A STUDY OF URBAN FORESTRY IN BALTIMORE, MARYLAND: ANALYZING THE SIGNIFICANCE OF STREET TREES IN BOLTON HILL

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The incorporation of trees in an urban environment has been recognized as an asset for hundreds of years. A rich database of research exists touting the environmental, economic, and social benefits provided by trees to humans and the surrounding environs. Many cities across the United States have embraced urban trees and have established forestry programs to nurture their existence. Baltimore, Maryland has been recognized for its system of urban forests and urban forest management; however, the city is experiencing a continuous decline in the percentage of tree canopy cover. One Baltimore neighborhood that is defying this trend is the eclectic community known as Bolton Hill. Through active community participation, regular tree maintenance, and a healthy relationship with the Forestry Department, Bolton Hill exhibits a healthy street tree population and can serve as an important model for communities in Baltimore, and across the nation, in pursuing a successful urban forest in a time of tight budgets and environmental uncertainty.

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Introduction

Relatively speaking, the city is a recent phenomenon. Beginning with our earliest city-dwelling ancestors in Africa, South America, and Asia, the vision and structure of the city has morphed and evolved to meet the demands of the inhabitants and industries that sustain it. Unlike the early metropolises of Egypt and China, the modern city is a complex, multi-dimensional organism, a patch-work of natural and man-made elements spread across the landscape. In recent years, urban sprawl has threatened the integrity and vitality of the city, as well as the livelihoods of its residents, many of whom subsist in a state of poverty. Nevertheless, cities continue to function as important venues of business, politics, and history and are vital in supporting the lives of future generations.

However, cities are more than just skyscrapers, blacktop, and concrete. They are living, breathing creations that are dependent on the surrounding environment and embrace the natural world within its confines. In reality, cities are not separate entities from the natural ecosystem; they are molded from nature and exist in an uneasy equilibrium with its elements. Often, the city environment is referred to as an urban ecosystem (Botkin and Beveridge 1997; Grove and Burch 1997; Spirn 1984). This label encompasses all the components that contribute to a city: economic, social, physical, and ecological. The city as an ecosystem has several implications. Every day cities consume ‘raw materials’ and expel ‘wastes’ to sustain the livelihood of the urban fabric. This flow of energy into and out of the city is similar to the process that occurs in natural environments. Moreover, the daily interactions that occur in cities,

such as competition and collaboration, parallel those carried out in nature. Finally, there is a constant need to adapt to shifting trends and circumstances.

Urban ecosystems comprise not only built structures and human inhabitants; flora and fauna are integral components of the urban infrastructure. Nature in the city comes in many forms, including large urban parks, neighborhood pocket parks, community gardens, parkways, and playgrounds. Even something as simple as a street tree or a flower planter contributes to a vibrant natural presence that offsets the frenetic pace of urban life. Embracing nature as a vital component of the city is not a revolutionary concept. Humans have relied on forests, meadows, rivers, and lakes as sources of escape from the pressures of work, family, and life for centuries. Thus, it is natural for humans to desire the presence of trees, flowers, and water structures to soften the city's image. Of these natural elements, trees stand out as popular urban features both in their appeal and versatility. However, urban trees contribute far more to urban ecosystems than aesthetics. Collectively referred to as the city's urban forest, urban trees provide a host of economic, social, and ecological benefits to a city's physical infrastructure and resident population. Urban trees aid in carbon sequestration, reduce storm water runoff and increase soil infiltration, provide shade and counteract urban heat island effects (Botkin and Beveridge 1997; Coder 1996; McPherson 2000). Moreover, urban trees can contribute to the psychological and mental well-being of city residents and workers. Exposure to greenery and natural landscapes has been shown to improve mood, ease stress, and quicken recovery from illness (Dwyer et al. 1994; Ebenreck 1989; McPherson 2000). The presence of urban

greenery, particularly trees, has been linked to lower rates of crime and heightened consumer traffic in commercial districts (Kuo 2003; Prow 1999; Wolf 2003). Urban trees are also a wise economic investment: by providing shade and blocking winds, the proper placement of trees can lead to lower heating and cooling bills for citizens and businesses (USDA Forest Service Northeastern Area).

Besides providing a plethora of benefits to the urban ecosystem, urban forests serve as indicators for socio-economic trends such as community health and income disparities. Therefore, urban trees can be employed as barometers for the types of communities present and can identify neighborhoods suffering from neglect and indifference. Such a role is important in remedying disparities that may exist in funding for the improvement and maintenance of neighborhoods, both rich and poor. Furthermore, educational opportunities can be cultivated to address the importance of trees in communities and to encourage residents to take a proactive approach to urban tree care. Fostering community involvement encourages community pride and sense of place. Tree-planting can enhance the quality of even the most impoverished neighborhood and can potentially reduce crime and violence among the residents. Although a great proportion of urban trees may be found in parks and plaza settings, the planting of street trees in cities is an equally important endeavor and extends the reach of the urban forest and its benefits to those who may not have the opportunity to frequent city parks and natural landscapes beyond city limits.

Street trees have been integral components of cityscapes for hundreds of years, beginning in Renaissance Europe (Lawrence 1995; Miller 1989). Especially in

France, tree-lined boulevards and thoroughfares were regarded as symbols of status and wealth. Over time, their practical purposes became as important as their aesthetic appeal, prompting their appearance along residential streets and commercial blocks. City dwellers welcomed the shade they provided in summer, their potential to act as wind barriers, and their ability to attract positive recognition to their community (Gumprecht 2001). Inspired by the transformative qualities of a green landscape, many citizens became pro-active tree advocates and organized community tree planting events and tree care workshops. Furthermore, many municipalities possess at least one non-profit organization dedicated to tree planting and city greening projects (e.g., Baton Rouge Green; Nashville Tree Foundation; Trees Atlanta).

One metropolitan area that boasts a nationally recognized urban forestry program is Baltimore, Maryland. Supported by Maryland's rich forestry history and landmark 1914 Roadside Tree Law, Baltimore began to address the issue of urban trees, including street trees, with a special ordinance passed in 1913. This tree ordinance established a city forestry department which enabled Baltimore to develop a first-class urban forestry program. Over time, Baltimore has benefited from a number of street tree projects, including a central business district planting program and a nationally recognized approach to eradicating Dutch elm disease.

During the late 1950s and early 1960s, Baltimore engaged in a number of neighborhood urban renewal projects which highlighted street tree plantings as integral components of the final neighborhood plans. One neighborhood that was a participant in the urban renewal program was Bolton Hill. Located northwest of the

downtown core, Bolton Hill is regarded as one of the more affluent Baltimore neighborhoods and has been recognized for its array of common spaces, pocket parks, and tree-lined boulevards. During the late 1950s, however, the neighborhood was in a transition stage and the city, as well as the residents, wanted to restore the community to the prominent district it had once been. The urban renewal project served to rescue a dying neighborhood and to re-instill in its residents an appreciation for street trees.

Baltimore, Maryland has continued to cultivate its urban forest through an active forestry department and a strong citizen response. Through regional and local partnerships, programs such as Revitalizing Baltimore and the Community Forestry Program have sponsored tree planting initiatives, promoted proper tree maintenance techniques, and provided educational opportunities for adults and children. Furthermore, Baltimore has been recognized as a center for intensive ecosystem research through the Long-Term Ecological Research - Baltimore Ecosystem Study (LTER-BES) (Baltimore Ecosystem Study). The overarching goal of the BES is to establish a better understanding of the ecological patterns and processes at work within the city as well as their evolution over time. As a critical component of the city environment, urban forests contribute to the unique ecology of Baltimore and provide a context for the study of environmental and socio-economic factors in an urban landscape.

In the following pages, I address the importance of urban trees – street trees in particular – and their emergence as part of the American urban landscape. Chapter One offers a brief history of the evolution of tree planting, narrowing to a focus on

urban tree planting. In addition, I explore the wealth of information available on the environmental, economic, and social benefits provided by urban trees. Finally, I address some of the challenges and constraints currently facing urban trees. Chapter Two delves into the history of urban forestry in Baltimore, Maryland. Beginning with the development of urban parks in the late 1800s, I trace the evolution of Baltimore's urban forest and the struggles faced by Baltimore's Forestry Division to the present. Furthermore, I discuss some of the positive initiatives implemented by the city to ensure the existence of a healthy urban forest for future generations. Chapter Three presents a case study on the Bolton Hill neighborhood that examines the impact and evolution of the street tree population. I explore how citizens have embraced street trees in Bolton Hill, the measures that were taken to promote street trees, and how street trees have left an imprint on the fabric of the neighborhood. In order to tell as complete a story as possible, I collected data from a number of sources including newspaper clippings, photographs, city documents, scholarly publications, and neighborhood indicator databases. I also conducted interviews with Bolton Hill residents, city resource managers, and local politicians. Throughout the thesis, I convey the importance of street trees to our modern urban environments and investigate the reasons why the urban tree canopy is decreasing at an alarming rate.

Despite the popularity of urban forest research, there remains an overwhelming lack of depth in the information gathered on urban trees beyond their obvious benefits. Such a dearth of data presents a dilemma for foresters and planners as the rate of urbanization has continued to escalate through the twenty-first century. Denser

concentrations of people in metropolitan areas are certain to impact the structure, quality, and quantity of urban trees. Understanding the interrelationship between people and trees can lead to better planning for and management of urban forests and street trees in harmony with the city environment. The approach taken in the Bolton Hill neighborhood in Baltimore, Maryland is an excellent example of integrating street trees into the urban fabric, although the combination of factors contributing to its success may prove difficult to replicate in many impoverished city neighborhoods. In Baltimore, as in other cities across the United States, the loss of population due to "white flight" and the lure of the suburbs have resulted in a concentration of lower income citizens in city residential districts. Issues such as providing enough food, paying the rent, and caring for young children drive the lives of these residents. Survival outweighs aesthetics for these working class city dwellers and convincing them of the beneficial values offered by street trees is a difficult proposition. However, Bolton Hill's approach, when broken down, contains initiatives that are simple and feasible to implement in any neighborhood and can pave the way to a greater appreciation of urban trees across all sectors of a city.

