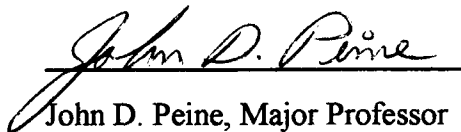
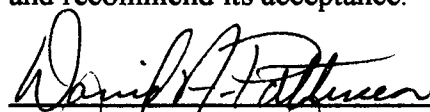


To the Graduate Council:

I am submitting herewith a thesis written by Valarie R. Evans entitled "Our Communities: Our Urban Forests." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Planning.


John D. Peine, Major Professor

We have read this thesis
and recommend its acceptance:




Accepted for the Council:


Associate Vice Chancellor
and Dean of the Graduate School

Our Communities:

Our Urban Forests

A Thesis

Presented for the

Master of Science in Planning

Degree

The University of Tennessee, Knoxville

Valarie Reese Evans

December 1997

DEDICATION

Thank you, Mom, for the inspiration that you have
given me throughout my life. You have been with me
through it all. Thank you for your strength, love and support.

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ABSTRACT

It is important that the benefits of urban trees and vegetation are recognized in order that their existence be maintained within towns and cities. Urban trees contribute a great deal to a community, including climate modification, air pollution control, noise pollution abatement, conservation of soils, while also providing an environment for wildlife habitats and biodiversity within the community.

The proof that trees and vegetation do, in fact substantially contribute to a healthy environment provides a resource for influencing local government leaders and citizens to recognize the value an urban forestry program has to a community.

Urban forests are places where the seeds of sustainable communities take root, where people become neighbors and where cities become more livable. They are crucial to the health of our cities and growing metropolitan areas.

-The Power of Parks, 1996

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CHAPTER ONE

BENEFITS OF AN URBAN FOREST

INTRODUCTION

“The forests and trees of our urban areas are essential elements of a community; essential to both the environment and the people who spend their lives in the community” (Moll, 1986). The planting of trees and vegetation within cities brings nature into the built environs and lessens the harsh conditions that are all too often associated with urban areas. This inclusion of nature into the built environment through the plantings of trees and vegetation is referred to as an “Urban Forest.” These areas have the ability to make our communities sustainable for both present and future generations. The incorporation of trees and vegetation into cities is a substantial initiative in the effort to create sustainable communities and ultimately, influence the global environment.

The benefits associated with an urban forest are an important contribution to the local community as well as the greater global community. Urban forests produce a myriad of benefits which, for the purposes of this discussion, have been organized into five categories. These categories include: Environmental benefits, Design benefits, Economic benefits, Social and Psychological benefits, and Quality of Life benefits. Quantifying the benefits associated with an urban forest has become invaluable to proponents of urban forestry programs. The proof that trees and vegetation do, in fact, substantially contribute to a healthy environment provides a resource for influencing local government leaders and citizens to recognize the value an urban forestry program

has to a community.

Definition

In *Urban Forestry: Planning and Managing Urban Greenspaces*, Miller describes the urban forest as “the sum of street trees, residential trees, park trees, and greenbelt vegetation. It includes trees on unused public and private land, trees in transportation and utility corridors and forests on watershed lands” (Miller, 1997). From a liberal perspective, urban forests include any species of trees and vegetation around a town or city environment (Lipkis, 1990). For the purposes of this discussion and research, the definition used by the National Urban Forestry Council will be utilized. Their method of defining an urban forest is as follows, individual trees and shrubs which collectively form “an interconnection of green spaces that contain a wide variety of plant material” (*Building Better Communities*, 1989). The important component of the NUFC definition is the “interconnection” of natural elements. Urban forests provide the most benefit to a community when interrelations exist between a diversity of natural settings and is attractive to a diversity of plant and animal life, thereby creating a varied ecological community.

Dimensions of the Urban Forest

In a presentation for the National Urban Forestry Conference in 1982, the magnitude of the urban forest within the United States was estimated by Clegg to be approximately 69 million acres. In this estimation, Clegg included street trees, cemetery trees and vegetation, as well as community trees found in parking lots, school grounds,

urban parks and greenspaces, and along freeways (Miller, 1997). While this estimation appears to be substantial, Kielbaso, Beauchamp, Larison and Randall conducted a survey in 1988 of municipal street tree programs and “ reported that there are at least 60 million city-owned trees in the United States, with an additional 60 million vacant spaces where trees can be planted” (Kielbaso et al, 1988). Opportunities for additional plantings of trees and vegetation within urbanized areas can be found in a variety of locations. These opportune locations are less obvious nearest the downtown centers and become more plentiful as one approaches the rural areas surrounding a community.

A concentric model can be applied to an urban forest to identify the concentration of vegetation within a city. Gary Moll, in his essay entitled, *In Search of an Ecological Urban Landscape*, discusses the rationale concerning this model in terms of circular zones. Moll asserts that, “geographically, urban forests exist in four zones,” which include: the urban zone, suburban zone, exurban zone and the rural zone. (Moll, 1989). (See Figure 1: Concentric Model of Land Use and the Urban Forest) These zones are based on land use patterns and ultimately, affect the inclusion of the natural environment into the contrived environs of a city.

The Urban Zone is the center of the city, an environment which is a relatively stressful and inconducive for trees and natural vegetation to thrive and reach full maturity. This is due, in part, to the intensity of the *unnatural* environment which exists in this zone. Moll describes the Urban Zone as the “inner reaches of the urban forest- trees grow in pots, in holes in the sidewalk, in vacant lots, and even on buildings. Almost every tree has to be ‘engineered’ into this zone” (Moll, 1989). In man’s race to progress, nature has been left out of the planning of most metropolitan areas and therefore soils and

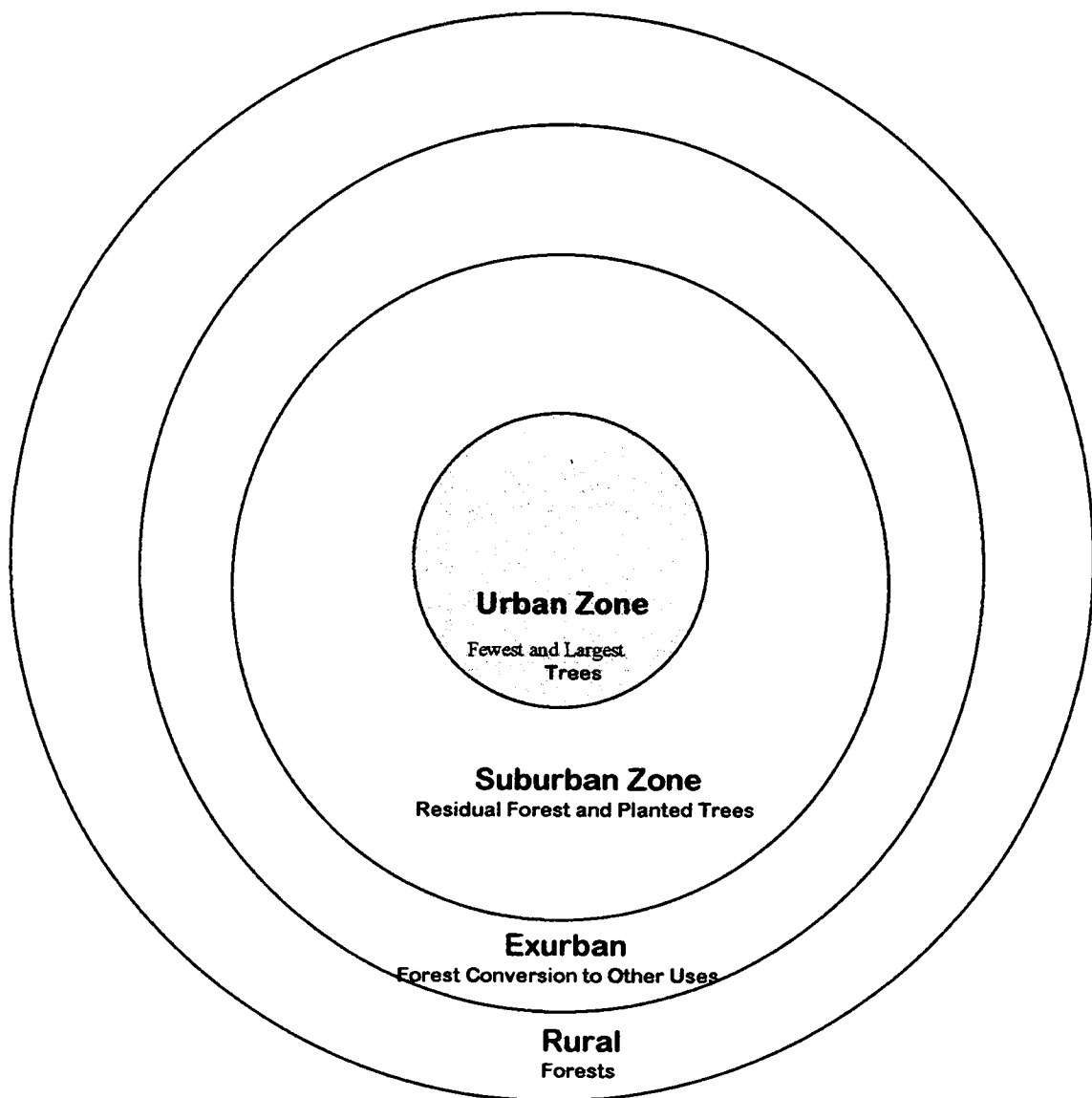


FIGURE 1: CONCENTRIC MODEL OF LAND USE AND THE URBAN FOREST

air qualities are not accommodating to the growth of natural processes and organisms.

Because cities implement above-ground restrictions in order to accommodate technology, the variety of tree species within the Urban Zone is limited. Trees which are planted in this zone are those species which “are more suited to small places and poorer growing conditions. Smaller trees lower maintenance costs, avoid many above-ground obstacles, are less demanding on the site and cost less to remove when they die” (Moll, 1989). Unfortunately, lack of variety of trees and plants limit the diversity of the ecological community within the Urban zone. It is not unusual that within most downtown areas within cities, the “city streets are lined with potted plants that have little effect on the ecology of the city” (Moll, 1989).

The next zone in this model is the Suburban Zone, which is primarily comprised of low-density housing and suburban shopping centers. Within this zone, remnants of the urban forest can be found mainly on public lands, such as schools and parks, vacant lots, areas surrounding public buildings as well as along transportation corridors.

The urban forest becomes less “urban” as the Exurban Zone is encountered. Here, trees and vegetation are abundant. “Residual agricultural and forest lands” are the majority of land uses in this zone. As urban growth extends outward from the suburbs, this land will shift to suburban land uses. As the human environment becomes less dense, the natural environment becomes more intense. The Exurban Zone provides a somewhat more accommodating environment in which the urban forest can mature and replenish itself.

The outermost zone is the Rural Zone. In this zone, most of the land is either heavily wooded or in or crop lands and relatively little residential land appears (Miller,

1997). The woodlands in the Rural Zone contain the “varied plants and associated wildlife, much richer than that in the Urban Zone, where more specialized, less dense tree planting occurs” (Clouston, 1981).

As the city expands outward, the concentric zones enclose upon the adjacent zones and each zone becomes larger, until the Rural Zone has been ultimately enveloped by the Exurban Zone. Essentially, the urban forest is “in a near-constant state of adjustment to the use of the land on and in which it grows” (Grey, 1986). To expand the rationale behind the concentric model of the urban forest, eventually the Urban and Suburban Zones will totally encompass the remaining Exurban and Rural Zones. Following this course of action, the urban forest will slowly diminish and the ecological communities and processes will decrease.

