing trees and new trees are street buffers, parking lots and between parking lots and the building. This is a major component of Island Character.

Town of Hilton Head Island Comprehensive Plan
http://czo.duncanplan.com/plans/hilton%2Dhead/

The Town of Hilton Head Island has worked to establish a strong sense of place and quality of life combining development, redevelopment and the protection of historic and natural resources. The natural resource vision, provided within the executive summary states:

> *To protect Hilton Head Island's diverse natural resources, the Town will continue to acquire property of high ecological value, promote innovative land and water management, support low impact economic development and provide for public use and enjoyment of open space.*

Included within this is the protection of existing vegetation. Within Section (B)(2) of the Land Use element, the Town of Hilton Head Island identifies the land use policy of "tree and native vegetation protection," stating that they will provide "protection for trees and native vegetation through LMO [Land Management Ordinance] amendments."

The established goals and objectives to meet this vision include a variety of measures from land acquisition to educational programs. Implementation strategies include such things as implementation of a wildlife protection plan and development of a continuing environmental education program.

Within the natural communities inventory and analysis section ((B)(5)) of the Natural Resource Element, both the location and unique conditions of Hilton Head's maritime forest are discussed. It includes a historical perspective, description of specific environmental conditions, and a listing of common species found within the environment. They also discuss "man-induced clearings" and the effects that it has had on the local environment.

City of Beaufort Comprehensive Plan

Within the Natural Resource Element, the City of Beaufort sets out the goal of "a natural landscape consistent with the quality of environment and culture in Beaufort." One policy of this goal includes minimizing negative effects of development on Beaufort's remaining forested areas. To accomplish this, they prescribe land use and development policies that encourage preservation, prohibit open air burning without a permit, and encourage the use of native vegetation in site development and landscaping. Other policies include the preservation of developable land in its natural state where appropriate and the protection of scenic areas and views.

Within their Land Use element, Beaufort identifies disadvantages and hindrances to future growth and development. One constraint listed in environmental sensitivity. Included in this is the consideration of urban development and its potential for detrimental effect on the environment if not properly managed. Policy 2(A) is to ensure that all future development is environmentally sensitive. The strategies related to

this include enforcing landscape guidelines, tree ordinances to protect natural features and restricting certain land uses in areas adjacent to sensitive environments.

CHARLESTON COUNTY

County of Charleston Comprehensive Plan

Within their intergovernmental coordination section, the plan identifies the need for coordination with the City of Charleston, the City of North Charleston, and the Town of Mt. Pleasant in development of a plan for an urban open space/greenway system.

Within their natural resource element, Charleston County identifies the requirement of vegetated buffers along shorelines to protect water quality. They also set out a goal to implement measures to preserve farm and forest land and open space, promote voluntary compliance by private non-industrial forest resource owners to S.C.'s Best Management Practices of Forestry, work to minimize conflicts with forestry land uses, and address forestry management issues.

Within their transportation element, the following objective is set: Respect the scenic beauty, community character, natural resources, and cultural heritage of Charleston County in the provision and use of any transportation system.

Mount Pleasant Comprehensive Plan

Within their natural and cultural resource inventory section, they discuss the conversion of natural habitats to allow man-made uses, including an analysis of land cover from 1990 to 1995. This includes forest cover broken down into deciduous, evergreen, mixed and palustrine forests, however, this does not include tree cover on developed land. Within developed land they identify the percentage of land with vegetative cover (21-50% for low density and <20% for high density).

Implementation strategies for protecting water quality include the requirement of minimum vegetated buffers between development and tidal and non-tidal wetlands and streams.

Another goal with the Natural and Cultural Resources section is to "promote public awareness of the value of protecting open lands within an urban setting for birds and other wildlife." One implementation strategy is to create diverse plantings of vegetation (rather than row or single-species plantings), preserve natural edges where possible, and amend buffer regulations to encourage a diversity of materials. Another goal is to "encourage new construction to occur in areas that are already degraded and no longer used as wildlife habitat, while requiring this redevelopment to come into compliance with current buffer and planting standards."

A goal within the Land Use section is "to project a positive, aesthetically pleasing community presence." Strategies to achieve this include continued landscape efforts along major streets and gateways to the community and the redesign of existing nonconforming parking lots to include planter islands and landscaped areas.

North Charleston

The Natural Resource element provides a section on natural vegetation which acknowledges the importance of trees within the urban environment and goes on to state that "the value of these resources is such that regulating and monitoring the care and cutting of trees is recommended as a means of protection and enhancement, together with street tree planting programs to soften and green the community, where needed." This is followed by the Natural Resource goal to "preserve and protect the city's canopy trees." Implementation strategies include through regulation and conservation efforts, including the preparation and adoption of a comprehensive tree ordinance and tree planting programs along major arteries.