Chapter One: Literature Review

A Brief History of Tree Planting

Humans have interacted with forest ecosystems since prehistoric times. Early humans depended on trees for a variety of uses, and it is likely that they domesticated trees to supplement their primary food sources and to provide additional fuel for domestic purposes. However, the intentional planting of trees, especially in urban settings, did not occur until the Renaissance Era in France when private baroque gardens began to incorporate trees into their architecture (Miller 1989, 32).

Typically, early intentional tree planting transpired in one of several different configurations: linear promenades, small squares, and large parks. These three settings form the basis of modern urban forestry, their varied structures influenced by a period's predominant cultural and ecological conditions (Lawrence 1995, 17). Early European linear promenades incorporated trees into landscapes along city walls, streets, and waterways. Essentially, the linear promenade was an adaptation of the allees of trees found in the private baroque gardens of the Renaissance. These arrangements began to appear in the late 1500s as cities, such as Antwerp, Belgium, planted trees along city walls for public use (Lawrence 1995, 18). Meanwhile, France championed the use of tree planting along a city's approach roads, while the Netherlands introduced promenades in the early 17th century as attractive features along town canal routes (Lawrence 1995, 18). By the early 19th century, almost every major European city contained at least one tree promenade. Paris, France epitomized the linear promenade phenomenon with its vast collection of tree-lined boulevards,

designed in the mid-1800s by Napoleon III (Lawrence 1995, 19). In North America, promenades gained acceptance in colonial cities and towns where colonists planted trees in front of private homes and businesses for shade and decoration. In contrast to Europe, the implementation of linear promenades in the American urban landscape was less rigid and was characterized by the irregular spacing of trees and the use of a diverse array of species (Lawrence 1995, 19-20).

The emergence of small public squares began during the Renaissance in Italy, France and Spain, but these early urban open spaces rarely incorporated trees into their design. This trend continued to dominate until the 18th century when public squares slowly began to include trees in their landscape structures (Lawrence 1995, 20-21). North American public squares evolved in a similar fashion. Most New England colonial towns were constructed around a multi-purpose village green used primarily for civic functions, not aesthetic pleasure. As in Europe, village greens did not adopt the planned use of trees until the late 18th century. The exception is the city of Philadelphia, founded in 1682 by William Penn, which contained five public squares, each five to ten acres in area, whose designs stipulated they be landscaped with groves of trees (Miller 1989, 33). Penn was also instrumental in implementing one of America's first pieces of legislation pertaining to urban trees. Drafted in 1700, the Pennsylvania Shade Tree Law was intended to address tree planting for the public good by enacting a set of landscaping and tree planting standards meant to guide the development of early Pennsylvanian settlements. The body of the Shade Tree Law proposed:

> …every owner or inhabitant of any and every house in Philadelphia, Newcastle and Chester shall plant one or more trees, viz., pines, un-bearing mulberries, water poplars, lime or other shady and wholesome trees before the door of his, her or their house and houses, not exceeding eight feet from the front of the house, and preserve the same to the end that the said town may be well shaded from the violence of the sun in the heat of summer and thereby be rendered more healthy… (Louisiana State University).

Pennsylvania's efforts to regulate tree planting are notable as they represent some of the earliest attempts to integrate trees into the urban environment. Another important tree initiative occurred almost one hundred years later in 1786 when the Commonwealth of Massachusetts passed an act that permitted highway surveyors to trim and/or remove all trees and brush regarded as possible obstacles to travelers on public highways. Further legislation pertaining to street trees was sparse until the late 1890s. In 1893, New Jersey passed one of the first laws addressing proper tree care. Six years later, Massachusetts drafted legislation requiring each town to hire a Tree Warden and set forth a list of duties and responsibilities specific to the newly formed office (Young 1955, 8-12).

In reality, many 18th century American cities had landscapes mirroring those of Williamsburg, Virginia where the main thoroughfare, Duke of Gloucester Street, and commons were all but devoid of intentionally planted trees. Although evidence does suggest the existence of several shade trees growing within the city limits in the late 1700s, the most common trees found growing within the city proper of Williamsburg were probably small fruit trees grown by private homeowners and businessmen. One reason posed for the lack of trees in Williamsburg and other eastern cities is that most

of the surrounding land had been cleared earlier for agricultural uses and the rural character of the surrounding countryside made treeless locales refreshing for travelers looking for wide open space (Colonial Williamsburg Foundation, 2004).

Despite the scarcity of shade trees lining streets in early cities, the aesthetic and social benefits of urban greenery were realized in the context of majestic city park designs being implemented in the mid-1800s. The creation of large city parks was sparked by the rise of Industrialism in Great Britain and the declining quality of life noted by concerned urban citizens. Determined to improve conditions in English cities, urban residents encouraged a variety of initiatives, including the creation of public green spaces (Miller 1989, 33). These green spaces were modeled after the royal hunting parks that dotted the English countryside. By the 18th century, these hunting parks had adopted a pastoral landscape design, a configuration that proved to be popular in green space implementation plans (Lawrence 1995, 23). Integration of public green space into the urban landscape spawned the influential Romantic Landscape Movement. The essence of the Romantic Landscape Movement was to "bring nature to the city" and it was characterized by an informal, "natural" arrangement of vegetation and structures in the landscape (Miller 1989, 33). The popularity of the Romantic Landscape Movement spread from Great Britain to other European countries that were overcome by the effects of industrial expansion and influenced the designs of many famous parks, including the Bois de Boulogne in Paris and the Tiergarten in Berlin (Lawrence 1995, 23). Eventually, the United States found itself embroiled in its own Industrial Revolution in the late 19th century. Looking to

Great Britain for inspiration, American cities eagerly embraced the virtues of the Romantic Landscape Movement and implemented a variety of city beautification efforts which included the planting of trees on streets and the construction of city parks and civic centers. Perhaps one of the most famous projects of this period was the design and construction of Central Park in New York City (Miller 1989, 34; Rosenzweig and Blackmar 1992). Championed by the famous landscape architect Fredrick Law Olmsted, Central Park sparked the City Park Movement in the United States, which led many large American cities to develop their own large urban parks, including Cincinnati's Eden Park and Nashville's Centennial Park (Lawrence 1995, 23; Rosenzweig and Blackmar 1992; Rybczynski 2000; Tuason 1997). According to Olmsted, the overarching goal of the City Parks Movement was to introduce naturally landscaped parks and green spaces into industrial centers in order to promote personal and social health among city residents (Miller 1989, 34; Rybczynski 2000).

As the City Park Movement captured the fancy of the eastern portion of the United States, an equally influential movement was occurring on the Great Plains among the homesteaders. As these hearty pioneers staked out land to settle and cultivate, many were faced with the harsh reality that defined the Great Plains: a land devoid of trees and dominated by harsh wind and few obstacles to block the intense sunlight. To most of these men, the Great Plains and its barren landscape represented a challenge to be conquered and set out to fill the "empty landscapes" with trees (Gumprecht 2001, 118-119). According to these early tree-planting proponents, their actions were intended to "assist" nature in "improving" the environment by

transforming the grasslands into more diverse and temperate settings. Some even saw the planting of trees on the prairies as a civilizing force and as an indication of soil fertility. They hoped that the act of planting and maintaining trees on the Great Plains would prove to skeptical outsiders that the region was not only arable, but habitable as well (Gumprecht 2001, 119).

Eventually, the pioneers of the Great Plains began to gain a reputation for their tree-planting activities. Incidences of squatters planting trees on land before they were legally allowed to settle became common. A prime example occurred in 1858 when, one year before settlement was permitted in the Nebraska Territory, a steamboat delivered approximately 55,000 trees to the squatters homesteading there (Gumprecht 2001, 119). By 1870, tree planting on the Great Plains had become a phenomenon. Railroad companies capitalized on the popularity by implementing tree planting projects in the towns along their routes to promote settlement. Even the U.S. Government became involved with the passage of the 1873 Timber Culture Act, which offered 160 acres of land to homesteaders if they agreed to plant a designated percentage of their land with trees. Overall, most of the major tree planting campaigns on the Great Plains focused their attention on "improving" rural areas (Gumprecht 2001, 120). These rural homesteaders reaped many benefits from the introduction of trees, including protection from the harsh winds, stabilization of the soils, moderation of temperatures, and production of wood for fuel and construction. City dwellers benefited from trees as well; for instance, urban trees were valued for their attractiveness, for the shade they provided from the summer sun, and for the increase

in property values their presence encouraged. The enthusiasm of the settlers toward tree planting on the Great Plains may be explained by their cultural and geographic origins. Most of the pioneers were of European stock and had been born or raised in forested regions of the U.S. or Europe. Thus, by introducing trees to their newly acquired lands, the homesteaders were attempting to recreate a more familiar environment to mask the loneliness of the grasslands (Gumprecht 2001, 120; Williams 1989).

As tree planting campaigns swept the Great Plains in the 1800s, settlers in the western states and territories were inspired to green their landscapes as well. Colorado City, Colorado was one western city that benefited from the introduction of trees. Established in 1872 by General William Jackson Palmer, Colorado City was located on a grassland plateau devoid of trees. A proponent of tree planting, Palmer advocated for a cityscape dominated by tree-lined streets and parks. When water became available for municipal use, Palmer obtained 600 cottonwoods from the Arkansas Valley, hired a forester, and oversaw the planting of trees along Colorado City's downtown and residential streets. Eventually, Palmer would be recognized for having given 2000 acres of parks, walking paths, scenic drives and roadways planted with trees to the people of Colorado City. In 1910, the Colorado City Council created the first forestry department west of the Mississippi River, as well as a tree ordinance and a city forester position. Presently, the Colorado City urban forest includes over 99,000 street trees accounting for over 30 different tree species planted throughout the city ("City of Trees" 2001).