In an attempt to build sustainable communities and contribute to the growth of the natural environment within cities, the influential factors which determine the structure of urban forests are significant. Rowntree suggests in *Urban Ecology*, that three factors which determine the composition of the urban forest are urban morphology, natural factors and management (Rowntree, 1984). “Urban morphology provides the space for vegetation and is determined by how we build our communities. Natural factors control what will grow there and include factors such as climate, soils, and topography. Management is what species and ecosystems humans elect to include and manage for in the urban landscape” (Miller, 1997). These elements of influence over the urban forest are best illustrated in the context of the concentric model. Within the Urban Zone there is very little space in which trees and vegetation can thrive, and in what space is available, the quality of the soil is usually relatively poor. Due to the compaction of soil

and lack of oxygen available to the roots of a tree, life processes are difficult for growth and maturation. Management of tree and vegetation within the Urban zone is usually selective and limited to particular species. When a variety of vegetation is not included, the ecological community is less diverse and somewhat non-existent. As the Suburban zone is encountered, the environment is more conducive to the growth of the urban forest in that spaces for growth are more plentiful and soils provide nutrients that are eliminated during the development process within intensely developed urban areas. The environment in which urban trees and plants grow becomes less problematic in the outer rings of the concentric model.

History of the Urban Forest

As early as Babylonian times (600 b. c.), trees have been recorded as being a significant element within the community. Babylonians used trees and vegetation in their private gardens to invite life into an otherwise arid region. Their gardens were irrigated on a continuous basis as were Egyptian plants and trees. Egyptians were known to import trees and plants from as far as 1500 miles away in order to grace their overpowering structures and moderate the dry and blistering climate. Trees in the Egyptian landscape were symbolic of the peaceful strength of the ruling pharaohs and were also valued for their shade.

Later in the 16th and 17th centuries, trees began to appear in the medieval cities. Trees took on an ornamental character and were enjoyed for their beauty and could be found in private gardens such as the Tuilleries Gardens in Paris and also at the gardens at Versailles. The concept of the private garden expanded into the urban landscape during

this time and influenced later conceptions of landscape design.

During the 18th century, the Chinese incorporated the use of water and natural elements into their public parks for the peaceful contemplation of their visitors. Gaining strength and philosophical insight from their gardens, the Chinese influenced the English concept of design of integrating the natural landscape into the built environs. Designers during this period such as William Kent, Capability Brown, and Repton emphasized natural beauty, and, in so doing, departed from formal garden traditions (Clouston, 1981). Their designs were the inspiration behind the open spaces within the city center and tree-lined avenues that became popular within American cities.

For the first time in the mid 19th century, trees were used in urban America for the environmental health of the community as well as for their aesthetic value. In 1844, trees were defined as “improvers of city air” and their planting was encouraged in built areas. The visual amenities that they provided to the city were also appreciated as well as their benefit to builders and taxpayers for enhancing property values (Clouston, 1981). During this time, Frederick L. Olmstead influenced the new concepts of landscaped urban spaces and was the innovator of new landscape design principles. One of his most memorable contributions is Central Park in New York. “Greensward” was the original title for Olmstead and Vaux’s park design. They wanted to imply a green district within the middle of the city. Another early example of Olmstead’s ideas of bringing nature into the city is Prospect Park in Brooklyn. Urban parks and forests began to gain recognition during the Chicago World’s Fair of 1893 and the City Beautiful Movement was launched.

Industrialization of cities began to occur after “mid 20th century and the stress of cities became more apparent. There were concerted efforts to reintroduce trees and open

spaces to downtown areas” during this time. (H. Smith, 1971). Designs for garden cities began to appear and emphasis was given to the idea that nature impacted the health of urban residents. A collective landscape began to emerge, natural elements which were integrated into every facet of community life- the workplace and the home. Not only were trees and vegetation used in private yards and gardens, they had become part of the municipal responsibility.

In recent times, Olmstead’s principles and ideas have been revisited and a greater sense of their value has been recognized. “Concern for morality and health has given way to concern for nature itself as an all-embracing context for human life, susceptible to unthinking exploitation. And research has indicated the benefits to a surpassingly tangible kind, which can be shown to for a long way towards improving living conditions in our towns” (Clouston, 1981).

ENVIRONMENTAL BENEFITS

Urban forests have a significant impact on the environmental health of urbanized areas. Their ability to improve the environs include climate modification, better air quality, noise abatement, improved soil quality and conservation, wildlife habitats, and biodiversity. The more closely a city simulates the natural environment, the healthier the city will become.

Climate Modification

Densely developed urban areas are often referred to a “heat islands,” due to the desert-like conditions that exist in these areas. The main characteristic of an urban heat island is the higher temperatures which permeate the area, as compared with the surrounding landscapes. Figure 2, Sketch of an Urban Heat Island Profile, reflects changes in temperatures as they correlate the density of development and the density of trees cover (Miller, 1997). (See Figure 2: Urban Heat Island Profile) Temperatures within the central areas of the city tend to be 3° to 8° C higher (McPherson, 1994). The increase of temperatures is due to the solar radiation which is “absorbed by city surfaces- asphalt, concrete, steel, glass, and tar roofs and others.” There is usually a considerable difference in temperatures between these city surfaces and the surrounding air. “Heat is then either convectively transferred to the air, causing an increase in surrounding air temperatures or is conducted to subsurface materials” (Grey and Deneke, 1986). In the surrounding landscape, trees and vegetation absorb the solar radiation therefore temperatures are cooler outside of the central city areas.

Along with the ability of urban forests to improve urban meso-climates through intercepting solar radiation, trees and vegetation are also effective in altering the climate through the evapotranspiration process. Essentially, trees act as “air conditioners” to the urban environment. In the process of evapotranspiration, trees secrete moisture which evaporates into the air. Thus, cooling the micro-climate, or the area surrounding the tree. “A single isolated tree may transpire approximately 88 gallons of water per day. This has been compared to five average room air conditioners, each with a capacity

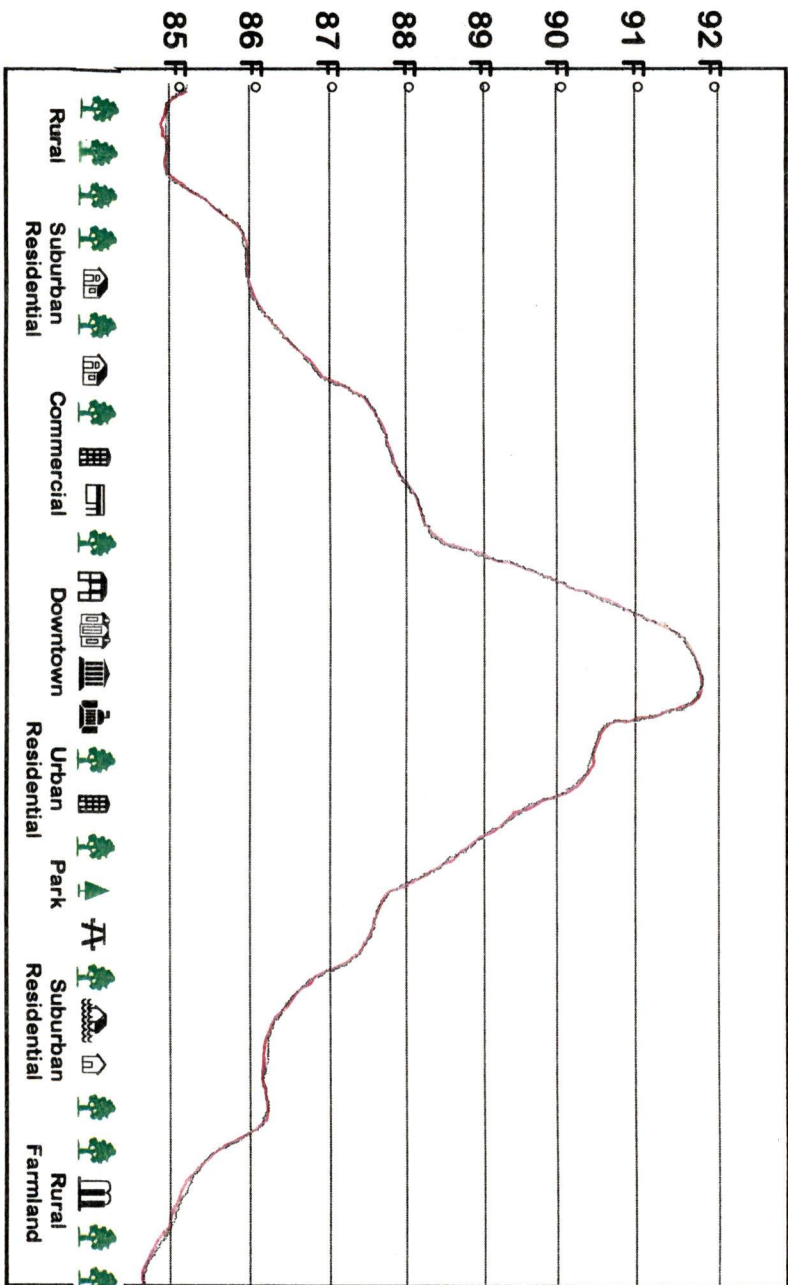


FIGURE 2: URBAN HEAT ISLAND PROFILE

of 2500 kcal/hr, running 20 hours a day" (Federer, 1976). The circulation patterns within a city environment diffuse the tree's cool micro-climate into the larger urban area to lower overall urban heat island temperatures. "Urban tree plantings offer viable alternatives to the city dweller and user in providing respite from harsh micro-climates" (H. Smith, 1971).

Trees and vegetation not only cool urban heat islands through the interception of solar radiation and evapotranspiration, they also reduce temperatures through direct shading of buildings and reduction of wind speed. Parker (1983) suggests the concept of "precision landscaping" in the amelioration of climates in urban areas. The basis for this idea, is that trees and vegetation moderate building temperatures in three ways: "(1) blocking solar radiation from buildings and the adjacent ground, and the foundation; (2) creating cool microclimates near the building by evapotranspiration; and (3) either channelling or blocking air flows through and around the building" (Grey and Deneke, 1986). Precision landscaping efforts cools and canopies the building exterior which lessens energy consumption in order to cool the building which, in turn, minimizes the waste heat of energy and ultimately affects temperatures. "Parker's studies show that west wall temperatures can be reduced by 28° F on very hot, humid afternoons in south Florida by large-canopied trees on the west and hedges adjacent walls" (Grey and Deneke, 1986). Parker indicates that trees and vegetation also have the ability to channel or block air flows through and around buildings which reduces the need for energy consumption and produces savings in energy costs. Trees essentially form an "insulation zone" around a building which offers cooling in the warmer months and in the winter

months prevents the escape of heat from the building.

Air Pollution Control

Urban forests also have the ability to mitigate air pollution within cities, thereby enhancing the quality of air for urban residents and wildlife. Trees can have a significant impact in the reduction of the largest pollutant within urban areas, carbon dioxide. They absorb carbon dioxide from the atmosphere in the process of photosynthesis, the process by which carbon dioxide is transformed into oxygen.

In addition to the reduction of carbon dioxide in the atmosphere, a tree's foliage filters other harmful contaminants from the air. "Chemicals such as nitrogen oxides, airborne ammonia, and some sulphur dioxide and ozone can be removed by foliar uptake" (Rodbell, 1991).

These pollutants, 60 percent to 70 percent of which is credited to automobile exhaust, make up the smog that surrounds many urban centers. Trees help reduce the formation of smog by lowering temperatures. "Since high temperatures contribute to the formation of smog, lowering temperatures by planting trees helps lower smog levels" (Rodbell, 1991).

Urban forests can have significant impacts on the reduction of gaseous air pollutants through the absorption process. Stevenson (1970) conducted a study of the effects of forested areas on ozone pollution. The results showed that if an "air mass containing 150 ppm of ozone were to stand over a forest for eight hours, the vegetation would absorb approximately 80 percent of it. Taller trees removed more ozone than shorter trees" (Grey and Deneke, 1986).