DORCHESTER COUNTY

Summerville Tomorrow Comprehensive Plan

Summerville has a history of tree protection. Shortly after their incorporation in 1847, the town enacted a tree protection ordinance that prohibited the removal of pine trees of a certain size without a permit. This tradition continues today. Within their Comprehensive Plan, Summerville identifies the "abundance of trees" as one of the six traits or images of the community (as identified at public meetings). Three goals of their Natural Resource Element include:

- *Preserve and protect important trees in Summerville.*
- *Promote the retention of existing and native vegetation.*
- *Encourage the preservation or recognition of the remaining farm and forest areas in town.*

GREENVILLE COUNTY

Greenville County Comprehensive Plan

Under the goal of encouraging efficient and orderly growth, the comprehensive plan recommends "amend[ing] zoning and subdivision regulations to allow cluster development and protect important natural and cultural resources."

GREENWOOD COUNTY

Greenwood County Comprehensive Plan

Within the Natural Resource Element, an entire section is dedicated to the Urban forest. It defines the term of urban forestry and discusses ways in which urban forestry affects the area, both in general function and specific value to Greenwood County. Within this section, they cite a questionnaire of County residents what found 95.7% of those sampled felt that trees should be protected or replaced when development occurs. Objectives of this section include the following:

1. *Enact community-based local incentives for developments to protect or replant the urban forest.*
2. *Prepare an Urban Forest Tree Plan in conjunction with an urban tree inventory.*
3. *Evaluate the need for local government and utility companies to establish tree management programs through local funding sources.*
4. *Evaluate the need for a tree board or commission for support and guidance of local forestry programs.*
5. *Qualify the City of Greenwood for a Tree City USA Award.*
6. *Evaluate the Tree City USA Program for other Greenwood County communities.*
7. *Revise and improve land requirements for commercial and industrial development to increase the natural tree cover.*

HORRY COUNTY

Horry County Comprehensive Plan (Adopted 3/16/99)

Within the Comprehensive Plan, Horry County identifies "centers" where as much of the counties growth should be directed as possible. Recommended development standards for these areas include "landscaping standards, including maintenance of existing, mature trees on site and increased street tree planting." Also recommended is parking lots landscaped with trees and vegetative buffers. Implementation strategies include the establishment of a landscape and tree preservation ordinance, increasing vegetative buffers between dissimilar land uses, as well as other more general objectives which could potentially apply.

Within the Land Use Element:

7. ***Character Districts***
   Centers…

- *A common green space or park should be included to provide an outdoor "living room" and focal point for the community's civic activities.*
- *Landscaping standards, including maintenance of existing, mature trees on site and increased street tree plantings.*

Recommended uses and development standards for core areas within Township (and Villages) include…

- *Parking lots landscaped with trees and adequate vegetative buffers surrounding the lot.*

D. Implementation Strategies…

5. Establish Open Space Conservation Subdivision design in zoning ordinances…

- *Clustering reduces the loss of existing vegetation and reduces impervious surfaces resulting in decreased stormwater runoff and construction costs for detention and piping.*

8. Establish a landscape and tree preservation ordinance. *A tree ordinance would prohibit clear-cutting lots, require developers to preserve a minimum amount of trees when clearing land for development, and, if necessary, replant trees removed for economical development. A Performance Standards would specify a minimum resulting amount of vegetation and canopy. Developers would receive more credit fro saving existing native trees, especially hardwoods, than for replanting new trees. Leaving intact mature forested areas, saving specimen trees, and preserving hardwoods would earn the developer extra credit towards the minimum amount of trees required. There should be public workshops with the development community to discuss the effectiveness of alternative approaches. The ordinance would be prepared by the Planning Department and would require approval of the Planning Commission and County Council…*

10. Increase vegetated buffers and screening standards between dissimilar land uses in zoning ordinance*. Where possible plan land use transitions in a step-down fashion to avoid abutting incompatible uses. However, if it is necessary to allow adjacent land uses or intensities that are incompatible, landscape buffers and screening can provide relief. Buffers should be specified with performance standards that allow flexibility in the technique as long as the result is a continuous, opaque visual screen with adequate attenuation of noise and light. Buffering may take the form of physical barriers, such as berms, hedges, or other landscape cover; opaque walls or fences that are aesthetically designed and landscaped; or dense indigenous vegetation with trees and understory that is densely vegetated or enhanced with addition evergreen landscaping. This strategy would be implemented by the Horry County Planning Department, Planning Commission and County Council…*

11. Require and monitor Best Management Practices for forestry operation in Horry County. *These are practices that affect the management of forest resources in conjunction with soil and erosion controls and other practices that protect land and stream habitat and water quality. This strategy would be implemented by the Planning Deparment in consultation with County and State forestry officials.*

Within the Natural Resources Element (see Section III for more detail)

Natural Resources Vision

Promote the management of Horry County's natural environment in a manner that ensures balanced and sustainable growth and the preservation of environmental resources and open spaces for future generations.