Back east, New York City had an early investment in street and shade trees as well. As the framework for the modern metropolis was being laid in the beginning decades of the 18th century, an abundance of trees was planted along streets, around public structures and greens, and in private property to compensate for those extracted to permit development of the city. The reintroduction of trees into the urban fabric connected the new city to its rural roots and reminded residents they were not far removed from the countryside. New York City's rapid development resulted in the implementation of a rigid street grid system in 1807 that eliminated a great number of the community trees that had been planted in the 1700s. For over half a century, New York residents ignored street tree planting in favor of designing and creating large urban parks and cemeteries, including the Greenwood Cemetery in Brooklyn and Central Park. It would not be until the late 1870s, under the direction of Boss Tweed, that a street tree policy was adopted in New York City. As a result of this renewed interest, the New York City Street Tree Planting Association was founded in the mid-1880s and in 1902 the management of public "vegetation" was transferred from the Public Works Department to the Parks Department. The change in jurisdictions triggered a series of new laws governing urban landscaping, including making it a crime to vandalize or mutilate public plantings and requiring the issuance of a permit to allow for the modification of urban plants or landscaping. An additional provision included in the permit required the replacement of any trees removed in the process of making modifications to the environment. Consequently, New York City's reinvestment in the value of street trees made an immediate impact on the public, who

flooded the Parks Department with requests to plant trees on the streets of their neighborhoods (Gunther 2002).

Tree planting was subject to exploitation, especially in perpetuating inequities among city residents and contributing to segregation practices in the South. Such was the situation in New Orleans where tree planting projects, coordinated in conjunction with a city-wide public works overhaul, gradually began to favor wealthy, white residents over their African American and Creole neighbors (Colten 2005, 78). New Orleans' interest in trees arose from a desire to create bucolic landscapes within the urban environment to counter nuisance conditions, including sewage, garbage, and industrial wastes, plaguing the city. Promoters of street trees and parks stressed that green landscapes were integral to improving public health and encouraging a better society (Colten 2005, 48). Drawing on European influences, the city began a campaign in the 1800s to line its boulevards and thoroughfares with trees in hope of improving air quality and providing shade for the masses, rich and poor, who traversed and shared the streets of New Orleans on a daily basis (Colten 2005, 72–73). By the 1850s, New Orleans' shaded streets had become the city's trademark, with oaks serving as the tree of choice. With the exception of Esplanade Avenue, which passed through a predominantly Creole neighborhood, most shaded routes served white neighborhoods whose residents benefited most from the trees, even though large numbers of people of all races and incomes utilized these streets on a regular basis (Colten 2005, 89). In 1909, the New Orleans City Council established a Parking Commission to oversee planting and maintenance of street trees, among other

responsibilities. The commission sought to provide a balanced streetscape, utilizing native flora when possible, and stressed that "there must be no distinction between the rich and poor quarters, for all are entitled to and must have the best" (Colten 2005, 91). Unfortunately, the Parking Commission would not fulfill its initial promises. Tree removal projects along Esplanade Avenue in 1915 and in 1920 were a source of protest and agitation for Creoles and African Americans who lived along or in the vicinity of the prestigious boulevard. The 1920 removal of oak and elm trees was contested by opponents who claimed some of the trees had been planted by New Orleans's founder, Jean-Baptiste Le Moyne de Bienville. To avoid further controversy, a tree protection association was created and its membership lobbied the mayor to halt the tree removals, to compel the Parking Commission to replace all cut trees, and to trim damaged trees to promote regrowth (Colten 2005, 95–96). These successes were short-lived. By the 1920s, the Parking Commission, renamed the Parks and Parkway Commission, altered their previous goal of providing shade trees to all neighborhoods by imposing special assessments as a necessary requirement for tree plantings. Under these assessments, only neighborhoods that voted to pay a fee for shade trees would receive new plantings along their streets, thus limiting expansion of tree projects and parkways to upper-middle class and wealthy neighborhoods and neglecting lower income and minority communities (Colten 2005, 100). Hence, in New Orleans, tree planting projects were not only environmental amenities, but assumed a role as indicators of status and class (Colten 2005, 80).

Western expansion and the Industrial Revolution took their toll on American forests. Urbanization, especially to the east of the Mississippi River, consumed tens of thousands of acres of forested land; meanwhile, clear cutting operations practiced by timber companies harvested thousands of trees at a time. By the early 1870s, Americans began to express concern about the declining condition and spatial area of their forests. As a result, tree planting projects began to draw renewed interest among the public. Responding to the demand for action, J. Sterling Morton, who served on the Nebraska Board of Agriculture, established Arbor Day. First celebrated in 1872 in Nebraska, the inaugural Arbor Day event witnessed the planting of over one million trees across the state (Miller 1989, 34) and garnered Nebraska the nickname, "The Tree Planters State" (Gumprecht 2001, 119). The fervor experienced in Nebraska spread to the rest of the United States, and as a result, Arbor Day became an annual celebration held in April where citizens across the country partake in tree planting projects in cities, suburbs, and forests (Miller 1989, 34).

Community tree planting projects were not confined to the celebration of Arbor Day. Civic groups partook in planting memorial trees to commemorate people and events. Memorial tree planting was popular in the post-World War I period when coalitions of women's clubs and service clubs across the U.S. began a tree planting program called Roads of Remembrance. The program was instituted to complement extensive post-war road building projects and responded to the favorable impressions soldiers expressed concerning roadside trees in Europe, especially in France. A large number of memorial tree plantings occurred along the Lincoln Highway; however,

many other well-traveled highways and interstates were selected for inclusion in Roads of Remembrance. Additionally, many towns and cities participated in Roads of Remembrance: Seattle, in the early 1920s, planted over 1200 trees along its streets while Middleton, Ohio added 1000 trees (Young 1955, 8-12).

By the early 20th century, many states were beginning to consider implementing state forestry programs. One such state was Maryland, which possesses a rich history in forest management and urban forestry. Motivated by excessive timber harvesting and its environmental repercussions, the Maryland State Board of Forestry was organized in 1906 to improve the management of public and private forest resources; Fred Besley was appointed Maryland's first State Forester. Under Besley's tenure, Maryland saw the adoption of the first roadside tree law and the establishment of the first state forest nursery in 1914, as well as the completion of the first forest inventory in 1916 (Buckley and Grove 2001; Kays 1995; Kirby 1995). Similar successes enjoyed by states across the U.S. prompted the arrival of the modern urban forestry movement. Consequently, large and medium sized cities began to initiate formal city forestry programs to address the planting and maintenance of street and park trees (Miller 1989, 34). The rise of the environmental movement in the 1970s prompted concerned citizens to engage in grassroots tree planting programs and to act as advocates for greater urban forestry funding allocations in municipal budgets. These community forestry initiatives have sparked the formation of numerous non-profit tree planting groups including The Greening of Detroit, Trees Atlanta, and

Colorado Trees. In fact, most major metropolitan areas have at least one group committed to urban greening strategies and education.

The Benefits and Values of Street Trees in an Urban Environment

The utilization of roadside trees in an urban context provides a variety of benefits whose impact could potentially enhance the viability of a city and the vitality of its citizens. The bulk of these urban tree benefits may be divided into three broad categories: environmental, economic, and social.

Environmental Benefits

As natural elements in the physical landscape, trees play a critical role in maintaining healthy ecosystems. Especially in urban settings, the contributions trees make to the environment are magnified and serve to improve the lives of residents in direct and indirect ways. One of the more significant impacts trees impart to their environs occurs through the mitigation of climatic effects (Botkin and Beveridge 1997; McPherson et al. 1995). For instance, the presence of trees in urban landscapes moderates the heat island effect imposed by absorption of solar radiation by streets, parking lots, and buildings. Trees provide shade that serves to reflect solar radiation from paved surfaces, thus reducing the temperature in city centers by as much as 3° - 5° C (USDA Forest Service Northeastern Area). This effect is achieved through the natural process of evapotranspiration, in which water evaporates from a tree's leaves and returns to the atmosphere. Consequently, trees act as a natural air conditioner,

reducing the immediate air temperature and alleviating the impact of the heat island effect (Botkin and Beveridge 1997; USDA Forest Service Southern Region). Increased shade and cooler temperatures extend the life of paved surfaces and defer necessary maintenance to streets and sidewalks by the municipality (USDA Forest Service Western Center 1999).

Site location for urban trees can influence the degree of energy savings possible for a particular area or structure. The proper positioning of trees around buildings can buffer the effects of high temperatures and direct solar energy on building occupants in summer, as well as allow the penetration of solar radiation in winter (USDA Forest Service Northeastern Area). Tree placement can also diminish wind speeds and reduce heating costs in winter months for affected properties (Harris 1992). According to the U.S. Forest Service, the proper placement of trees can reduce air conditioning needs by 30 percent and produce energy savings of 20-50 percent for heating requirements (Cool Communities).

A second environmental benefit of urban trees is their promotion of pollution control and improved air quality. Although most reductions are modest in nature, trees are generally effective in the removal of solid particulates and gaseous pollutants from the atmosphere (Botkin and Beveridge 1997; USDA Forest Service Southern Region). Ultimately, the absorption and entrapment of airborne pollutants, such as nitrogen oxide, ozone and carbon monoxide, is dependent upon the leaf surface area of the tree, and thus the tree species (International Society of Arboriculture 1995; Nowak 1994).

Overall, urban forests are more successful in the absorption and storage of CO_2. Through carbon sequestration, trees act as "carbon sinks" by removing atmospheric carbon and transforming it into cellulose to be stored in the trunk, roots, leaves and branches (Colorado Tree Coalition; Nowak 1993). Research indicates that the average tree can store up to 13 pounds of carbon yearly. Furthermore, a community forest is capable of absorbing enough CO_2 annually to compensate for driving an automobile approximately 26,000 miles (Cool Communities). Through photosynthesis, trees recycle the CO_2 into oxygen. According to the USDA, "one acre of forest absorbs six tons of CO_2 and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people" (Cool Communities). Furthermore, the U.S. Forest Service has estimated that over a fifty year lifetime, one tree has the potential to generate $31,250 worth of oxygen and provide $62,000 worth of air pollution control (USDA Forest Service Pamphlet #R1-92-100). To support air quality improvements, an increasing number of public and private investments are being made in urban forestry initiatives. For example, a recent trend among electric utilities is to implement shade tree programs in local communities to reduce the peak demand of electricity and to offset their emissions of CO_2 (McPherson 2000).