Gaseous air pollutants can be significantly reduced by urban forests, as can

particulate air pollutants be removed from the environment. Particulates such as dust, sand, pollen and smoke are trapped by leaves, branches and stems of trees and vegetation. These particulates cling to vegetation and later are washed away during rainfall.

Noise Pollution Abatement

Noise is often thought of as “invisible pollution.” It is excessive or unwanted sound within the environment. Donald Davis, a U. S. Forestry Service Air Pollution Specialist asserts that “noise pollution, one of our more subtle type of pollution, can be greatly ameliorated by trees” (Davis, 1971). In a co-operative study conducted by the University of Nebraska and the Rocky Mountain Forest and Range Experiment Station entitled, “Trees and Shrubs for Noise Abatement,” evidence was found that “properly designed plantings of trees and shrubs significantly reduced noises” which were often present within an urban environment such as sounds from cars, trucks and buses (Cook and Van Haverbeke, 1971). The study measured these sounds at various distances behind belts of trees and shrubs and the same noise in the absence of the vegetation belts. Their research concluded that the ability for trees to attenuate noise was directly related to the placement, density and height of the vegetation. In ideal conditions, they reported that “apparent loudness may be reduced by 50 percent or more” (Cook and Van Haverbeke, 1971).

Another study by Weiner and Keast (1959) documented that “sound propagation patterns over woodland areas differ from those over open level terrain” (Grey and Deneke, 1986). Other studies show that “leaves, twigs, and branches of trees absorb and mask sounds, particularly high frequency sounds, that are the most bothersome to humans

(Rodbell, 1991). While trees are significant in the attenuation of urban noises, they make their own sounds. The rustling of their leaves, the whisper of the wind as it passes through their branches. These are sounds which are pleasant to the human ear and “make us less aware of the more offensive noises” that are often encountered in urban areas.

Soil Quality and Conservation

Vegetation in urban areas aids in soil conservation and contributes to the nutritive quality of soils. Quality of soils are increased when nutrients from fallen tree leaves decompose and replace organic matter back into the existing soil. These soils are conserved and less erosion occurs when there is an abundance of plant life because roots hold soil in place, this allows less soil to escape with water runoff. Also, more moisture is absorbed by soil as well. “Without trees, cities would need to increase sewage and storm water drainage channels and waste-treatment capacities to handle increased water runoff” (*Benefits of Urban Trees*, 1990)

Wildlife Habitats

A variety of wildlife exists in urban areas where there are a diversity of urban trees and vegetation. Urban forests are vital to a number of animal species for their existence within built environs; they provide a natural habitat for a vast diversity of wildlife within urbanized settings. Wildlife adds “color, movement, and sound to the landscape, and thus can contribute much to the human habitability of cities” (Grey and Deneke, 1986).

The idea of the city as a habitat for people as well species from the plant and animal kingdoms leads to the concept of ecosystem. Cities themselves are ecosystems, comprised of a variety of plant and animal life, maintaining critical natural processes that are essential to each species' survival.

The presence of many wildlife species within urban areas "depends upon immigration from rural environments. Where strips of natural vegetation, including trees, shrubs, and grass, extend into the city from the rural edge," wildlife appears to follow and are numerous within urban areas. "This suggests the use of vegetation corridors, more or less continuous bands of mixed plants and trees, connecting urban areas with the surrounding countryside. "Urban wildlife is a product of the total environment and illustrates that no aspect of the urban forest can be considered out of context with others." (Grey and Deneke, 1986).

Biodiversity

Clyde Hunt defines "biodiversity" in the article, "Tough Trees for America's City Forests," as "the variety of species in the ecosystem and as the genetic variability within each species" (Hunt, 1989). Urban ecosystems offer a diversity of organisms and systems, which co-exist together in the urban landscape. It important to incorporate a wide variety of vegetation within the urban forest in order to attract a diversity of natural plant and animal habitats. "Trees and associated plants create local ecosystems that provide habitat and food for birds and animals. They offer suitable mini-climates for other plants that would otherwise be absent from urban areas. Biodiversity is an important part of urban forestry" (*Benefits of Urban Trees*, 1990).

“A variety of vegetation and wildlife in an urbanized environment “makes social as well as biological sense since the requirements of an infinitely diverse urban society implies choice” says Hough, landscape architect and author of *Cities and Natural Process* (Hough, 1995). Hough concludes his discussion on biodiversity in urbanized environments by suggesting the reliance that each natural process and organism has on one another. A biodiverse environment is a stable environment, supporting a number of organisms. The interrelationships between human and non-human life is essential to a biodiverse environment. Biodiversity “implies that the greater the reliance on a single source of energy, the more vulnerable will the urban community potentially become in times of need (Hough, 1995).

Barry Commoner once stated that “everything is connected to everything” in his book entitled, *The Closing Circle*. The individual aspects of the urban forest cannot be discussed without consideration of the influence of supporting elements. The inclusion of urban forests into towns and metropolitan areas is essential to the concept of sustainable communities. Biodiversity in the environment presupposes that man and the built environs must co-exist with nature to ensure sustainable communities.

ECONOMIC BENEFITS

The economic benefits from urban forests are often indirect in the sense that most urban forests are not planted and managed for their monetary value. However, there are tangible benefits that the community shares in having an urban forest. Such benefits

include energy conservation, urban hydrological benefits, local economic development, and increased property values.

Energy Conservation

Trees and other types of urban vegetation have the capacity to conserve energy through the shading effects that their canopies provide. "Large numbers of trees and expansive green spaces can reduce local air temperatures by one to five degrees, and the advection of this cool air can lower the demand for air conditioning" (McPherson, 1994)

Meir (1991) conducted a study which analyzed the correlation between reduction of temperatures within an urban area and the presence of urban vegetation. He reported that "vegetation consistently lowered wall surface temperatures by about 17 degrees Celsius and reduced air conditioning costs by 25 percent to 80 percent (Meir, 1991).

Many urban utilities are beginning to realize the potential savings that trees and urban vegetation can produce. A study conducted by the Arizona Corporation Commission (1990), reported that trees reduced the demand for electricity within areas of their community where trees offered direct shade to buildings. Trees that are planted with energy conservation in mind, can provide energy savings that, on a community level, are quite substantial. The urban forest contributes to national energy savings as well as community energy savings. Akbari (1988) suggests that "U. S. cities could reduce energy use for heating and cooling by 30 billion kilowatt- hours and reduce carbon dioxide emissions by as much as 9 million tons per year" (McPherson, 1994). With estimates of carbon dioxide emissions related to heating and cooling efforts close to 1.3 billion tons per year, it is important that the urban forest is recognized for their

contribution to the environmental health of community as well as their capacity to conserve energy.

Urban Hydrology

In an urbanized environment, the natural elements of the earth are replaced by concrete and pavement. Precipitation that would otherwise be absorbed into the soil as nourishment for natural vegetation is frequently diverted as runoff that is collected in storm drainage systems. In *Cities and Natural Process*, Hough suggests that the “amount of water run-off is directly related to the percentage of impervious surfaces” (Hough, 1995). In a completely forested area, water run-off is slowed or non-existent due to the natural process of absorption. Whereas, in an urbanized environment, run-off is increased and there is a greater propensity for erosion and flash flooding. Hough illustrates that these tendencies are “caused by large areas of impervious paving and the concentration of water flows to specific points” (Hough, 1995).

It is further documented that trees and vegetation are beneficial in the hydrological process of a city where there is “30 percent tree cover and has a leaf and branch area that adds up to four times as much intercepting surface as provided by the city’s buildings and concrete” (Rodbell, 1991). Urban areas which have an abundance of trees and vegetation have considerable reductions in the devastation and costs to the city that often accompanies flooding. Urban forests, in effect have the ability to reduce the “damage to life and property, and less(en) pollution flushed into rivers, lakes and estuaries” (Rodbell, 1991).

Local Economic Development

A healthy urban forest is said to be the sign of a healthy community. "The scope and condition of a community's trees and, collectively, its urban forest, is usually among the first impressions a community projects to its visitors. Studies have shown that trees enhance community economic stability by attracting businesses and tourists. People linger and shop longer along tree-lined streets. Apartments and offices in wooded areas rent more quickly, have higher occupancy rates and tenants stay longer. A community's urban forest is an extension of its pride and community spirit" (*Benefits of Urban Trees*, 1990). Urban trees and vegetation impact the livability index of a city which is used by many businesses to decide where to locate. This can have a direct impact on a community in terms of additional jobs.

Susan Brown, Director of the Department of Development Services for the City of Knoxville, Tennessee, discussed the impact that trees have on a community. She stated that "trees add to the livability of a community. People want to work in the same environments which surround their homes and pervade their leisure activities. Trees and parks contribute to the overall quality of life within a community, and that means business" (Brown, 1997).

Real Estate Values

To suggest the obvious, people are more likely to appreciate property that is inclusive of natural vegetation as opposed to property that is barren. Lots with trees have been shown to sell faster and are more expensive than those lots without trees. "The United States Forest Service estimates that market values for homes are pushed upward

by the presence of trees, at rates ranging from seven to 20 percent” (Ebenreck, 1989).

“The amount of taxes contributed to community coffers throughout the United States due to the value added by privately owned trees on residential property is conservatively estimated at over \$1.5 billion per year” (*Tree City U.S. A. Bulletin*). Given the choice, people are more inclined to live, work and play in setting where trees and vegetation have been included in the landscape.

An initiative in Chattanooga, Tennessee entitled, Futurescapes, sought to get public perceptions on landscapes within the community. Citizens were asked to rate what they thought were “ideal” and “unattractive” scenes within the Chattanooga community. As could be expected, scenes which had an abundance of natural plant and animal life were identified as being more pleasing than those scenes devoid of any natural vegetation. People in a community do not want to separate themselves from the natural environment. Urban forests provide the means of incorporating the natural environment into the built environment (Johnson, 1996).

More and more attention is being provided for the economic benefits that trees within a community can offer. “These values make a strong statement on behalf of planting more trees and taking care” of the existing ones. To provide a better perspective on the annual costs and benefits of trees within city environs, Dr. E. Gregory McPherson constructed a computer model to assess a tree planting program in Tucson Arizona, known as “Trees for Tucson.” This project was an effort to plant 500,000 new trees within the community. Dr. McPherson’s computer model assessed the cost of planting, the annual cost of water per tree, as well as the costs for maintenance for these trees. In his analysis, he listed “energy savings, dust control and storm runoff management” as

benefits. The computer model for the “Trees for Tucson” program showed the cost of the program exceeded benefits only during the first five years. However, overall the “projected total benefits exceeded costs by \$236.5 million over a 40 year period” (*Tree City U. S. A. Bulletin*, #4).

DESIGN BENEFITS

Aesthetic Qualities

“Of all the elements in our landscape, surely the tree has the greatest capacity to bring the presence of nature into the built environment. Even a single mature tree can soften the uncompromising angular shapes of modern buildings, or disguise the all too familiar, unhappy juxtaposition of vernacular and contemporary architecture” (Clouston, 1981). Urban forests have the ability to improve the appearance of urban landscapes, which increases the desirability of the urban centers as a place to live work and visit (*Better Community Catalog*, 1989). Trees are often used to “create such recognizable imagery, to embellish architecture, and to enrich the urban environment. Trees give a scale to architecture through their size and familiarity. They provide shade, enclosure of spaces, screening, framing, and other important assets. As a result, they are vital tools in responding to difficult contemporary design challenges” (Anlian, 1989). Essentially, they create comfortable landscapes for human beings (Miller, 1995)

Urban forests also can direct movement within urban areas. For example, a tree-lined boulevard clearly delineates the course that the road will take even when the pavement is out of view. “In visual terms, they can be used to frame views, softening the

hard outlines of buildings and roads, and adding interest to the townscape” (Clouston, 1981). Urban forests are important to enhance the aesthetics within urban areas; they enrich the urban townscape and can be considered to be the most influential element in terms of visual qualities within cities.