Goal 1: Develop land management strategies that re-orient development patterns to complement the coastal plain landscape of Horry County.
Goal 2: Compile and maintain maps describing the natural resources of Horry County for use in suitability analysis to determine the intensity of future development.
Goal 3: Expand cooperative efforts with local governments and State agencies to establish conservation areas to protect the diversity of natural resources found in Horry County.
Goal 4: Support county-wide programs with public/private sponsorship to designate and preserve scenic vistas.

Goal 5: Ensure water quality is maintained in Horry county through the protection and conservation of the natural function of wetlands and water bodies.

E. Implementation Strategies

1. *Establish land management techniques that re-direct land use and development patterns away from urban sprawl patterns and promote the conservation of natural resources and sustainable development practices.*

- *Develop a county-wide mapped inventory of natural resources that identifies environmental constraints to future development. The inventory should identify natural features, environmentally sensitive areas, and other natural assets such as:*

  - *Stream corridors*
  - *Watersheds and wetlands*
  - *Viewsheds*
  - *Prime habitat*
  - *Wildlife corridors*
  - *Prime farmland*
  - *Open spaces*
  - *Carolina Bays….*

- *Establish an environmental review process to determine the effects of subdivisions and rezonings to ensure mitigation of development impacts on natural resources.*
- *Establish a scenic vista program that identifies scenic viewsheds throughout the county and promotes the co-management of these areas by local community and conservation groups.*
- *Require a landscaped or forested visual buffer strip between new arterial roads and residential areas.*
- *Coordinate efforts with local governments, land owners, and conservancy groups to establish an urban forest management plan that promotes the county's reforestation goals.*

2. *Coordinate with local governments, non-profit organizations, and State Department of Health and Environmental Control to establish conservation areas and promote public awareness and education of Horry county natural resources…*
3. *Establish incentive programs for landowners and developers to protect sensitive wildlife habitats and natural resources…*
4. *Establish protection standards for water bodies and promote habitat preservation…*
5. *Preserve air quality through the ongoing monitoring of air quality standards to identify areas that fall below State and Federal standards...*

North Myrtle Beach

The City of North Myrtle Beach sets the goal of improving the "visual image of the city," acknowledging that within this section that the loss of greenery and natural open space have been a negative contribution to the city's image. Objectives include improving their existing landscape ordinance (it has addressed the problem to some extent already) and research alternative methods to protect large trees and/or limit clear cutting of properties.

Myrtle Beach

A goal of the Comprehensive Plan includes the use of CITYgreen (and other programs) as an educational tool to increase awareness of environmental value and functions and publicize the results. Another goal is to "actively protect examples of all the native vegetative communities, including rare species, in the area." A sub goal under this objective is to complete an inventory of the area's vegetative communities. Another goal of the Plan is to manage development to respect vegetative communities. Included under this is a review of zoning and land development regulations, adoption of their "Community Tree Planting Plan" as part of the comprehensive plan, and conducting a study that extends the plan throughout the planning area.

Myrtle Beach has an extensive Community Tree Planting Plan. While the plan was adopted as a part of the Tree Protection Ordinance and recommended for adoption as part of the Comprehensive Plan, at this writing, it has not been adopted as part of the Comprehensive Plan.

In the Natural Resources element of the Comp Plan, page D.26 –

> Objective 9d: "Adopt the "Community Tree Planting Plan" as part of the comprehensive plan and implement its recommendations. City Council recently accepted the Community Tree Planting Plan. To give the plan and its recommendations for improving the urban forest within the city full effect, it needs to be included as a part of the comprehensive plan. Implementation: The Planning Commission recommends the plan to City Council for adoption and, with assistance from the Planning and Cultural and Leisure Services Departments, develops an implementation program for Council approval.
>
> Page D.26 - Objective 9e: Conduct a study that extends the "Community Tree Planting Plan" throughout the planning area. The Community Tree Planting Plan covers most of the city. The Air Base and unincorporated areas near the city were not studied in the plan. Those developing areas need to be assessed in order to enhance the urban forest where much growth is now occurring. Implementation: The Planning Commission, with assistance from the Planning and Cultural and Leisure Services Departments, conducts the plan and submits it to City Council for adoption.
>
> Objective 9e has been completed. The Community Tree Planting Plan was extended to include the former Air Force Base now referred to as South Park Village and areas west of Highway 17 Bypass to the Intracoastal Waterway that are in the unincorporated areas of the County.