Another environmental benefit provided by urban forests is the conservation of soil and water quality. During periods of precipitation, tree canopies intercept and store some of the resultant rainfall. Consequently, rain that penetrates the tree cover loses some of its force and does not disrupt the soils underneath, leading to reductions in erosion potential and in runoff volumes (USDA Forest Service Northeastern Area).

In a study conducted by the U.S. Forest Service, rain interception by the urban forest for a twelve hour, one inch rainstorm in Salt Lake City reduced stormwater runoff by 11.3 million gallons; furthermore, Coder found that for every five percent of tree canopy cover added, there was a two percent reduction in stormwater runoff (American Forests 1999; Coder 1996). Stormwater runoff may also be controlled by the processes of root growth and of the decomposition of leaf litter, which increase the soil capacity and the rate of rainfall infiltration (McPherson 2000). Research has shown that root systems remove nutrients that degrade water quality and stabilize surrounding soils and ground cover (American Forests 1999; Harris 1992). Trees are also known to play a major role in evapotranspiration processes. Through evapotranspiration, moisture is drawn up from the soil by the tree, thus increasing the soil's water storage potential (Center for Urban Forestry Research). Finally, urban trees may be used to recharge aquifers through the use of recycled wastewater, which in turn, reduces storm water treatment loads (McPherson 2000).

Finally, urban trees operate as important noise and visual buffers in urbanized environments. Street trees planted near busy thoroughfares can deaden the sound of heavy vehicular traffic and provide "background noise" through the rustling of leaves and branches to muffle additional nuisance noise, including lawn mowers and construction work (Harris 1992). Trees have proven to be effective visual screens, blocking unattractive buildings, objects and land features that may detract from a citizen's enjoyment of the landscape and distract motorists along congested commercial corridors (USDA Forest Service Southern Region).

Economic Benefits

Besides enhancing and sustaining the urban environment, urban trees are capable of providing monetary benefits and incentives. Urban forests are major capital assets for metropolitan regions and contribute overwhelmingly to a city's unique infrastructure. Furthermore, urban trees may be considered one of the few capital improvements to increase in value over time. A study conducted in Tucson, Arizona concluded that for every dollar spent to maintain trees, $2.62 in benefits was recovered through energy savings, dust reduction, and reduced stormwater runoff ("Trees are a Wise Investment"). One particularly important benefit of trees is their ability to add value to a property. According to the U.S. Forest Service, healthy, mature trees can increase a property's value by an average of 10 percent (Cool Communities). A Rochester, New York study bolsters the Forest Service's findings by indicating the presence of trees in a residential suburb increased the average sale price of a home by $9500, or by 18% (Nowak, David J., undated). Thus, one can easily deduce that a well-landscaped home is more valuable than a non-landscaped home in the same community.

Similarly, trees serve as stimulants of economic development, attracting promising new enterprises and tourism opportunities. Well-landscaped commercial districts lure more shoppers and apartments surrounded by trees tend to have lower rates of turnover among occupants (Cool Communities). Furthermore, businesses that rent space in office parks and commercial buildings landscaped with trees report decreases in absenteeism and increases in worker productivity (Michigan State University Extension, Urban Forestry #07269501, "Benefits of Urban Trees"). A

recent national survey that focused on consumer / urban forest relationships in business and commercial shopping districts showed that those business owners who invested in trees as landscape features experienced positive responses from their patrons, including feelings of enhanced visual quality and comfort, friendlier interactions with merchants, and assumptions of attentive maintenance and up-keep. These same patrons were willing to travel farther and pay more for parking to shop in well-landscaped business districts (Wolf 2003).

The monetary benefits of an urban forest extend to energy savings as well. Landscaping structures with trees can provide cuts in both heating and cooling costs. Furthermore, by cutting air conditioning costs, trees can indirectly reduce CO_2 emissions equivalent to 15 times the amount the tree alone could absorb (USDA Forest Service Northeastern Area). In general, the amount of savings achieved through landscaping with trees is dependent on specific factors, including building structure, climate, tree arrangement, and quality of tree maintenance. For example, U.S. Forest Service meteorologist Gordon Heisler estimates that savings of 20 - 25 percent in energy costs are possible when trees are strategically planted around a house compared to a house situated in a wide open location (Ebenreck 1989, 50). Sewage treatment savings are also possible for plants that choose to apply treated effluent to trees for watering purposes. Trees benefit from the nourishment and the plant benefits from a reduced need for evaporation ponds and sewage lagoons and a decreased reliance on dumping municipal wastes into nearby rivers, lakes, and oceans (USDA Forest Service Northeastern Area).

Social Benefits

Trees provide not only environmental benefits, but social benefits as well (Botkin and Beveridge 1997; Dwyer et al 1994; Kaplan 1995). Unlike the American colonists, who expressed an aversion toward forests (Williams 1989), most human populations have nurtured a special relationship with trees, regarding them as connections to nature or as symbols of religion or relaxation. For example, people who visit green spaces and parks often report feeling a reduction in stress and a renewed sense of vitality (McPherson 2000). Several studies have been conducted to try to quantify the mental health benefits derived from exposure to trees. One study, initiated by geographer Robert Ulrich, involved comparing the health records of two groups of patients at a suburban Pennsylvania hospital. The first group studied could view trees from their hospital windows while the second group could only glimpse a brick wall. Results of the experiment demonstrated that patients with access to trees had shorter hospital stays, fewer negative comments recorded in nursing reports, and were administered fewer potent pain killers (Ebenreck 1989, 54). Another study concluded that prisoners whose cells overlooked green landscapes visited the prison health center less often than prisoners whose cells overlooked other prison buildings (USDA Forest Service Northeastern Area).

Besides promoting mental health and well-being among individuals, trees also are credited with encouraging a city to embrace its unique identity and its sense of place (Anlian 1989; Dwyer et al. 1994). Treescapes serve as defining features in urban centers and illustrate the values held by the city. Citizens who participate in

urban tree planting and maintenance report an enhanced sense of cooperation and pride in their community. Additionally, tree planting and maintenance programs connect participants intimately with the urban forests and encourage accountability for the health and appearance of the trees. In fact, the extent of local involvement in tree plantings tends to dictate the survival rate of the newly planted seedlings (Miller 1989). Consequently, local accountability and pride in one's place has the potential to encourage stronger citizen involvement in city government and in the shaping of the city's future development (Ebenreck 1989, 55).

Inclusion of trees in the urban environment has been further credited with strengthening community and social contacts as well as reducing the incidence of domestic violence and violent crime. One study, conducted by Frances Kuo, sought to determine how urban trees impacted the social ecology of inner city residents in Chicago public housing projects. Evidence drawn from observations, interviews and police reports, among other sources, showed a positive correlation between the presence of urban trees and stronger neighbor ties, greater feelings of safety, improved relations among adults and youth, greater use of outdoor spaces, and lower rates of property crimes and violent crimes (Kuo 2003). An earlier study conducted by Kuo and Bill Sullivan focused on a single public housing project, the Chicago Robert Taylor Housing Project, and considered whether daily exposure to trees had an impact on the social and emotional lives of the residents. They drew several important conclusions from their work. First, citizens who resided in complexes situated closer to trees reported cultivating stronger ties and better relationships with their immediate

neighbors. Secondly, Kuo and Sullivan uncovered fewer reported incidences of physical violence in residences surrounded by trees. Additional findings included the potential for reduced social service budgets, decreased police calls for domestic violence disturbances, fewer reports of child abuse, and stronger community relations (Prow 1999). As a result of their research, the city government was moved to appropriate $10 million dollars to plant 20,000 trees (Colorado Tree Coalition).

Despite the positive correlations exhibited between trees and strong, healthy urban communities, there exist city dwellers who profess a fear of trees and forested areas. For these individuals, urban trees may serve as hiding places for criminals, especially in densely planted corridors and groves along streets and in parks. Beyond fears of crime and violence, some people fear trees will breed insects that carry infectious diseases, such as Lyme disease. Hence, wary urbanites might be reluctant to support dense tree plantings in their neighborhoods and may avoid similar forest clusters in other districts of a city. Dwyer and Hutchinson (1990) conducted a study in Chicago that examined how African Americans perceive the urban forest. Their results suggested African Americans were more likely to prefer developed recreation areas over natural ones and intimated many held negative connotations of forests in rural Southern areas, perhaps a product of their ancestry and their relationship with the forest (Dwyer et al. 1994; Dwyer and Hutchinson 1990). Another possibility contributing to the fear of trees is that urban residents lack a sense of familiarity with forest landscapes, prompted by residing in intensively developed environments for a majority of their lives. Schroeder (1983) found individuals who resided in the suburbs

were more likely to favor natural settings while individuals who resided in cities favored developed settings (Dwyer et al. 1994; Schroeder 1983).

Urban trees also present unique educational opportunities for children and adults. Interacting with the urban forest environment can highlight the relationships trees share with various aspects of the natural world and can demonstrate how a tree's health can serve as an indicator of the health of a whole ecosystem (Ebenreck 1989, 56). Presently, many metropolitan areas have one or more non-profit organizations and/or community groups that offer specialized educational programs and classes designed to empower residents with information regarding proper tree care and the critical roles trees fulfill in an urban environment. An excellent example is the Community Forestry Stewardship Program, coordinated by Baltimore, Maryland's Parks and People Foundation. Through this initiative, residents may engage in hands-on training in tree-planting and streetscaping techniques and attend classes devoted to developing greening projects and implementing fundraising strategies (Parks and People).

Challenges and Constraints for Street Trees in an Urban Environment

Regardless of the numerous benefits urban forests have to offer urban centers and communities, there exist a number of challenges and constraints that threaten their sustainability. One of the major constraints imposed on the urban forest is the gradual loss of urban green spaces and parks to development affected by the increasingly limited amount of growth potential in cities. Elimination of green space results in a

subsequent loss of critical natural areas and the important ecological services they provide to wildlife and the surrounding environment (McPherson, 2000). Strategies exist to counteract the elimination of urban green space, specifically, street trees. Community education and outreach is one of the easiest and cheapest to implement. Classes, lectures, and informational materials are just a few of the ways proper tree preservation can be communicated to the general public. Another strategy to preserve street trees is to provide the public with incentives, including the establishment of community grant funds dedicated to replacing or planting new trees and property tax breaks for landowners who agree to preserve their trees. Finally, the community may establish a series of regulatory measures in their efforts to protect trees. Implementation of regulations may require emphasizing tree protection in planning, zoning, and land use ordinances as well as establishing distance or buffer zone requirements **(**Scenic America). A popular option being exercised by many metropolitan areas is the development of urban greenways and greenbelts (Lindsey 2003; Little 1990). These amenities not only incorporate tree planting and maintenance in their design, but promote healthier cities and people by providing opportunities for exercise, tourism, and alternative commuting routes.