SOCIAL AND PSYCHOLOGICAL BENEFITS

“Urban residents desire urban trees, parks, and forests for a variety of reasons. We are a species that evolved from the natural world and find it difficult to live without some contact with nature. As we become more urban in our ways of living, the desire for contact with nature will increase rather than decrease. This desire will manifest itself in an increased demand for urban tree and forest amenities as we seek to enhance the quality of life in our cities” (Miller, 1997).

Quality of Life

The quality of the environment in which people live, work and recreate characterizes the concept of quality of life. Urban forests provide a myriad of benefits which contribute to the quality of life of urban residents. Each beneficial element of the urban forests contributes to the quality of life within a community. As beneficial components of the community, urban forests are “essential to both the environment and the people who spend their lives in the community” (Moll, 1986). Benefits of the urban forest which contribute to an enhanced quality of life include: better air quality, increased visual quality, noise reduction, recreation opportunities, wildlife habitats, pollution control, water and energy conservation, and social and psychological well-being. Each benefit discussed contributes to the quality of life in one aspect or another. It is difficult

to separate the urban forest and its contributions from the effects that these contributions have in the context of quality of life.

Sense of Place

The concept of a sense of place can be illustrated as the unique characteristics that a physical place embodies. Each person has a sense of place concerning where they live or maybe a special place once visited. It may be the large allees of oaks which promenade Main Street in one's hometown or it could be a cluster of fir trees that cover the slopes of a nearby ridge. Whatever the element, or wherever the place, people have recollections about a memorable aspect of a place. This is what is referred to as a sense of place.

The natural elements within communities are often what people identify with most when recalling a sense of place. "Trees are one of the important elements that tie a neighborhood together and form a sense of unity and character" (Kielbaso, 1989). Urban forests have the ability to create "recognizable imageries" within a community (Anlian, 1989). Trees are often used to separate a sense of place within a community through plantings of distinctively different trees and vegetation. The change in scenery and vegetation is the indication that one is entering another neighborhood or district within the community. The urban forest creates this sense of community, and provides people with vivid and memorable pictures of places once visited.

Stress Reduction

Andy and Katie Lipkis observed in *The Simple Act of Planting a Tree* (1990),

that trees have the capacity to evoke a sense of peace, beauty, safety, joy, simplicity, caring and satisfaction.” Urban forests have the powerful ability to produce calming effects on people. Studies have shown evidence that trees have soothing effects on the human mind and spirit. Hartig, Mang and Evans conducted a study in 1987 which tested the “theory of restorative environments.” Their subjects “sought to relieve stress by walking for 40 minutes in a natural area with trees, walking for 40 minutes in an urban setting, listening to music, or reading to relax. Participants who had walked in the natural area reported more positively toned feelings than those subjects who had engaged in either of the other activities” (Miller, 1997). Another study conducted by Schroeder (1986) revealed that after visitors left the Morton Arboretum outside of Chicago they recollected feelings of tranquillity and calmness. Of the studies that have been conducted concerning the serene effects that nature has on people and despite the many differences in contexts, “results showed remarkable similarities in the capacity of a nature experience to have a healing effect” (Kaplan, 1995).

Thoreau as early as the mid 1800’s recognized the special role that nature has on a person’s well-being. Olmstead also understood the necessity for people to be able to access the natural environment to alleviate the stress of urban life. His ideas manifested themselves in his park designs (Kaplan, 1995). An urban forest has the ability to offer an escape from the harsh realities of urban life. They offer a tranquil alternative to an otherwise unforgiving environment.

Health Benefits

The study which is most evident of the effects of nature on physical health was

conducted by Ulrich (1984). His research involved a group of hospital patients recovering from surgery. Half of the patient's windows overlooked a grouping of trees in an outside courtyard, the other patient's windows faced a brick wall. Ulrich reported that "individuals with tree views had significantly shorter postoperative stays, had far fewer negative evaluation comments in nurses notes, and tended to have lower scores for minor post surgical complications such as persistent headache or nausea" than patients with the wall view" (Ulrich, 1984).

The beneficial effects of nature on a person's physical and mental health has been proven in numerous studies (Ulrich 1984; Verderber 1986; Moore 1981; West 1986; Kaplan 1985). Of these studies, regardless of the age of the subjects or the context of the study, all report significant results in the ability of nature to heal the human mind and body (Kaplan, 1995). Urban forests serve as "healers" within an urban environment, extending their healing touch to any onlooker or observer who encounters its presence.

Recreation

Urban forests provide many urban residents with most of their forest-related recreation opportunities (Dwyer, 1982). They offer opportunities for a variety of activities including walking, jogging, bicycling and other recreational activities. Urban parks and forests allow people the freedom enjoy passive relaxation or embark on an intense physical fitness journey. Whatever the purpose of the visitor, urban parks can provide the opportunity.

Because the cost associated with travel is increasing, the urban forest within the community is becoming more convenient, as opposed to parks and recreational

opportunities that are further away. More than ever, urban forests and parks are becoming widely appreciated by local residents and visitors. It is no longer necessary to travel to distant locations when there are natural amenities within the urban areas of the city.

DISCUSSION AND CONCLUSION

It is important that the benefits of urban trees and vegetation are recognized in order that their existence be maintained within towns and cities. Urban forests are quite versatile, impacting atmospheric carbon levels, urban temperatures, air quality, stormwater control, wildlife habitat, community noise levels, and human health (Rodbell, 1991). Urban trees and plants contribute such a great deal to a community, that their presence should receive as much attention as roads, sewer and water lines, and utilities. They are a component of the infrastructure of the city and therefore are an integral part of the city planning process (Winterfield, 1992).

Planners today, more than ever before, must concern themselves with environmental, economical, as well as social commodities available as viable tools to be utilized in the community development process. Urban forests are relevant to all dimensions of community life. As planners, there is a challenge "to merge the designed, man-made environment and the managed, natural environment so that neither is destroyed in the process" (Moll, 1986). Urban forests provide this opportunity to enhance communities while fostering sustainable communities.

There are an abundance of urban forest opportunities available to planners for

contributing to a community's sustainability. These opportunities exist on both public and private lands. It is up to the city planner, in a co-operative effort with city foresters and arboriculturists and city engineers to take advantage of spaces within urban areas that are receptive to trees and utilize these spaces to expand the urban forest within the community.

Cities are growing at a rapid pace, and the urban forest must be expanded in order that their benefits may have a recognizable impact on the environment. "The urban forest should cover approximately two thirds of a city's total land area. Unfortunately, the average city today has a tree canopy over about one third of its area" (Moll, 1989). Spaces and opportunities for trees and plants within urban environments exist. It is the job of the planner to find these opportunities to incorporate nature into the urban environment and plan for their inclusion.

CHAPTER TWO

THE URBAN FOREST WITHIN THE COMMUNITY

INTRODUCTION

Parts of the urban forest within a community can be found essentially anywhere; along streets, in parks, around public buildings and on all kinds of other public and private property and within any land use zone (Grey and Deneke, 1986). Trees and natural vegetation are integral components of the urban and natural environs within communities.

Grey and Deneke suggest looking at the urban forest in terms of public and private ownership as a sensible method for conducting a distributional analysis. They estimate that 30 percent of trees and vegetation in urban areas are publicly owned, while the remainder are in private ownership (Grey and Deneke, 1986). For the purposes of this discussion, the urban forest is divided into two categories, that which exists on public land and that existing on private land. The parameters of urban forests on public lands include: trees and vegetation along streets, transportation and utility corridors, within riparian areas, in parks and along grounds adjacent to public buildings. The majority of urban forest vegetation exists within privately held lands which include residential property, commercial areas, parking lots, vacant lands, and industrial districts. Cumulatively, trees and vegetation found within both public and private holdings form the urban forest.

PUBLIC LANDS

Street Trees

In *Urban Forestry: Planning and Managing Urban Greenspaces*, Miller defines street trees as “ the publicly owned tree growing in the public right of way, usually between the sidewalk and the curb” (Miller, 1997). Trees and vegetation along street right-of-ways constitute a substantial part of public urban forest lands (Miller, 1997). Street trees are the most recognized part of an urban forest, probably, because they are the most visible within the community. Street trees, along with other plants and vegetation contribute to a community’s sense of place.

The conception that trees significantly effect a sense of place can be understood if one has ever traveled down the oak-lined streets of Savannah, Georgia or along the streets of Minneapolis where grand elms grace the townscape. It is difficult to recall images of such places without envisioning the great trees and natural plant life that encompasses them. How remarkable it would be if every American city could evoke such memorable responses with their city street trees.

Transportation and Utility Corridors

Public highways and railroads appear ubiquitously amidst urban landscapes. Lands adjoining these corridors make up a significant part of the urban forest. Trees and plants can be found along any highway or railway route. A relatively new initiative within the southeast has been the planting of wildflowers along the nation’s highways. These scenic pleasures also are a part of the urban forest.

Trees and plants found along rail lines also contribute to the composition of urban

forests. In some areas where railroad beds are no longer in use, bicycle trails and parks have been created. The natural vegetation along these trails and paths are elements contributing to a community urban forest and create areas for recreational uses while also offering wildlife habitat.

In addition to transportation corridors, the urban forest can also be found along utility corridors. Transmission wires result in vast corridors. Along these utility right-of-ways, plant and animal habitats are abundant. These lines provide green corridors that connect peripheral green areas to open spaces within the city” (Miller, 1997). Elements of the urban forest often can be found in the most unsuspecting areas within a city.

Riparian Areas

The urban forest can be found along riparian areas within a community. These areas are “vegetative buffer strips along streams or around ponds and lakes. The main purpose of forested riparian zones is to prevent pollution of stream and pond waters. The forest floor within the riparian zone filters sediment from runoff waters” (Johnson). Riparian areas also provide for food, nesting sites and travel corridors for wildlife.

While these areas are often left undeveloped, they often are utilized for recreational uses in the form of parks or marinas. As an unseemingly contributor to the fabric of the urban forest, riparian areas encompass a diversity of plant and animal habitats, often not found in other parts of the urban forest.

Parks

Parks contribute a great deal to the urban forest in their abundance of natural

vegetation that exists within their borders. "Parks vary from tiny green spots in central business districts to large acreages, often beyond city limits" (Grey and Deneke, 1986). Parks are usually publicly owned and include vest pocket parks, recreational parks, and playgrounds. Large or small, and whatever the use, parks contribute to the dynamics of an urban forest.

Public Buildings and Grounds

"Grounds adjacent to public buildings (e.g., schools and colleges, hospitals, auditoriums, museums, penal institutions, courthouses, and utility plants), are important parts of the urban forest" (Grey and Deneke, 1986). Public buildings often are surrounded by some form of natural vegetation, which is customarily an aspect of the building's aesthetic design. However, the trees and plants which are used as landscape materials are contributors to the community urban forest.

There are a myriad of niches within a city in which one encounters fragments of an urban forest. Urban plants and trees seemingly are everywhere. Our cities are forests in and of themselves. The authors of *Urban Forestry* wrote, "most cities are indeed forest-communities of trees and other woody plants both on and in the soil. One has only to stand on a high vantage point or fly over the city to perceive that below is a true forest" (Grey and Deneke, 1986). The central idea behind urban forests is that it is everywhere. Trees and plants in urban environs collectively make up the urban forest.

PRIVATE LANDS

The urban forest can be found in any area of the city. The majority of trees and

vegetation composing the urban forest is found on private lands. These areas include residential property, commercial areas, parking lots, vacant land and industrial districts.

Residential Property

Urban forests can be found in abundance throughout a community's residential districts. Trees and vegetation in these areas make up the largest part of the urban forest. "Although precise figures for the total urban forest area do not exist, it appears reasonable that 20 to 30 percent of the nation's urban forests are in residential areas" (Grey and Deneke, 1986).