See Myrtle Beach Comprehensive Plan, 2000
http://www.cityofmyrtlebeach.com/compplan/CompPlan2000.pdf
Pages C44-C54; D15-D31

See Myrtle Beach Comprehensive Plan, 2000 Addendum—Implementation and Timeframes
http://www.cityofmyrtlebeach.com/PDF%20Forms/AR02appndx.pdf

KERSHAW COUNTY

Camden Comprehensive Plan

Within the Natural Resource element, the Plan states:

> *One of the most important natural resources in any community is its trees… The value of this resource is such that regulating and monitoring the care and cutting of trees is recommended as a means of protection and enhancement.*

The subsequent goal (NG-1) is to "preserve and protect the city's trees" through regulation and conservation efforts, including the preparation and adoption of a comprehensive tree ordinance.

A goal of the Land Use element is to foster quality development, including tree protection requirements, specifically to ensure the survival and protection of mature trees on private property.

OCONEE COUNTY

City of Seneca Comprehensive Plan

Within the Comprehensive Plan, the City of Seneca states that "efforts [for the city] should include introduction of tees and improved greenspace along major thoroughfares…in order to enhance scenic views and provide natural breaks in the urban landscape."

PICKENS COUNTY

City of Easley

In discussing the Nature Resource issues, the City of Easley states:

> *The loss of mature trees, natural drainageways, alteration of existing topography and the loss of unique plant and animal life all have negative impacts on a community. The loss of mature trees and alteration of natural topography can lead to increased flooding, devaluation of neighboring properties and the loss of native plant and animal species.*

In response, they set the implementation strategy of amending their existing tree ordinance to strengthen preservation standards on tracts of land under development and to include a city-wide tree inventory.

SPARTANBURG COUNTY

Spartanburg County Comprehensive Plan

Approximately 53 percent of all land in Spartanburg County is forested (as of 1993). Despite urban development, this percentage increased from 1986 to 1993. Within the comprehensive plan, the multitudes of values of forested land are recognized. One of the goals is to establish policies that "preserve greenspace and perpetuate significant forest stands for future generations to enjoy," as well as using infrastructure and land use planning that minimizes the destruction of forest lands.

Spartanburg County breaks the County into planning areas. A goal within Planning Area One (north of Lake Bowden and Lake Blalock) is to conserve the rural and scenic character of area one, including the preservation and maintenance of tree lines and scenic vistas along SC-11.

SUMTER COUNTY

Sumter County Comprehensive Plan

Sumter County sets the following goal within their Natural Resource element:

> *During development plan review process, ensure adequate shade trees/large shrubs/pervious area to impervious area of large (greater than ½ acre) parking areas in order to decrease surface temperature and provide visually pleasing areas.*

In order to foster quality development (defined as having a positive impact on the City and/or County by way of design, amenities, siting and/or geographic positioning), the comprehensive plan calls for tree protection and land disturbance requirements, including the protection of mature trees and the problems associated with clear-cutting of property.

YORK COUNTY

York County Comprehensive Plan

Within the Comprehensive Plan York County states that they are currently working on a tree protection ordinance to work in cooperation with other regulatory methods aimed at preserving plant and wildlife habitats.

Rock Hill Comprehensive Plan (The General Plan 2000-2010)

Within the Land Use Element, Rock Hill sets the objective to provide sufficient tree or natural buffers between new subdivisions as a means of "guaranteeing less future cramping and lack of green space." More specifically, they set the recommendation of increasing the requirements for the replacement of trees and

other natural assets when developers elect to remove existing natural areas that could have been maintained. Another goal set by the plan is to achieve best environmental practices for air quality, with the recommendation to plant more trees to clean polluted air.

Within the Natural Resource element, heritage trees are identified as one of the important natural resources of the area. Within this section they set the general goal of tree protection.

Recommendations include the following:

1. *Use best management practices regarding tree removal.*
2. *Improve and adopt tree replacement standards.*
3. *Provide a tree replacement option to donate $$$ to tree bank.*
4. *Improve enforcement on tree protection/replacement/ maintenance.*