Another challenge facing the urban forest is the quality and the quantity of planning and management that is directed toward the sustainability of trees and vegetation. There are many specific issues associated with this particular challenge, including the following:

- An inadequate amount of funding allocated for municipal tree care programs
- An inadequate amount of space dedicated for trees in development plans
- A lack of knowledge regarding how certain tree species respond to the environment
- A lack of commitment to developing urban forest management plans and working tree inventories
- A lack of public awareness regarding the benefits of a healthy urban forest.

(McPherson 2000)

To address these critical issues, many communities have begun to adopt tree ordinances that outline specific standards and guidelines relating to tree care and management. Communities that embraced tree ordinances have reaped numerous benefits, including enhanced communication and interaction among local government entities, heightened visibility of existing tree programs, greater support for tree wardens and arborists, and more opportunities for educating the public on the benefits of trees and proper tree maintenance. To be effective, tree ordinances must have a solid foundation of support from community stakeholders as well as conform to the unique needs of a community. Thus, a cookie-cutter model does not exist from which tree ordinances may be developed. Every ordinance reflects the priorities and desires of the community it serves (University of Connecticut Cooperative Extension Forestry).

A third challenge imposed on the urban forest is the stress associated with existing in an urban landscape. Air pollution, cars, construction, and limited root

space can corrupt a tree's health and well-being, leading to shortened life spans and unattractive green spaces (Dwyer 2000; Spirn 1984). City environments are foreign habitats to many tree species and present unique situations and circumstances not encountered in native settings. Unlike trees planted in urban and residential parks, street trees are planted as "specimens," or spaced to provide maximum crown spread and minimum competition for sunlight (Quigley 2004). Planting spaces, or tree wells, established for street trees are typically small in area and provide inadequate opportunities for proper root system growth and nourishment (Williams 2005). Moreover, building and street foundations and the abundance of sidewalk pavement limit the percent of pervious surface which not only inhibits infiltration of water and nutrients, but impacts the zone where fine roots concentrate in the soil (Quigley 2004; Spirn 1984, 176 - 177). The maturation of root systems is further constricted by infertile, compact soils and the placement of gas, electric, and telephone lines (Spirn 1984, 175). Compaction of urban soils, spurred by adoption of modern construction methods, reduces soil oxygen and water exchange and decreases root penetration (Quigley 2004). Hence, a lack or an abundance of water can damage healthy root systems and prevent the tree from receiving the proper balance of nutrients needed to thrive at its full capacity (Spirn 1984, 175). Quigley (2004) conducted a study to determine whether urban trees could achieve mature sizes comparable to their rural counterparts. His findings confirmed urban trees grew at slower rates and that most urban tree trunks were smaller in diameter than same-aged rural conspecifics (Quigley 2004). In addition, vandalism and destruction caused by cars and humans have

gouged trunks, branches, and roots (Spirn 1984, 175). Consequently, average life expectancies for street trees have been estimated to be as low as 8 to 10 years when planted in highly congested locations ("The Endangered City Forest").

Another significant threat facing street trees is the introduction of harmful pests and diseases that have the potential to eliminate entire species of trees, especially given that many cities employ only a select few species for planting. Perhaps the best known of these diseases was, and remains, Dutch elm disease. Essentially, Dutch elm disease is a fungus transmitted by the bark beetle, which lays its eggs under the bark of an elm tree. The fungus feeds off the "veins" of the tree, clogs them, and induces wilting as well as the yellowing, curling, and thinning of the leaves. Once infected, a tree may live for as little as a few weeks to as long as a year (Schoettler 1962). A second troublesome tree pest to emerge has been the emerald ash borer. An exotic pest from Asia, the ash borer belongs to a group of insects known collectively as metallic wood-boring beetles and qualifies as a threat worthy of quarantine significance. Emerald ash borer activity tends to remain invisible to the naked eye until affected trees display classic symptoms, including the thinning and eventual die-back of the upper third of a tree, D-shaped exit holes and vertical splits in the tree bark, and serpentine-shaped tunnels in the cambium layer where larvae halt the tree's nutrient flow and starve it to death. Once infested, a tree typically lasts one to three years before it is completely ravaged (News Release, Maryland Department of Agriculture, 2004).

Perhaps one of the most troubling trends identified in urban forestry is the continuing decline in tree canopy cover experienced in cities across the U.S. Utilizing satellite imagery and data collected from Urban Ecosystem Analyses conducted in ten cities over a six year time period, the American Forests Association, in cooperation with the U.S. Forest Service, private corporations, and organizations, estimated the National Urban Tree Deficit for the U.S. as 634,407,719 trees. Based on the average urban tree cover spanning 133 square feet, American Forests' estimated deficit is alarming when one considers how many square feet are involved (American Forests). Currently, urban tree removal rates exceed planting rates in most major metropolitan areas by a ratio of 4:1. Furthermore, a study conducted by American Forests found that for one-third of twenty cities surveyed one tree was planted for every eight trees that were removed. Present estimates conclude that 90 to 100 million must be planted annually over the next ten years to expand and maintain the nation's urban forest resources ("The Endangered City Forest"). As the urban footprint of cities continues to grow in the United States, even modest tree planting goals seem impossible to attain. Moreover, the diminishing urban forest has environmental implications since tree cover can be an indicator of environmental quality. Consequently, air and water management costs rise as urban tree canopy cover decreases and expenses related to building infrastructure increase to accommodate demands placed on heightened air and water resources (American Forests).

To address this disturbing trend, American Forests has advocated for communities to establish tree canopy goals to ensure that a healthy green

infrastructure exists throughout its continual growth and development. Setting appropriate goals involves determining the present amount of tree canopy cover and assessing how the community intends to meet federal and local air and water quality regulations. Since every community has a unique set of attributes, every community will have a unique set of tree canopy cover goals. However, American Forests has developed a list of recommended tree cover percentages based on geography and land uses (Table 1). American Forests' recommendations were derived from 20 years worth of analyzing tree cover percentages.

	Metropolitan Areas East of Mississippi River and in the Pacific Northwest	**Metropolitan Areas in the Southwest and the dry West**
Average Overall Tree Cover	**40%**	**25%**
Suburban Residential Tree Cover	**50%**	**35%**
Urban Residential Tree Cover	**25%**	**18%**
Central Business District Tree Cover	**15%**	**9%**

Table 1: Recommended tree cover percentages for specified regions of the United States. (Source: American Forests)

The resolution of these and other constraints will require a significant amount of effort and collaboration among cities, regions, countries and government entities at all levels (McPherson, 2000). Currently, several strategies may be employed to aid in

the preservation of urban trees. One of the most basic methods is through the provision of adequate education initiatives that distribute pertinent tree care and maintenance advice via pamphlets, lectures, and workshops accessible to all members of a community. Volunteer efforts organized by individuals, community groups, or local government contribute greatly to tree preservation whether through the donation of money or time to support tree planting events, specialized maintenance programs, or the acquisition of conservation easements. Many towns and cities across the U.S. can claim to possess at least one community group concerned solely with the protection and preservation of street trees (Scenic America). Perhaps one of the most influential groups responsible for the future of street trees is private property owners. Approximately 80 percent of urban street trees reside on private property ("The Endangered City Forest"). To ensure a vibrant urban forest, it is imperative to include ordinary citizens in coordinating tree planting and maintenance in their neighborhoods by reaching out through city forestry divisions and non-profit agencies. One city to have embraced such an endeavor is Baltimore, Maryland, a city beset with its share of street tree successes and failures.

Chapter Two: Urban Forestry in Baltimore, Maryland

Urban Forests Prior to 1900: Urban Park Movement

The origins of urban forestry in Baltimore can be traced to 1827 when William Patterson offered several acres of land on Hampstead Hill to the city of Baltimore to be developed into a public gathering space. At the time, the land in question had already become a favorite destination for Baltimoreans to picnic and recreate. Patterson hoped to enhance the landscape by incorporating elements of the public walks he had encountered in Europe ("History of Patterson Park"). In 1835, several years after his generous donation, Patterson planted over 200 trees, spanning twelve species, to improve the aesthetics of the park. Patterson's death in 1835 did not halt development and acquisition of land for the park ("The Pattersons and Their Contributions"). His vision was finally realized on July 13, 1853 when the public was formally welcomed into Patterson Park, now considered one of the oldest public parks in Baltimore. One of the hallmarks of Patterson Park is the array of tree-lined pathways and carriageways weaving throughout the pastoral landscape. These elements reflect the romantic design envisioned for Patterson Park and embrace the utilization of trees to enhance their aesthetic appeal among park patrons ("History of Patterson Park").

Spurred by Patterson Park's popularity, city officials contemplated establishing an even larger public park to serve the residents of Baltimore. Thus, the planning process for Druid Hill Park began in 1858. In April of 1858, Baltimore City Council drafted an ordinance that proposed raising passenger railway fare from 3 to 4 cents to

facilitate accumulating a separate fund devoted exclusively to purchasing land for a public park. The acquisition of land occurred in 1860 when Mayor Thomas Swann (1856 – 1860) and his park commission approached Lloyd Nicholas Rogers and offered to purchase his country estate, "Druid Hill." Rogers relented and on October 19, 1860, Druid Hill Park was dedicated with the help of several thousand Baltimore residents, a concert, and a 39-gun salute (The City of Baltimore Webpage; Perlman 1960). In addition to the water features and expansive lawns characteristic of the Picturesque Movement, Druid Hill Park contained a number of scenic tree-lined drives, orchards and woodlands. These natural landscapes were considered integral features in attracting visitors; hence, the Park Commission took extra care to ensure the trees were healthy and attractive. A nursery was established on-site to provide a variety of ornamental trees and shrubs for planting throughout the park grounds (First Annual Report of the Landscape Gardener of Druid Hill Park 1860).