Majestic forests exist even in the midst of the city within residential properties. This is most strikingly obvious as one encounters Sequoyah Hills neighborhood in Knoxville, Tennessee. The canopy of trees and the abundance of wildlife one experiences within the 2-3 mile stretch of road is, perhaps, mystical, to the frustrated driver traveling along Kingston Pike, the most dangerous and most traveled road in Knoxville, Tennessee.

Within these residential districts, there are often parcels of wooded areas which have been undeveloped for residential uses due to "zoning restrictions relating to soil stability, flooding or other restricting factors" (Grey and Deneke, 1986). These wooded lots provide habitat for wildlife and also significantly contribute to the fabric of the urban forest.

Commercial Areas

Commercial areas also are a home for pieces of the urban forest. Trees and

shrubs border many sidewalks and entranceways surrounding commercial buildings.

While commercial areas make up a relatively small part of the urban forest, nevertheless, these areas provide an opportunity for urban plant and animal habitats.

Parking Lots

Trees and natural vegetation can also be found in parking lots within the city. Tree plantings are often used in parking areas for the shade and canopy that they provide. These, too, make up the urban forest.

Vacant Land

Vacant lands are an opportune place for encountering part of the community urban forest. Sites of neglected land and revegetated derelict lands is a valuable component of the urban forest. Here, trees and plants are uncultivated and grow freely, often providing refuge to urban wildlife. (Clouston, 1981).

Industrial Districts

“Industrial districts are often more utilitarian than beautiful. However, many industries contribute substantially to the total urban forest with landscaped grounds, screen plantings, and outdoor park and recreation areas for employees” (Grey and Deneke, 1986). Trees and vegetation within industrial areas, unseemingly, are a large part of the urban forest structure. It is somewhat ironic that areas where there are so many synthetic processes and dynamics occurring could be the environment supporting a significant part of the community urban forest.

DISCUSSION AND CONCLUSION

The urban forest can be found within any part of the city's structure. Perhaps the reason that most people cannot identify the urban forest within the community is because the trees and vegetation defining the urban forest are somewhat separated and dispersed throughout the landscape. The urban forest is the dogwood tree growing in the front yard; it is the dandelions in the park; it is the shrub that hides the stop sign at an intersection; it is even the weeds growing between the cracks in sidewalk. The urban forest is not a forest, in the traditional sense of the word. It is a forest of an entire community, limited only by the confines of political boundaries.

The urban forest is invaluable to the community. How much more could communities benefit if the amount of tree cover and vegetation were increased, recreational opportunities augmented, wildlife habitats extended and virtually all dimensions of community life enhanced? Urban Forests hold the promise for such opportunities within communities. In an effort to expand the urban forest throughout the cityscape by linking small clumpings of trees to wooded areas by paths, a network is essentially formed. These networks are a chance to protect the "remaining special places in the city and countryside where nature still reigns, where the opportunity to find tranquillity still abounds, and where our quality of everyday life can be enriched" (Hay, 1990).

As stewards of the environment, planners have the capacity to initiate change within a community which enhances the quality of life to all members of a community.

Ideally, planning endeavors should emphasize this objective in their future plans for the community. Opportunities can be found within communities which permeate the cityscape for the expansion of the urban forest and the enrichment of daily life. It is the responsibility of planners to recognize these opportunities and ensure efforts to incorporate urban forest principles and concepts within communities. The potential benefits that urban forests provide to the local community, as well as the global community, present a challenge to planners to ensure the principles upholding the urban forest are integrated into current and future plans. Urban forests are places where the seeds of sustainable communities take root, where people become neighbors and where cities become more livable. They are crucial to the health of our cities and growing metropolitan areas (*The Power of Parks*, 1996).

CHAPTER THREE

CASE STUDY OF AN URBAN FOREST COMMUNITY

INTRODUCTION

A model city was selected based on urban forest principles and concepts which had been synthesized within the community planning and development efforts. Athens, Georgia was selected as the representative model for an urban forest program. This city was chosen for investigation because of the characteristics of its urban forest program, the size of the city itself, and the general value that the experiences and expertise of urban forestry personnel have to contribute to other urban forest initiatives. The urban forest within the City of Athens and within Clarke county is quite substantial and inspiring. This initiative has drawn national attention for local endeavors. Principles and concepts utilized in their urban forest planning, development and protection efforts will be the focus of this discussion.

Methodology

A program analysis of urban forestry principles and policies was conducted. This analysis was a conjunctive effort, combining information gathered from personal interviews with Athens and Clarke County planning and administrative personnel, the urban forest coordinator for the Athens and Clarke County, Georgia regional urban forestry personnel, along with the University of Georgia's Urban Forestry faculty. This

analysis also required assimilating and reviewing associated written materials provided by area forestry, planning and conservation officials. In order to assess the holistic urban forestry initiative in Athens, Georgia, the following were analyzed:

- Urban forest management plans and principles
- Budget allocations for the urban forest initiative
- Ordinances or policies for the protection, establishment and improvement of trees and shrubs within the community
- Existence of educational programs concerning the community's urban forest
- The University's role in providing assistance to the urban forest initiative

It is the purpose of this assessment to provide a conceptual model from which principles and concepts can be taken and utilized in other urban forestry initiatives; to draw from one community's experience and rewards of an urban forest initiative in order to simulate similar effects in other communities.

In order to provide a visual analysis of the urban forest within the communities analyzed for this discussion, photographs are included. These photographs provide a visual image of each city's community forest. Not only are these photographs illustrative of the current urban forest within these two communities, the photographs also depict the opportunities for expansion of the urban forest which can be found within Athens, Georgia as well as Knoxville, Tennessee. Both cities have impressive urban forestry programs, each implemented with a diversity of local and state resources; each deriving multiple benefits for the community. Plate 1 provides the first of these illustrations of the urban forest within the Athens community.

ATHENS, GEORGIA: AN URBAN FOREST COMMUNITY



PLATE 1: PHOTOGRAPH TAKEN IN DOWNTOWN ATHENS, GEORGIA

History

Athens, Georgia is located approximately 70 miles east-northeast of Atlanta, Georgia. Athens provides a magnificent model for urban forestry with grand magnolias gracing the city streets, elegant dogwood trees blooming in the early Spring and shady weeping willows which can be seen throughout the downtown parks and along pathways. (See Plate 1: Photograph taken in Downtown Athens, Georgia) Athens is located within Clarke County and is home for 94,133 residents, 29,000 of which are students attending the University of Georgia located near downtown Athens.

Athens provides a model for a vital urban forest with its tree-lined streets and thoroughfares, along with the abundance of city parks, botanical gardens and an urban greenway. The many trees of Athens include those on public properties as well as those found on residential and privately held properties. The trees and vegetation found within

Athens is cherished by local residents. Trees within the city provide the community with environmental, psychological, social as well as economic benefits. Although those grandiose trees standing on private properties are special to the community, there is more recorded information available on those trees found on public properties. "Public trees are a fundamental, but unique part of the public infrastructure. (See Plate 2: Photograph of Lumpkin Street, Downtown, Athens, Georgia) The publicly owned trees are located within the street right-of-ways and public parks, around the public facilities of Athens and within greenways, along trails and in managed wooded areas. Athens- Clarke County owns tens of thousands of trees. Information about 11,936 public trees is currently available. The dollar value of these trees has been estimated at \$9,500,000" (Head, 1997)



PLATE 2: PHOTOGRAPH OF LUMPKIN STREET, DOWNTOWN ATHENS, GEORGIA

URBAN FOREST MANAGEMENT PLAN AND PRINCIPLES

In January of 1997, a draft of the Urban Management Plan for the Public Trees of Athens-Clarke County, Georgia was submitted to the Athens-Clarke County government. Constance Head, the consulting urban forester was commissioned with this task in order to help “guide the government in the proactive management of publicly- owned trees” (Head, 1997). Ms. Head added the plan was to be developed also to have a positive, but limited impact on privately-owned trees through the examples set by the government and through a community-wide urban forestry education program (Head, 1997).

The urban forest management plan for Athens and Clarke County involved a large number of people, representing various interests. The urban forest management plan, as any plan is expected to do, was envisioned as a method to develop and implement a program of activities that would assist the community in achieving their goals; to facilitate short term, as well as long term goals within the community. The management plan has aided in making citizens aware of the needs of the community’s trees. The process of developing a community plan has increased awareness and provides education about the urban forest simultaneously.

The urban tree management plan focuses on “improving the safety, health and beauty of the public trees through the implementation of basic and necessary tree care activities. These activities include tree establishment, maintenance, pruning, protection, inspection and removal. The plan provides information on how to accomplish these activities in a cost-effective manner according to professionally accepted standards. The Plan assigns responsibilities for public tree care to a broad network of urban tree

management partners and provides opportunities for further development of these important partnerships” (Head, 1997).

The development of this program is necessary in order for Athens to “ensure a sustainable presence of healthy public trees” (Cauthen, 1997). The Plan identifies the crucial components of a successful urban forestry management program. The plan also recognizes those people who are responsible for, or have some impact on the urban trees in Athens-Clarke County. These people were referred to as “urban tree management partners.” On a volunteer basis, these partners developed a vision and goals for the public trees within the Athens community.

Urban Tree Advisory Committee

Until 1991, very little existed in terms of “official” tree management within Athens. At this time, the Urban Tree Advisory Committee (UTAC) was established “to provide a vehicle for broad based community representation to work with local government and citizens for the stewardship of trees in public places” (Athens Urban Tree Advisory Committee by-laws, 1991). (See Plate 3: Photograph of Clayton Street, Downtown, Athens, Georgia)

The UTAC is comprised of fifteen appointed members whose goals include the following:

1. To assist in providing long-range planning and program evaluation.
2. Identifying and developing both public and private financial resources.
3. Developing community networks and coordination among government departments and community groups.

4. Developing and coordinating a community tree management plan for public trees.

The Urban Tree Advisory Council meets monthly in an effort to assist in the stewardship of public trees within the community.



PLATE 3: PHOTOGRAPH OF CLAYTON STREET, DOWNTOWN, ATHENS, GEORGIA

Since 1991, the City of Athens-Clarke County, in coordination with the Urban Tree Advisory Committee and Georgia Power Company, have increasingly been directing activities toward public tree management. This partnership has enabled working relationships to become established between Athens- Clarke County, representing local government interest, the UTAC, which represents citizen interest and Georgia Power Company, representing the community's business interest. "This effort has been successful in sponsoring projects funded through grants and local matching funding for public tree inventories and plantings. Pilot projects have tested this partnership and have proven its effectiveness" (Cauthen, 1997).

Athens-Clarke County Tree Survey

In 1996, a Community Tree Survey was conducted in order to gather public opinions concerning City's trees. The City of Athens initiated the survey with the intention of developing a plan and beginning a comprehensive management program for the publicly owned trees of Athens as well as to initiate citizen input concerning the future of the City's urban forestry program. The survey was not a traditional "tree survey" taken for inventory of the community's trees, rather it was an effort to obtain citizen responses concerning local urban forestry efforts, and also to make citizens aware of the City's commitment to the perpetuation of their vibrant natural resources: trees.

Generally, the results supported the efforts for urban tree management in Athens and Clarke County. Respondents placed a high priority on the management of urban trees. Likewise, a majority of the respondents indicated that the city should spend public tax dollars to maintain the urban forest. The survey revealed that over 98% of respondents felt that trees were beneficial to the community. Other questions were asked which dealt with the level of satisfaction with the current tree management practices, the amount of money spent on trees per year, and if more education was needed concerning the urban forest within the community. Of these questions, 62.6% of respondents were satisfied with the current level of urban tree management; On average, survey results showed that \$10 per person was a just assessment to maintain the urban forest; and approximately 53% of survey respondents suggested that they were willing to learn more about urban trees.