Early 1900s: The Awakening of Urban Forestry in Baltimore

Baltimore's parks were not the sole location of urban forests in Baltimore. Trees were planted along the streets and highways in and around the city to promote a positive aesthetic appearance, to give the downtown a unique character, and to attract new residents and businesses. Street tree planting and maintenance was the responsibility of the Park Department, which proved to be a strain on its budget and workforce. By 1904, the Public Park Commission reported that trees planted on various streets throughout Baltimore were fairing poorly. However, the Baltimore City Law

Department forbade the Park Department from planting and tending to trees on streets outside of parks and squares using park funding, despite the fact that park employees were the most qualified of all city workers to complete these tasks. (Annual Report of the Department of Recreation and Parks 1904, 34-35).

Public frustration concerning negligence toward street trees peaked in 1907 when, at a meeting of the Citizens' Improvement Association of Northeast Baltimore, a series of resolutions was drawn up and submitted to Mayor J. Barry Mahool (1907 – 1911) recommending the appointment of a commission dedicated to citywide oversight of street trees. The recording secretary of the association, P.G. Skirvan, emphasized the need for municipal attention to street trees, citing a lack of pride among some city residents for trees growing along their neighborhood streets and the potential aesthetic benefits Baltimore could derive from properly maintained trees. Skirvan further suggested the appointment of a forestry commission, which could lead to educational opportunities for residents regarding tree care techniques and facilitate arrangements with utility companies to lay wires so that they do not interfere with tree root systems (The City of Baltimore Webpage; "For Forestry Commission" 1907). Unfortunately, Skirvan's vision would take several years to implement fully.

Public interest in tree planting re-intensified in 1912 when the local chapter of the Women's Civic League, concerned for the social welfare and health of the city's residents, proposed the creation of a specific agency devoted to the planting and management of trees. The League's proposal proved convincing, and the Baltimore City Forestry Division was established in 1913, along with the first city street tree

ordinance, known as Ordinance No. 154. Due to Baltimore's use of eminent domain, the regulations concerning street trees would prove to be stricter than those proposed by the state of Maryland in its Roadside Tree Law of 1914. This significant piece of legislation, enforced by the Maryland Department of Natural Resources Forest Service, was considered to be a significant precursor to the practice of urban forestry across the United States. It provided for the protection of trees located in public road rights-of-way through proper methods of maintenance to ensure compatibility with utilities and street networks. Under the roadside tree law, licenses are granted and training is provided to professional tree care experts and permits are available for homeowners who wish to maintain trees in rights-of-way adjacent to their homes (Maryland Department of Natural Resources 2003, 21-22). Hence, Baltimore had begun to cultivate, and continues to maintain, one of the best managed urban forests in the United States today (Bedingfield 2004).

Baltimore's Ordinance No. 154 was approved on August 17, 1912. The ordinance authorized the City Engineer to regulate the planting, maintenance, and preservation of urban trees, specifically street trees as outlined in section 2, with the help of an appointed City Forester and supporting staff. Additionally, the City Engineer was vested with the responsibility to ensure all street tree legislation was strictly observed. Public citizens were forbidden from tending to, altering, or removing street trees without obtaining a written permit from the City Engineer. Permits were also necessary if a citizen desired to have a tree planted on the street in front of their property (Preston 1912). A budget for the newly created forestry

department was set at $5,000 and the trees to be planted were donated by the Park Board (“Rush for New City Job” 1912).

R. Brooke Maxwell was appointed as the first City Forester for Baltimore in 1912. As City Forester, Maxwell was responsible for overseeing planting and pruning activities that occurred on private property, along streets, and on public grounds, including those of schools, municipal buildings, and libraries. Regulation and inspection of tree plantings on private property was handled through the issuance of a permit to the interested homeowner, who also had to assent to a preliminary and final inspection prior to obtaining the permit as well as abide by a strict set of planting specifications. Popular trees selected for planting by homeowners included Norway, sugar, and silver maples, pin oaks, European lindens, and American elms. Requests for trees were numerous and the fledgling forestry department was forced to limit their regular planting activities to those areas in greatest need of trees, including public drives and heavily traversed thoroughfares, although they attempted to satisfy as many requests as possible. Pruning work was similarly constrained. Maxwell and his crew concentrated on regions of the city that contained the most desirable trees, removing deadwood, diseased limbs, and low hanging branches to return trees to their proper growing conditions (Maxwell 1914, 5-10).

Maxwell’s first several years as City Forester were frustrated by lofty ambitions and minimal resources. The first city forestry budget had been set at $5,000; however, actual expenditures amounted to $5,053.59. To service the entire city of Baltimore, Maxwell relied on two small crews of men to carry out the bulk of

planting and maintaining trees. The lack of manpower was magnified in the spring and summer of 1913 when the hot, dry months necessitated frequent watering of the newly planted trees. Furthermore, Maxwell and his men had to contend with a variety of scale and leaf-eating insects, including the tussock moth and the fall web worm. Subsequently, the first year of tree planting resulted in a failure rate of 19%. Nevertheless, there were several positive developments for the forestry department. The Baltimore Police agreed to cooperate with forestry officials in canvassing the tree conditions across the city and reporting any dead or dangerous trees spotted on patrol. Additionally, Washington D.C. bestowed upon Baltimore a gift of 600 trees – 400 Oriental planes and 200 silver maples – for the cost of removing and transporting the trees from nursery to planting sites (Maxwell 1914, 11-18). Within several years, Maxwell felt comfortable enough to try innovative planting techniques, including the planting of nut-bearing trees, either English walnut or pecan, along sidewalks in front of city property. Maxwell felt "these plantings will mark the beginning of a plan to plant trees for something more than shade, following the custom in other cities" ("Nut Trees for Streets" 1916). This street tree "experiment" was embedded within the overall planting campaign devised by the forestry department for 1916, which included the planting of 620 trees, encompassing a variety of species, between March 15 and May 10 of that year ("Nut Trees for Streets" 1916).

Baltimore Urban Forestry: 1940 – 1960

Further notable advancements in urban forestry were absent for the next 30 years. Then on May 20, 1946, Mayor Theodore R. McKeldin (1943 – 1947) authorized passage of Ordinance No. 396 in Baltimore to hold the highway bureau responsible for the maintenance and management of street trees placed along thoroughfares, thus reestablishing powers granted under the 1912 tree ordinance. The extent of power relinquished by the Forestry Division in this transfer of duties is unknown (Annual Report of the Department of Recreation and Parks 1946, 7; The City of Baltimore Webpage). To assure trees received proper care, the highway engineer in charge was to be advised by the forester on technical questions ranging from the selection of appropriate street tree species and the procedures applied when disposing of diseased or damaged trees ("City Plans Tree Care and New Plantings" 1946). The Parks Department was to be compensated by the Highway Engineer with a small sum of money specified exclusively for street tree activities (Annual Report of the Department of Recreation and Parks 1946, 7). Subsequently, Highways Engineer William N.D. Fischer devised a new program to address street tree planting and maintenance on public highways. According to Fischer, the events of World War II had overshadowed routine tree care. As a result, Baltimore had faced the prospect of losing a number of trees to removal since their presence had evolved from being beneficial to hazardous. Fischer's program, to be implemented in 1947, was to follow an extensive survey of the condition of Baltimore's street tree stock. As a newly appointed park forester, Charles A. Young Jr. was to assist Fischer in his street tree

evaluation efforts ("City Plans Tree Care and New Plantings" 1946). Young would eventually rise to accept the post of City Forester for Baltimore.

Young and his forestry staff abided by a strict set of requirements when planting street trees. To enable a tree's root system to have room to expand as the tree matured, saplings could not be planted within 50 feet of a tree on private property. This specific spacing of trees ensured the health of public and private trees, as well as contributed to the aesthetic appeal the trees brought to individual streets. Tree species were chosen based on their ability to thrive sufficiently in particular soil types and topographical situations. In 1955, Young reported the most common tree growing along Baltimore's streets was a hybrid of the Sycamore family of trees, the plane tree. Ranked second and third were Norway maples and American Elms, respectively (Millspaugh 1955). In addition to their routine tree planting agenda, the Forestry Division sought to plant a variety of flowering trees, such as crabs, cherries, and dogwoods, throughout Baltimore's neighborhoods and along primary gateways to downtown (Annual Report of the Department of Recreation and Parks 1952, 16). All tree planting activities performed by the Forestry Department occurred on city property within the right-of-way, usually a space of 8 feet on each side of a street (Millspaugh 1955).

Urban stressors and diseases began to exert a negative impact on Baltimore's urban trees by the mid-1950s. Although City Forester Young oversaw the planting of 707 trees in 1954, his efforts did little to mitigate the reduction of street trees, as many as 1,054 in the same year, due to road expansions and increased automobile emissions.

Thus, Young's goal to plant 2000 trees a year would remain a lofty one at best (Millspaugh 1955). In July of 1956, Young remarked, "The odds are about 9 to 1 against replacement of any tree removed in the course of a city project" (Furgurson 1956). To facilitate a clearer picture of the state of Baltimore's street trees, Young conducted an extensive census beginning in January 1956 and concluding in 1959. By the end of the survey, Young had amassed 18,000 cards detailing important aspects of the street trees examined including the size, species, number, and condition of specimens on a street block. As of July 1, 1959, the street tree census reported a total of 68,614 trees, broken down as follows:

- 9,364 elms
- 28,370 maples
- 2,039 oaks
- 13,960 planes
- 2,045 ashes
- 4,148 lindens
- 3,041 poplars
- 5,647 mixed species.

Additionally, the survey noted that 4,650 street blocks were without street trees; however, Young stressed the count was not final since the number of "green" street blocks were continually increasing and a number of newly planted trees had not been inventoried (Annual Report of the Department of Recreation and Parks 1956, 35; Annual Report of the Department of Recreation and Parks 1959, 34-35).