Athens is one of hundreds of community's nation-wide which has created an awareness and spurred the desire within the community to develop a more comprehensive

urban forest management plan. This survey was an ideal way in which to find out concerns and interests of the community for their urban forest.

Urban Forest 1997 Fiscal Year Budget

The 1997 fiscal year budget for the urban forestry program in Athens totaled \$80,100. With the population presently at 94,133, approximately \$0.85 is spent on the urban forestry program per capita. The budget allocation used for the urban forestry program is quite modest in Athens. Expenditures for general maintenance and emergency tree care consumes most of the budget, demanding over 41% of the current funding available. (See Plate 4: Photograph of City Hall, Downtown, Athens, Georgia) Other expenditures include "Professional Services" of which 34% of the budget is allocated; Supplies and Materials expend 15% of total funds; Facility and Building costs account for almost 10% of the budget, while education for the community concerning the urban forest is only allowed \$500. This is less than one percent of the total budget dedicated to urban forestry. (See Figure 4: Athens, Georgia Urban Forestry Budget and Expenditures, 1997)*

In 1996, the funds budgeted for urban forestry efforts were considerably lower as compared with the 1997 Fiscal Year Budget. In the previous year, the total amount of funds spent on managing Athens-Clarke County's tens of thousands of trees was \$26,000. This is less than .02% of the total Athens-Clarke County operating expense budget. The funds spent consisted of several grants, private donations and some Athens-

* Figure 4 can be found in the Appendix

Clarke County general revenue funds. Community groups, such as the Founder's Trust, the Junior Ladies Garden Club and the former Athens Tree Commission have provided support throughout the years by planting trees and cataloging significant trees within the community, as well as supplementing the urban forestry budget for local endeavors.

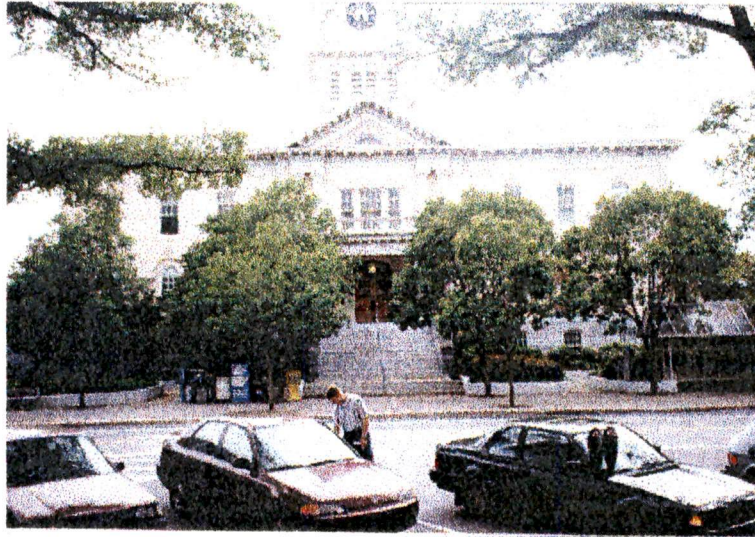


PLATE 4: PHOTOGRAPH OF CITY HALL, DOWNTOWN ATHENS, GEORGIA

Citizen Advocacy and Involvement

As previously mentioned, Athens' residents take a strong position concerning their natural resources. Neighborhoods from all areas of Athens adopt public areas for landscape improvement purposes; garden clubs donate funds for wildflower projects throughout the City; Citizens have organized into environmental action groups such as the "Clean and Beautiful Commission" and the Urban Tree Advisory Committee. In 1996, a local neighborhood association, in conjunction with Georgia Power Company

contributed funds toward the purchase of a tree planting project in their neighborhood.

Another Athens' organization, the Discovery '92 Committee, promoted the planting of a single tree at each school in Athens and Clarke County.

Such citizen initiative is a model for communities across the nation. As a testament to the respect and value that Athens' citizens have for their city's trees, Plate 5 is a photograph which shows a monument at the base of a local towering oak tree which reads, "For and in consideration of the great love I bear this tree and the great desire I have for it's protection for all time, I convey entire possession of itself and all land within eight feet of the tree on all sides." Historically, there has been substantial citizen support for urban and public tree management in Athens and Clarke County. Community groups have provided guidance as well as encouragement, funding, and volunteer time and effort for the management of the community's trees.



PLATE 5: IN HONOR OF TREES, DOWNTOWN ATHENS, GEORGIA

DISCUSSION AND CONCLUSION

Nighswonger, in an article presented to the National Urban Forestry Conference in 1982, asserted that a prosperous community forestry program was one that is "cost-effective, involves people in the community, simulates community pride, is well-planned and is educational" (Nighwsonger, 1982). Athens' urban forestry program is a successful one. It is considered successful because of the previous assertions. Athens has established itself as an urban forest community with citizen involvement and endorsement. "Urban trees are valued by the citizens of Athens and Clarke County. This is evident in the abundance and variety of the community's tree resources" (Head, 1997).

Concerned with the urban forest, citizens of Athens are, essentially, tree stewards for their community. They have insisted on the protection and maintenance of the Athens- community urban forest. Because there is such an established network of citizen support, the urban forest is becoming a more important part of the agenda for the unified government of Athens and Clarke County.

Athens and Clarke County's urban trees have value to the citizens of the community. Trees provide Athens community with environmental, economic, psychological and social benefits. Trees are a fundamental but unique part of the Athens and Clarke County public infrastructure. Like other components of the public infrastructure, trees require maintenance to insure that they remain safe and provide maximum benefits to the community.

The Athens community is "pro-urban forest." Citizens have taken an active role in their urban forest. There is an excellent resource of funding and man labor which can be

found within the community- groups willing to plant trees and donate funding to local urban forestry efforts. The citizens of Athens have a sense of ownership for their city's trees. This is what sets the urban forestry program apart from many other communities with existing successful urban forestry programs. When a community's citizens actively take part in their natural resources, a sense of pride and ownership begins to emerge.

CHAPTER FOUR

THE URBAN FOREST IN KNOXVILLE, TENNESSEE

INTRODUCTION

As the late Dr. Enoch Colvin Idol, Sr. said, Knoxville is the place where "...the valleys meet the mountains and the mountains kiss the sky; and the mountain streams make music flowing like a lullaby. There the wild birds sing their love songs and the air is pure and free, in the midst of nature's splendor in the hills of Tennessee" (Idol). Knoxville has established itself as a growing urban and regional center in the midst of the Smokey Mountain region's abundance of natural resources and beauty. The City no longer is a sleepy town nestled in the Valley; Knoxville is now a city which supports local as well as regional and national activity along the highways and byways which pervade the City.

KNOXVILLE, TENNESSEE: TREE CITY, U. S. A.

With Knoxville being situated in the Tennessee Valley, abundant with natural forest growth and vegetation, it is not unusual that the City has been awarded the designation of Tree City U. S. A. five consecutive years since 1992. Knoxville's urban forest can be found in the many parks and greenways within the community, along the city's public right-of-ways and adorning residential streets and lawns. (See Plate 6) The trees and vegetation within the City enriches the beauty and health of the community.



**PLATE 6: PHOTOGRAPH TAKEN OF THE WHITTLE COMMUNICATIONS TOWER,
DOWNTOWN KNOXVILLE, TENNESSEE**

The many benefits that trees provide to the Knoxville community have made them an essential part of the urban environment. The Tree City, U. S. A. designation has served as an awareness and educational device for the community's residents by establishing the importance of trees within communities.

The award is sponsored by the National Arbor Day Foundation, in cooperation with the U. S. Forest Service and the National Association of State Foresters. The Tree City U.S.A. designation is awarded to communities across the nation who "effectively manage their public tree resources," and implement community tree management plans based on the following standards: Tree City U. S. A. necessitates that the community have an established tree board, a community tree ordinance, a community forestry program with an annual budget of at least \$2 per capita, and an Arbor Day Observance and Proclamation (*Tree City U. S. A. Guidelines*). Knoxville has met and exceeded the

guidelines for the Tree City U. S. A. award. The rewards of an abundant urban forest abound throughout the Knoxville community.

URBAN FOREST MANAGEMENT PLAN AND PRINCIPLES

Knoxville's urban forestry program provides for the establishment and maintenance of its urban forest. The involvement of Knoxville/ Knox County government, as well as non-profit organizations and individuals, private businesses and educational institutions is essential in order to promote the growth of the urban forest in the City. Through efforts focused on the area's natural resources and the survival of the native plant and animal species, accomplishments have been made regarding tree plantings, public education and municipal tree ordinance development (*Urban and Community Forestry Plan for Tennessee*, 1997).

The local urban forest management program involves trees and vegetation on public as well as private properties within the City of Knoxville. (See Plate 7: Photograph of the First Tennessee Bank Building at the intersection of Cumberland Avenue and Gay Street, Downtown, Knoxville, Tennessee) Knoxville submitted its 1997 Tree Plan to the State of Tennessee's Urban Forestry Department earlier this year. The plan suggested that expansion of the urban forest would occur on public properties throughout Knoxville. It also asserted that over 1,000 new trees were to be planted in parks and along public right-of-ways. All of the trees were to be either a 2 or 2½ inch caliper. The total cost of the program was estimated to be approximately \$130,000. Also an additional 130 trees were proposed as an addition for the Neyland Greenway Project.

These efforts provide evidence that tree planting has become “an integral part of all Public Works improvement projects in the City of Knoxville” (*1997 Tree Plan*).



PLATE 7: PHOTOGRAPH OF THE FIRST TENNESSEE BANK BUILDING AT THE INTERSECTION OF CUMBERLAND AVENUE AND GAY STREET, DOWNTOWN KNOXVILLE, TENNESSEE

Knoxville has taken steps to ensure that trees remain a vibrant part of public properties as well as on private properties. (See Tables 1, 2 and 3)* The City’s Tree Ordinance maintains that developers preserve “six trees per acre or the installation of eight trees per acre depending on the circumstances” (*1997 Tree Plan*). The ordinance further requires that these trees on newly developing properties must be kept in a living

* Tables 1,2 and 3 can be found in the Appendix

condition for at least eighteen months after the development has been completed to ensure their growth and success of the landscaped vegetation.

The current tree plan for Knoxville describes the maintenance program that Knoxville follows for the care and management of its trees. This maintenance program addresses issues involving mature trees as well as those which have been newly planted. Mature trees in the city's public areas are inspected for diseases and distress and mulched during the winter months. These trees are also pruned when needed for the health of the tree as well as the safety of the City's residents. Newly planted trees are nourished for a three year growth period. Knoxville maintains a solid record of tree growth and care. The Department of Public Services Tree Inventory suggested that Knoxville's trees were in "good condition."

In 1987 a downtown plan was developed entitled, The Downtown Knoxville Plan. The plan served as a visionary tool for future developments to occur within downtown Knoxville. In this 1987 plan, it was recommended that a Streetscapes Plan be developed which would help guide the "design and development of downtown's public spaces and adjacent private property" (*Downtown Knoxville Plan*, 1987). Fortunately, much of this resource is comprised of the developmental plans for the inclusion of trees and vegetation into the Knoxville business core. Today, the plan has been completed and is a vibrant addition to the downtown area.

Aside from the Streetscapes Plan, landscape requirements are in place for any future developments occurring within the City of Knoxville. "The purpose of the landscape requirements is to introduce natural elements into the urban landscape" (*Knoxville Design Guidelines*, 1996). These requirements are as follows:

1. The Streetscape Plan shall be used as a guide for the types of trees to be used on various streets.
2. A planted, evergreen ground cover or heavy mulch shall be maintained under and around trees.
3. Compliance with the City Tree Ordinance must take place.
4. Parking lot owners are responsible for maintaining all trees for the duration of parking use on the property.