Despite the losses of street trees to road infrastructure projects, Baltimore citizens continued to demand the planting of shade trees along their neighborhood streets. Lengthy backlogs of requests for tree plantings sat idle as the forestry department continued to suffer from insufficient manpower. As a result, petitions for trees filed by groups of interested residents received priority over the requests of individual homeowners (Furgurson 1956). Eventually, the public's concern regarding the continued loss of street trees persuaded Mayor Thomas D'Alesandro (1947 – 1959) to appoint a five-man committee dedicated to the study of street trees in Baltimore (The City of Baltimore Webpage; "Mayor Names Group to Study City Trees" 1958). The initial charge was led by Mrs. Russell Wonderlic, the president of the Women's Civic League, who advocated for the formation of a group responsible for investigating the disappearance of street shade trees and for providing an educational program focused on shade trees for neighborhoods and individual property owners. The Women's Civic League had already been engaged in tree planting activities; the League was responsible for the planting of flowering crab trees throughout Baltimore's private and public grounds ("Tree Inquiry Proposed" 1958). The newly formed committee undertook a rigorous two week study of Baltimore's trees and crafted a five-point plan to guide the city's tree planting program from their results. The recommendations advised by the Mayor's Committee on Trees included implementing a comprehensive block planting program; adopting a tree-pruning schedule by street, block and area locations instead of relying on individual requests; approving faster clearing and removal of dead tree debris from streetlights, traffic signals, and street signs; disposing

of brush by mechanical means to eliminate transportation costs and brush burnings; and obtaining an additional mist blower to combat destructive insects at the beginning of their life cycles ("5-Point Plan Advised in City Tree Program" 1958).

In addition to these recommendations, the street tree committee suggested implementing a cooperative downtown tree planting program between property owners and the city itself ("5-Point Plan Advised in City Tree Program" 1958). Upon receipt of the committee's findings, Mayor D'Alesandro challenged the street tree committee to prepare a comprehensive planning and preservation program, stating that such an initiative "not only is necessary but highly desirable for Baltimore" and "their (the trees') presence is an especially valuable asset in downtown areas and in congested neighborhoods" ("Mayor Wants Tree Program" 1958). By the end of 1959, Baltimore's business district became the first recipient of trees as part of this anticipated downtown greening program. Projected costs for the final plan were estimated to top $500,000 ("Planting of Trees will Begin Nov. 1" 1959).

Realizing the benefits that were accruing from the recent tree planting campaigns, Baltimore's Mayor Harold Grady (1959 – 1962) appointed a street tree planting committee on August 10, 1959 to inform the Central Business District (CBD) Master Landscape Plan. Their task was to oversee the implementation of an "open space and landscape program" developed by the Baltimore Planning Council in the spring of 1959. The essential premise of the CBD Master Plan was to reinvigorate downtown Baltimore and to reestablish its desirability as a destination to visit and inhabit. Street trees were to play an important role in the reinvention of Baltimore by adding to the

attractiveness of the inner city business district and inviting citizens and tourists alike to patronize the shops, restaurants, and attractions offered exclusively downtown. For instance, the tree committee proposed an intensive planting program along all major roadways that channeled traffic into the downtown district, as well as in the vicinity of major landmarks and monuments to highlight their importance to the city's history and culture. Container plantings were suggested for retail districts to enhance their aesthetic appeal and to create an atmosphere in which patrons are willing to linger for extended periods of time (Baltimore Central Business District Master Landscape Plan 1961; The City of Baltimore Webpage).

All tree species considered for this extensive project were identified as species that had prospered in Baltimore in the past and were proven to be adaptable to the city's specific environmental traits, specifically:

- To be hardy enough to thrive in paved areas;
- To tolerate shade, wind, poor soil, infrequent watering;
- To resist most tree diseases;
- To possess a habit of growth that is clean, straight-stemmed, and uniform;
- To be available in adequate quantities at a reasonable cost.

Upon consideration of these requirements, several species of trees were chosen for the project, including the Tree-of-Heaven, Norway maple, common linden, paper mulberry, Modesto ash, and male ginkgo (Baltimore Central Business District Master Landscape Plan 1961).

Implementation of the CBD Master Plan's street tree planting program was to commence over a period of several years and was to be monitored to identify circumstances that would warrant modifications to meet any unforeseen conditions that would arise. A budget of $130,000 was allocated for installation costs; future expenditures were to be dependent upon the extent of maintenance and replacement demanded by the new urban forest. Additionally, the street tree committee advocated for an expansion of the Forestry Division within the Bureau of Parks so that an adequate labor force would be available to install and maintain the new plantings (Baltimore Central Business District Master Landscape Plan 1961). Initial tree planting activities for the Central Business District commenced on February 18, 1960 in cooperation with the Bureau of Highways in Unit blocks on Light Street, West Redwood Street, South Charles Street, and West Baltimore Street (Annual Report of the Department of Recreation and Parks 1960, 28-29). To ensure the viability of the CBD tree plantings and to counter potential damages triggered by drought conditions in the summer months, the Forestry Division began a weekly watering program in 1962 (Annual Report of the Department of Recreation and Parks 1962, 34).

Separate from the Central Business District program, a second tree planting project was carried out in the Harlem Park Urban Renewal Area in 1960 where, after considerable study of the renewal area to determine the appropriate number and variety of trees to utilize, 879 trees were planted in cooperation with the Bureau of Highways. These plantings, sponsored by the Baltimore Urban Renewal and Housing Agency, were one of the first initiatives undertaken in the rehabilitation of the Harlem

Park neighborhood and were a precursor for subsequent tree plantings in urban renewal projects throughout Baltimore's neighborhoods (Annual Report of the Department of Recreation and Parks 1960, 28-29). A second phase of tree plantings in Harlem Park occurred in 1961 with the addition of 34 trees, thus bringing the total to 913 trees planted. However, an October 1961 survey of the Harlem Park trees showed a loss of 139 trees, or 15.2% of the share planted in the neighborhood. Unfortunately, this trend was not confined to Harlem Park. The Department of Recreation and Parks noted in its annual report for 1961 that the city experienced a total annual loss of 2300 trees across all reporting agencies; hence, to maintain a healthy tree population, an annual planting of 3000 trees would be essential to offset losses exacerbated by residential development and to keep up with an expanding park system (Annual Report of the Department of Recreation and Parks 1961, 35). To encourage the re-establishment of a desirable acreage of tree cover in the city core, extra care was devoted to ensuring the survival of newly planted saplings, sometimes at the expense of other tree maintenance operations (Annual Report of the Department of Recreation and Parks 1964, 33).

Baltimore Urban Forestry: 1960 – 1975

By the early 1960s, the Forestry Division had begun to acknowledge another serious problem afflicting Baltimore's tree population: vandalism. In 1963, the current City Forester, Frederick S. Graves, noted an estimated 260 trees had been vandalized, both on the streets and in the parks. Many of the affected trees had been uprooted, struck

by motor vehicles or, in the case of young saplings, completely destroyed. In addition, a number of supportive cages, tree guards, and stakes had to be repaired or replaced. By 1967, attempts to address the damages sustained through criminal acts had begun to consume a large portion of the Forestry Division's time and money (Annual Report of the Department of Recreation and Parks 1963, 31; Annual Report of the Department of Recreation and Parks 1964, 33; Annual Report of the Department of Recreation and Parks 1967, 27).

Despite the discouraging trends of tree canopy loss and vandalism, the prior successes experienced in Baltimore with street tree planting initiatives drove the forestry department and City Council to adopt more ambitious goals for expanding the urban forest. In 1965, Councilman Thomas Ward outlined a detailed plan that encouraged planting 8,000 street trees, more than four times the number planted the previous year. Ward confirmed the allocation of $326,000 toward implementation of the street tree plan, including:

- A $150,000 contribution from state gas tax revenues specifically dedicated to the beautification of “primary” streets, about 400 miles of streets in Baltimore, through the Bureau of Highways;
- A $150,000 contribution from City Council and the Board of Estimates that had been recovered as surplus from the 1964 operating budget of the Department of Public Works;
- A $26,000 contribution allocated specifically for tree planting in the Department of Recreation and Parks 1965 operating budget

(Somerville 1965).

A master street tree planting plan prepared by City Forester Graves divided Baltimore into fourteen areas and outlined each region’s unique planting requirements, including costs incurred. According to Graves, the act of upgrading the street tree plantings in thirteen of the fourteen areas would involve costs ranging from $14,775 to $88,670 per area served. The fourteenth section, located in East Baltimore, would require an investment of at least $385,000 due to its scarcity of tree plantings and its abundance of concrete sidewalks devoid of openings for tree plantings. City Forester Graves recommended beginning the tree planting campaign in those of the fourteen regions “that are in the greatest need of trees” (Somerville 1965).

Councilman Ward’s tree planting challenge in 1965 was announced to coincide with an ambitious four year landscaping program established in a 1963 four-part, street tree ordinance introduced by Ward. Within this four year time period, Ward advocated for the planting of 21,000 new trees throughout the city, approximately 30

trees to a block. To accomplish this monumental task, Councilman Ward recognized that the forestry department would need to undergo a major workforce expansion. Thus, Ward placed a request to increase the number of full-time employees dedicated to street tree planting from three to eleven. Ward was also instrumental in acquiring additional funding for the forestry division's 1963 budget, netting $540,000 to aid in the implementation of the street tree initiative (Somerville 1965; Ward 2004).

Unfortunately, several obstacles, aside from inadequate staffing, challenged the full implementation of Ward's tree planting program. A heat wave that struck Baltimore in the summer of 1966 threatened the survival of the 11,000 young trees that had been planted in spring and fall of 1965. Forester Graves implored homeowners to water the newly planted trees since the city's two watering trucks concentrated most of their work downtown and around apartment buildings. "If homeowners and associations are interested in having trees planted in their area, they should assume responsibility for keeping them watered. Without water they die. Last year (1965) we lost 5 percent of those we planted," Graves explained (Rackemann 1966).