These landscape requirements are in place because the City recognizes that “trees and other plants provide shade, increase the visual appeal of the property, and provide a break from the expanses of asphalt” (*Knoxville Design Guidelines*, 1996).

Knoxville Tree Board

The Knoxville Tree Board is a group of appointed citizens who have the responsibility of encouraging the conservation, protection and management of trees on public property within the City. The Tree Board meets monthly to discuss urban forestry issues throughout the community. The Tree Board has been an instrumental liason between community residents and the Knoxville and Knox County municipalities. They act on behalf of the urban forest within the community. They are dedicated to the preservation and enhancement of the urban forest found on public properties within the community.

Knoxville Tree Ordinance

The City of Knoxville’s Tree Ordinance is designed to “...encourage the

conservation, protection, and management of trees on public property within the City; The Knoxville Tree ordinance provides for the maintenance and establishment of community trees on newly developing properties. Specifically, the ordinance requires eight trees per acre. For commercial developments, "At a minimum, one (1) tree every twenty (20) feet should be placed along those sides with street frontage near the back of the sidewalk in order to create a tree-lined street setting" (*Knoxville Tree Ordinance*). Additional trees required on site can be distributed to other locations in the lot. The ordinance asserts that for new developments, at least six trees per acre must be preserved, or at least eight trees per acre must be replaced if existing trees and vegetation was unable to be maintained in the development process. The ordinance, unfortunately, does not provide for the maintenance of the urban forest on existing properties or private lands.

Urban Forest 1997 Fiscal Year Budget

Knoxville's 1997 Urban Forestry budget was submitted as a resource tool for the Tree City U. S. A. certification. (See Figure 3: Urban Forest Budget, Knoxville, Tennessee, 1997) The budget was designed, essentially, to assist the City in identifying its investment in trees. Funding for the Urban Forestry program comes from several departments including: Parks and Recreation Department and Public Services Department. Knoxville suggested that the total cost of its tree program was \$1,505,245. This total included planting expenses, care and management expense, utility expense, and other expenses including brush clipping and leaf collection. The percentage of total funds expected to be spent on new plantings for 1997 was less than 3%, while care and maintenance services consumed over 80% of the total budget allocated for urban forestry

1. City Population	167,422
2. Planting Expenses- Including the cost of tree purchases, and the labor and equipment for planting	\$ 50,047
3. Care and Management Expense- Including the costs for pruning, watering, insect and disease control	\$ 182,428
4. Utility Expenses- Utility trimming expenses are allowed only if the utility is a partner in the city's tree program, and has implemented a tree swap program and lateral pruning methods	\$ 0
4a. Maximum allowed for Utility Expenses is one dollar per capita. Enter the smaller of line 1 or 4	\$ 0
5. Removal Expenses- Including the cost of saws and equipment, supplies and labor	\$ 67,478
6. Other Activities- Brush chipping	\$ 671,522
Leaf collection	\$ 533,770
7. Total	\$1,505,245

FIGURE 3: URBAN FOREST BUDGET, KNOXVILLE, TENNESSEE, 1997

efforts.

Knoxville's current mayor, Victor Ashe is a proponent of trees in the City. His annual goal is to plant 1,000 new trees. The public services department, under the direction of Bob Whetsel ensures that this happens each year. These new plantings are contracted out through the Public Services Department (See Tables 1, 2 and 3). These urban forestry expansion initiatives are important to the Knoxville community to ensure a healthy urban forest for the future.

Urban Forest Informational and Educational Programs

The University of Tennessee serves as a remarkable resource tool for the establishment, continuation and innovations involved with the community urban forest. The University of Tennessee Arboretum, a project of the University of Tennessee Agricultural Experiment Station, "serves as a center for education, research and public service" (Tankersley, 1997). Currently, the Arboretum is host for educational research which includes the investigation of "the ability of various plants to attract wildlife to urban settings" (University of Tennessee Arboretum).

There are other resources for urban forestry education which can be found throughout the community in addition to the resources sponsored by the University of Tennessee. The Arbor Day celebration serves as a method of awareness and education of urban forestry for Knoxville community residents.

The Urban Forest Agenda for Knoxville

In 1995, a document was produced by the Downtown Organization entitled, *The*

Next Big Steps for Downtown Knoxville. The booklet was designed as a visionary tool for future plans for the central business district of the City. (See Plate 8: Photograph of the Cumberland Avenue Approach to Downtown, Knoxville, Tennessee) The Chairman of the Downtown Organization, Williams Arant, stated in this manual that, “ultimately, the vitality of our region depends on the vibrancy of our downtown.” Mr. Arant makes no argument that Knoxville must include certain elements into future plans to ensure its success.



PLATE 8: PHOTOGRAPH OF CUMBERLAND AVENUE APPROACH TO DOWNTOWN KNOXVILLE, TENNESSEE

Mike Carberry, Principle Planner of the Metropolitan Planning Commission in Knoxville, confirmed that sector plans for the City were concerned with the environmental protection of all areas, including the establishment and maintenance of trees and vegetation within existing and newly developing sites as it corresponded with the current tree ordinance. He concluded by saying that one way in which Knoxville is currently maintaining and establishing urban forest components is through the current

greenway initiative which is taking place.

For any future developments within the city and beyond, it should be required that developers incorporate “predetermined infrastructural landscape plans” which include the planting of a specific percentage of trees and vegetation to the property or either that the property maintain existing vegetation (Anlian, 1989). Especially concerning downtown revitalization efforts, such as those taking place in the hearts of cities across the nation.

“Main Street, U.S.A. is getting a facelift, and in doing so, is attracting merchants, office workers, and shoppers back to the central business districts formerly plagued by a deteriorating image and a perception of being somewhat less than user-friendly.

Fundamental to most of these streetscape projects is the use of extensive tree planting, a dominant design tool to help capture the community’s heritage” (Anlian, 1989).

Knoxville can benefit from this relatively recent interest in downtown areas and extend the surrounding forested areas into the heart of the City. (See Plate 9: Photograph of Krutch Park, Downtown, Knoxville, Tennessee) The east Tennessee region is well-established for its natural beauty and abundance of resources. Downtown should be just as breathtaking in its urban beauty (*Next Big Steps for Downtown Knoxville*, 1995).

“The sense of community celebrated by the very presence of trees is perhaps the most inspiring of all effects. Our care for the trees in our communities is a reflection of our care for the environment at large. A well-managed urban forest reflects the community’s insight, self-esteem and graciousness. “Green cities are unselfish places, ‘value-added’ zones, and superior places to live and work. Trees make sense; a sense of pride, a sense of community, and a very memorable sense of the unique places we’ve visited” (Anlian, 1989).



PLATE 9: PHOTOGRAPH OF KRUTCH PARK, DOWNTOWN, KNOXVILLE, TENNESSEE

OPPORTUNITIES FOR URBAN FOREST EXPANSION

Knoxville has many opportunities to expand her urban forest through the utilization of the most unseemingly ingenious use of spaces. Here, in Knoxville, lies the opportunity for an impressive urban forest with a variety of wildflowers, grasses and native trees that provide a haven for a diverse wildlife population” (Townsend, 1997).

The urban forest can be found on public as well as private properties. The opportunities to incorporate new urban forest growth in and around these properties is limitless. Tar-topped parking lots, which increase summer temperatures on average 10-12 degrees, can become a cool haven for pedestrians under the shade of a tree’s canopy. School playgrounds can become outdoor classrooms abundant with plant and animal habitats, with the inclusion of plants and trees intermittent throughout the swing-sets and jungle-gyms. Vacant lots can become jungles, lush with vegetation, acting as a home away from home for animals within the city. Railroad and transportation corridors

become wildlife travel corridors, allowing the animal habitats to travel from one place to another, without the fierce interruption of urban environs. Trees and plant vegetation can easily be incorporated into almost any site, whether it is found in an alleyway between two buildings, or the neighborhood grocery parking lot. The areas offering the most potential for future development include: parking areas, transportation corridors and public right-of-ways. What is essential to this discussion is finding opportunities for the inclusion of the urban forest all around the city.

Notice Plate 10 below, Photograph of the Kingston Pike/Cumberland Avenue Approach to Downtown Knoxville. When compared with Plate 8 found on page 59, a dramatic differences in landscape appearances can be seen. One photograph illustrates an urban environment abundant with trees and plant vegetation (Plate 8), the other photograph (Plate 10), illustrates an urban landscape where no natural elements exist. These two photographs were taken only ¼ mile apart from one another. This is one example of how trees can be incorporated into urban settings, and a dramatic difference that trees can make aesthetically.



PLATE 10: PHOTOGRAPH OF THE KINGSTON PIKE/CUMBERLAND AVENUE, APPROACH TO DOWNTOWN, KNOXVILLE, TENNESSEE

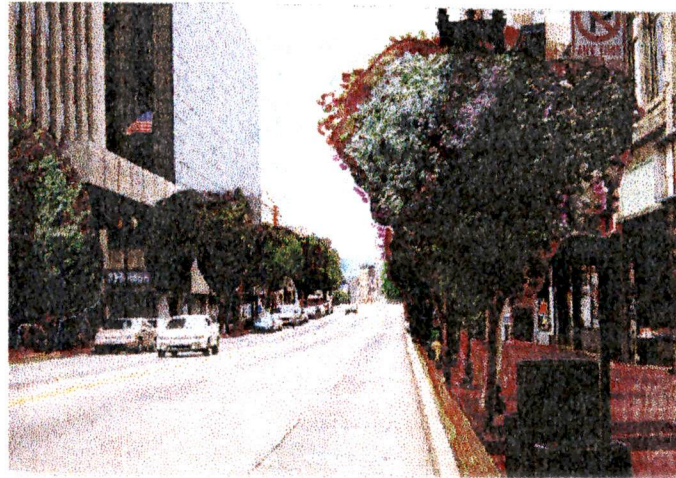
Another example of the opportunities which can be found in Knoxville for the expansion of the urban forest can be found in the downtown areas of the City. Gay Street is the main corridor for downtown travelers, automobile, as well as pedestrian traffic. Gay Street presently has no natural elements incorporated into the streetscape, aside from intermittently-placed potted holly bushes. Plate 11 provides a visual image of Gay Street as it presently exists. The urban landscape is rather a harsh and uninviting environment to the pedestrian traveler. Tall buildings and narrow alleyways located between buildings make Gay Street act as a wind tunnel during cold winter months. During the warmer months, lack of shading provided by trees, intensifies the heat island effects within the inner core of the City.



PLATE 11: PHOTOGRAPH OF GAY STREET, DOWNTOWN, KNOXVILLE, TENNESSEE

The enhanced photograph of Gay Street, Plate 12, portrays Gay Street with tree plantings added to the urban landscape. The scene is a much more aesthetically pleasing, and inviting atmosphere as compared with Plate 11. Opportunities for urban forest

expansion can be found virtually anywhere in the city. From public right-of-ways to private driveways, opportunities can be found to expand the existing urban forest to make cities more livable for human habitats as well as animal habitats.



**PLATE 12: ENHANCED PHOTOGRAPH OF GAY STREET WITH TREE PLANTINGS,
DOWNTOWN, KNOXVILLE, TENNESSEE**

DISCUSSION AND CONCLUSION

The urban environment is enriched through the presence of trees. Trees are often the most dominant element in these urban landscapes and are often, the most memorable (Anlian, 1989). Urban planners strive to create these memorable places within a community. In these urban environments, a sense of place emerges often with the memory of trees being the most significant. Urban images seem to blend together when facades of concrete and steel merge together. However, when natural elements are introduced, an otherwise lifeless landscape becomes quite dynamic with the introduction of vegetation and wildlife.

There is a necessity and value of trees for Knoxville, as well as any community,

for residents and visitors alike. "No town can fail of beauty, though its walks were gutters and its houses hovels if venerable trees make magnificent collonades along its streets" (Miller, 1997).

Knoxville, Tennessee and Athens, Georgia are both urban forest communities. They have established their programs with the same goal in mind: to make their communities more livable. Both of these communities have experienced rapid growth during the last ten years, and are expected to continue to increase in size in the twenty-first century. This growth will create an increased need for expansion of the urban forest within these communities, and many others as well. The urban forest must grow with the expanding population.

These two cities have substantial urban forests within their communities. They have an opportunity to share their experiences with other communities in the development and potential growth of their community forests. Ideas and program aspects are diverse for each these communities, using the available resources, each community has similar end results: a healthy urban forest. With the cooperation of local government, state and federal agencies, non profit organizations, private businesses and educational institutions working together to promote and support the urban forest program, accomplishments can be made which include tree planting and maintenance, public education, municipal tree ordinance development and technical assistance services (*Urban and Community Forestry Plan*, 1997).

CHAPTER FIVE

DISCUSSION AND CONCLUSION

IMPLICATIONS FOR URBAN PLANNING

The health and vibrancy of a city is communicated through its natural resources. Urban planners not only need to be aware of this, but also be environmental, as well as societal proponents. The implementation of plans and policies, which are conducive to a healthy environment, is necessary for sustainable communities. Planners are the visionary sources for communities. Planners must have visions for their communities, which are healthy and environmentally sound. What future does a community have with no vision? Planners must attempt to predict the future condition of their communities. In so doing, there are certain speculations, which can be made to predict future probabilities. These speculations include a national population growth, an increased amount of residents living in urbanized areas and a decrease in the abundance of natural resources. With these in mind, urban planners need to have responsible visions and goals for communities to anticipate these occurrences.

“Urbanites are more concerned about trees today than ever before. They realize that trees are important for their existence and will have to be protected and managed for future generations” (F. Smith, 1971). It is clear in the President’s Commission on American Outdoors report, that access to “urban forestry/recreation areas, whether they be greenways, open space, or parks is an important concern of the public” (Bey and

Kielbaso, 1988). In creating visions and future goals for the community, urban and community planners need to conceptualize the need for contact with nature along with the necessity of economic development within communities in order to ensure the ultimate goal of an improved quality of life for urbanites.

Cities are not entities unto themselves, instead, they are a multitude of microorganisms all working towards a common goal: life. The sustainability of a community is perpetuated through its visionary components, continuously looking to the future to ensure success. Planners are commissioned with this duty: to ensure a community's livability and success. Ultimately, urban planners are the coordinators for improving a quality of life for a community's residents. Having the broad base of a variety of disciplines and connections, planners are the facilitators of changes within a community. For a community to exist as a vibrant, and healthy whole, all the individual components must be able to function together efficiently towards a common goal. Not only are urban planners visionary resources to the community, they are also stewards of the community's health. As the community steward, planners become somewhat of a missionary for the community. As a citizen, every member should be a steward of his or her own community, building the community in a unified effort.

Urban and regional planning is involved in the integration of urban forest within local planning and development efforts. "Urban forest management and protection procedures should be incorporated into a more comprehensive urban planning process" (Miller, 1997). The urban forest is a vital and essential component within any community. Urban planners have a significant role in the establishment, development and protection of these natural resources to the community. Planners need to incorporate

urban forest needs into their current and future plans in the early stages of the planning and development phases, instead of in the final stages, where trees and vegetation become more of an afterthought, or an addition to the already in-place design.

“Trees need to be understood as an integral part of city planning. They need to be discussed and encouraged in long-range comprehensive plans as well as the various shorter range sector and neighborhood plans. Trees need to be thought of not as a luxury, but as a part of the infrastructure of the city. When contemplated, the budget and plans for tree planting and maintenance must be accounted for from initial discussions” (Winterfield, 1992).

Along with trees and vegetation being excluded from plans, is the unfortunate truth that many city officials have come to think of trees within the city as more of a “liability than an asset” (Head, 1997). Urban forestry budgets have dwindled in the competition with other priorities such as police and fire protection, sanitation and street maintenance, which has left little support for urban forestry” (Miller, 1997). With programs emphasizing the importance of trees and the benefits they can provide, detrimental attitudes can be changed and more attention given to urban forestry efforts within the community. Fortunately, for many communities around the world, there are a few dedicated individuals who will continue to put forth their efforts for the growth and development of their community forests.

Those communities which have withstood these budget cuts and program elimination, are those in which “good management was supported by a long-term program of maintaining public support through information and educational programs” (Miller, 1997) “Urban forests are places where the seeds of sustainable communities take

root, where people become neighbors and where cities become more livable. They are crucial to the health of our cities and growing metropolitan areas” (*The Power of Parks*, 1996)

Planners are involved in so many aspects of community health- they have a significant part of the urban forest within the community. “Without trees, the city is a sterile landscape of concrete, brick, steel and asphalt. Trees make communities livable for people” (*Benefits of Urban Trees*). This is essentially what a planner’s main goal is: to make communities more livable.

APPENDIX

1. City Population	94,133
2. Professional Services	\$ 28,000
3. Grounds Maintenance Services	\$ 32,900
4. Education and Training	\$ 500
5. Supplies and Materials	\$ 11,700
6. Facility and Building	\$ 7,000
7. Total Operating Expenditures	\$ 80,100

FIGURE 4: ATHENS, GEORGIA URBAN FORESTRY BUDGET AND DESCRIPTION OF EXPENDITURES, 1997

Professional Services

1. Contractual services for the "Urban Tree Management Program" include professional management services, provided by a registered forester to serve as the "Urban Forestry Program Coordinator." This service will work under authority of the Central Services Department/ Landscape Management Division Manager. The recommended budget funds the equivalent of a half time position, and is supported by the recommendation of the "Urban Tree Management Plan" (UTMP)

2. Contractual services for continuation of the public tree inventory includes data collection on approximately 1500 trees in the General Services District.

Grounds Maintenance Services

1. Tree pruning services for the "Urban Tree Management Plan" include hazard reduction pruning, corrective structural pruning, clearance pruning and tree removals for large trees. Small tree pruning and removals will be performed by existing staff.

2. Emergency Response Plan for Public Trees. This budget will serve as a contingency to provide storm damage initial cleanup support, damage surveys, FEMA GEMA reimbursement applications and grant applications related to amelioration of damages.

3. Special Project Matching Funds- The budget will provide seed money for matching grant educational projects.

Education and Training

1. Georgia Urban Forest Council Membership Dues
2. Educational materials for Tree City U.S.A, and tunneling and trenching near trees.

Supplies and Materials

1. Provides office supply products that will be used to provide community workshops as a way to proactively impact trees on private and public properties through awareness programs
2. New and replacement trees. Provides for the purchase of 100 trees, the average annual planting.
3. Miscellaneous supplies- Supplies needed for tree establishment and maintenance which includes gator bags, fertilizer, stakes, wire, and pesticides.
4. Tree Protection- This provides supplies such as posts and construction barrier fencing to be installed in the event of right-of-way construction near larger "landmark" trees in order to protect the tree from large equipment damage to the trunk, limbs, and root zone.

Facility and Building

1. Provide funding for the "Hazard Tree Reduction Program" and for pruning limbs conflicting with street infrastructure, such as red lights, signs, sidewalks, or sewer lines.

TABLE 1: NEW TREE PLANTINGS, KNOXVILLE, TENNESSEE (1997)

1997 NEW TREE PLANTING LOCATIONS	# TREES
RIGHT-OF-WAY	
Acker Street	4
Central/Quincy Ave	5
Chilhowee Blvd	1
Cumberland Ave	2
Dempster St./Edgewood	8
Henley Median, Exit 388 Main	10
Interstate Trees, I-40, I-275	418
Lonas Road/Weisgarber	4
Love's Creek	2
McCalla/MLK	2
McKamey Rd.	14
Middlebrook Pike	4
Neyland Dr.	4
North Hills Blvd.	2
Old Kingston Pike	2
Ozark circle	3
Ray Mears Boulevard	10
Rutledge Pike, Magnolia	2
17th Street and Blackston	10
South Knox Blvd.	98
Summit Hill Ave.	6
Walker Boulevard	13
SUBTOTAL R-O-W	624
PARKS	
Adair Park	28
Badgett Field	12
Baxter Ave. Park	1
Cal Johnson Rec Center	1
Ed Cothren Pool	12
Holston River	149
Inskip Pool-NE Field	11
Lake Shore Park	6
Neyland Greenway	3
Oliver Smith Greenway	193
Sam Hill Park	5
Sequoyah Hill Park	30
Third Creek Greenway/Bike Trail	57
West Haven Rec. Ctr.	1
West Hills Park	20
SUBTOTAL PARKS	529
OTHER	
Candy Factory	4
Central High School	4
Chilhowee Int. School	1
Civic Auditorium/Coliseum	34
Christenberry School	7
Fire Hall # 15	1
Fort Kid	3
Loraine Street	1
Market Square Mall	1
MLK/Cas Walker Pkg. Lot	6
Safety Building	3
Sarah Moore Green School	1
Transfer Station	115
Vine Middle School	1
World's Fair Park	10
SUBTOTAL OTHER	192
TOTAL CITY TREES	1345

TABLE 2: NEW TREE PLANTINGS, KNOXVILLE, TENNESSEE (1996)

1996 NEW TREE PLANTING LOCATIONS	# TREES
RIGHT-OF-WAY	
Broadway (6011)	1
Cherokee Blvd (569)	3
Clinch Street	1
Cumberland Ave.	19
Eleventh Street	2
Emoriland Blvd. (2231)	1
Fountain Park Blvd.	3
Fourth and Gill	1
Henley Street	7
I-640-Mall Road	50
Jackson Ave.	3
Middlebrook Pike	239
Project Parkway	1
Sevier Ave./Lovelace/Plu	2
Woodrush Drive	3
SUBTOTAL R-O-W	336
PARKS	
Adair Park	39
Baxter Avenue	20
Bearden Middle	27
Campbell Park	17
Edgewood Park	14
Inskip Ballfield, Pool, Park	19
Lakeshore Park	159
Lonsdale Park	20
Mary Vestal Park	3
Ned McWherter	10
Park Ridge Park	18
Sequoyah Park	200
Scottish Pike Park	20
Tyson Park	19
Union Square Park	10
World's Fair Park	5
SUBTOTAL PARKS	635
OTHER	
Firehall #3	9
Firehall # 10	1
Loraine Street	22
Love Kitchen	6
St. Joseph School	10
SUBTOTAL OTHER	48
TOTAL CITY TREES	1019
KCDC	100

TABLE 3: NEW TREE PLANTINGS, KNOXVILLE, TENNESSEE (1995)

1995 NEW TREE PLANTING LOCATIONS	# TREES
RIGHT-OF-WAY	
Asheville Hwy.	60
Broadway	3
Cherokee Blvd	4
Cherry Street	30
Church (east)/Salvus	1
Gibbs Drive	5
Heather Lane Circle	3
Interstate Trees(1-29,1-40,1-275)	133
Neyland Drive	48
Orlando and Underwood	5
Project Parkway	10
Sharps Ridge	6
Shaw/Fairmont	3
Western & Athur	7
Whittle Springs	10
W. Ford Valley	1
W. Red Bud	1
Woodrush Blvd.	6
SUBTOTAL R-O-W	336
PARKS	
Adair Park	100
Ed Cothren Pool	21
Fort Dickerson	6
Inskip Field, Pool	15
Riverside Landing	19
S. Knox Optimist	15
Third Creek Greenway	42
Tyson Park	20
West Hills Park	84
SUBTOTAL PARKS	322
OTHER	
Community Develop.	2
Fort Kidd	12
NW Walking Trail	10
Sam Hill School Park	5
World's Fair Park	26
SUBTOTAL OTHER	55
TOTAL CITY TREES	713
KCDC	202

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