Despite the good faith efforts of the city and its citizens to restore Baltimore's image as the "City of a Million Trees," the encroachment of devastating tree diseases proved to be a challenge for the city forestry department. Of particular concern in Baltimore was the arrival of Dutch elm disease, which first surfaced in Baltimore County, Maryland in 1933 (Breen 1960). The years following World War II witnessed a doubling in its infection areas from 18,000 to 36,000 square miles and

affected thirteen states, including Maryland ("The Steady Spread of Dutch Elm Disease" 1946). To combat and contain its spread, the forestry department devised a three-prong approach which entailed spraying the elm trees to attack the suspect bark beetles, pruning all deadwood that may serve as breeding grounds for the beetles, and removing any infected elm trees to retard the spread of the disease to neighboring elms (Schoettler 1962). Diseased trees were to be sprayed and removed within 48 hours of diagnosis. Although the forestry department's containment program had been effective on city property, individual homeowners were responsible for addressing Dutch elm disease risks on their private property (Breen 1960). By 1965, Baltimore began to reap positive results in the fight against Dutch elm disease with a sharp decline in the incidence of the disease in elm trees along streets and in parks, as well as a 224% reduction in the removal of afflicted trees over a three year period (43 trees removed in 1965 versus 192 trees removed in 1964 and 303 trees removed in 1963) (Annual Report of the Department of Recreation and Parks 1965, 30). Subsequently, Baltimore was recognized in 1966 as one of the most successful major cities to address and control the Dutch elm disease infestation (Annual Report of the Department of Recreation and Parks 1966, 17). The positive results borne from these preventative measures have justified their on-going use over the last several decades and have continued to ease the burden of Dutch elm disease on Baltimore's street trees (Schoettler 1962).

Accolades for Baltimore's tree programs were not limited to eradicating Dutch elm disease. In 1966, Baltimore was considered the leading municipality in the United

States in tree planting due to its intensive tree planting campaigns (in 1966 alone, 3,956 trees were planted in parks and along highways by the Forestry Division) and its diversity of tree species utilized in planting activities (52 species in 1966). Its notoriety was strengthened with the release of a street tree census on June 30, 1966 that noted the presence of 166,355 trees (Annual Report of the Department of Recreation and Parks 1966, 17-18). Although the quantity of urban trees continued to increase at a healthy rate throughout the late 1960s and into the early 1970s, the Forestry Division began to suffer from a backlog in the pruning and removal of trees precipitated by a failure to recruit additional tree trimmers to flesh out its staff. At the close of the 1972 fiscal year, there were only four trimmers remaining on the forestry staff, with one planning to leave within the coming months (Annual Report of the Department of Recreation and Parks 1972, 28). As a result, acting City Forester Calvin Buekima entered into a contract with a private firm to assume the responsibility of pruning Baltimore's street trees in 1973. The success of this decision led to an indefinite continuation of the contract and helped eradicate the backlog of requests for tree maintenance filed by citizens and allowed forestry staff to concentrate on further preventative maintenance concerns (Annual Report of the Department of Recreation and Parks 1973, 20; Annual Report of the Department of Recreation and Parks 1974, 18).

The early 1970s proved to be a boon for urban forestry in Baltimore. In 1973, Councilwoman Mary B. Adams proposed a program entitled "Adopt-A-Tree" which encouraged Baltimore residents and businesses to care for the trees growing in public

rights-of-way along residential streets and in front of commercial developments. Adams's proposal was endorsed by Mayor William Donald Schaefer (1971 – 1987) who mounted a publicity campaign to encourage cooperation and participation within the city. Another tree program initiated with the help of Mayor Schaefer involved collaboration with a national effort sponsored by the Datsun automotive company. Datsun's program, "The Drive a Datsun, Plant a Tree" campaign, promised that for every Datsun a customer took for a test drive, the manufacturer would plant a tree in a national forest. The office of the Mayor approached local Datsun dealers with a plan to plant trees in city parks as an extension of the national program. Ultimately, six dealers each agreed to contribute $250.00 to Baltimore to enable the purchase and planting of eighteen trees (Annual Report of the Department of Recreation and Parks 1973, 20; The City of Baltimore Webpage).

Baltimore Urban Forestry: 1975 – Present

Since the mid-1970s, little has changed concerning the planting and management of street trees in Baltimore. An intensive 5-year tree planting program was proposed in 1983, but was discarded due to a lack of adequate funding and a sparse forestry budget (Bedingfield 2004). Perhaps the most important evolution in street tree planting for Baltimore has occurred in its tree ordinance. Since 1912, Baltimore's street tree ordinance has changed to accommodate jurisdictional shifts in responsibility and to reflect 21st century attitudes and values. The current Baltimore City Code assigns street tree responsibilities to two departments. The Department of Public Works is

charged with regulating tree plantings as well as enforcing all protective laws and ordinances pertaining to street trees. The Department of Recreation and Parks, however, shoulders the bulk of responsibility for Baltimore's street trees, overseeing the planting and preservation of street trees; the pruning, trimming, spraying, and cultivation of street trees; and the control and extermination of tree pests and diseases that pose a threat to street trees (Baltimore City Code 53-2 to 53-3, 2003).

Baltimore's tree planting program is managed entirely by the Department of Recreation and Parks' Forestry Division and is dependent upon funds allocated annually through the city budget. Monies distributed exclusively to tree planting subsidize the acquisition and planting of street trees, including all activities necessary to prepare a site for planting (e.g., removing concrete and digging tree wells). Spacing of trees is regulated such that a tree should be planted at least 30 feet from its nearest neighbor(s). Exceptions are granted when a special request is made by a property owner (Baltimore City Code 53-4, 2003). In fact, private citizens who wish to plant a tree on any street must first obtain a written permit from the Department of Public Works and agree to comply with all conditions set forth by the permit. Obtaining a tree planting permit involves meeting several criteria, the first of which is the submittal of a tree planting agreement by the interested party. The agreement requires that the adjoining property owner:

- Own the property adjoining the tree planting site;
- Refrain from placing items, such as raised planter boxes, around the tree which may impede the free flow of water;
- Understand that existing planter boxes may be removed prior to tree planting and/or tree removal;
- Agree to water the tree with at least 20 gallons once or twice a week, April through November, for a minimum of two years following installation;
- Understand the tree is city property and one must obtain written permission from the Forestry Division to have the tree pruned, trimmed, cut, or removed.

(City of Baltimore Tree Planting Request Procedure; Baltimore City Code 53-11 and 53-12, 2003)

Upon submitting the requisite tree planting agreement to Baltimore's Forestry Division, the interested party must ensure several additional conditions are met:

- Appropriate spacing for the requested tree must be available and the site is subject to a variety of external factors including existing utility lines, sidewalks, street lights, visibility hazards, and land use patterns;
- The final selection and placement of the tree will be determined by the Forestry Division;
- The chosen tree meets American Standard for Nursery Stock and the minimum caliper should be no less than 2" to 2.5", the lowest limb height no lower than 6' from the ground.

(City of Baltimore Tree Planting Request Procedure, 2004)

Aside from implementing tree planting programs, the Forestry Division has concentrated on addressing a number of tree maintenance concerns. Perhaps one of the most crucial has been reducing the loss of large, mature trees. Unlike their younger counterparts, older trees are responsible for most of the economic and environmental benefits reaped from their presence in an urban setting. Ideally, street trees need to survive 17 – 20 years to return the initial investment made in their planting and upkeep. In Baltimore, the average life expectancy is approximately 7 – 15 years, which falls within the average age range for urban street trees across the United States. Thus, beginning in the 1970s and extending through present day, City Foresters from Calvin Buikema to Marion Bedingfield have channeled time and money into pruning, fertilizing, and watering these urban assets.

The replacement of street trees has received careful consideration as well. Several species of tree utilized in the past proved to be poor selections for urban street planting. One such species, the cottonwood, posed several problems that rendered it inadequate for the city, including its rapid rate of growth and its shallow root system, which damaged sidewalks and foundations. Other trees were poor selections due to their annual dropping of flowers, seeds, and fruits which littered sidewalks and streets and posed potential safety hazards for neighborhood residents. To satisfy the demands of the people and to stay abreast of current tree trends, Baltimore's Forestry Division relies on tree nurseries to supply their street tree stocks. Reliance on the tree nurseries to experiment and develop new species is critical due to the ephemeral nature of the urban environment and the need to adapt efficiently to any unique circumstances.

Presently, City Forester Bedingfield attempts to plant a variety of trees, 50 species to date, to introduce greater diversity in Baltimore's urban forest and to prevent the rapid spread of species-specific diseases throughout entire neighborhood blocks. GIS technology is utilized to map the locations of tree plantings every year. These maps are useful tools for identifying city districts with low levels of tree canopy and to concentrate tree planting campaigns in these areas, with the blessing of the communities in question[1]. (Bedingfield 2004).

Maintaining the vitality and longevity of Baltimore's street trees is no easy task. With approximately 300,000 street trees in Baltimore, a 32-member staff, and an inadequate budget, maintenance backlogs have strained the Forestry Division's workload and have pressured the employees to do more with less in a short amount of time. Presently, the Forestry Division can expect to plant approximately 3500 trees per year, remove 2000 trees per year, and prune 5000 trees per year. Unforeseen events, such as catastrophic storms, have the potential to set the department back anywhere from two weeks to three months. Ironically, at least 85% of damages sustained by trees in bad weather could have been prevented through routine pruning and upkeep; however, due to the delays experienced by the Forestry Division, maintaining an appropriate tree care cycle has proven nearly impossible to achieve. To ease the burden on the forestry staff and to foster a sense of ownership, residents have been encouraged to water and mulch any trees they request for planting. Upon installation of trees, a card is hung on the recipient's door detailing watering guidelines and mulching and fertilizing tips, as well as the phone number to call

[1] The GIS maps for tree plantings were not available for further analysis and use in my research.

should any problems or questions arise. Despite the efforts put forth by forestry officials to address tree care in a timely manner, backlogs in tree care have prompted sharp criticism, typically from chronic complainers (Bedingfield 2004).

Besides struggling to address mounting requests and complaints, Baltimore's forestry staff is engaged in a constant battle with traditional urban threats. Vandalism has continued to be a major source of frustration; street trees are subjected to abuses instigated by humans (e.g., snapping of branches, uprooting of saplings, and nailing of notices) and motor vehicles (e.g., traffic accidents and intentional hitting of trees). In addition, many city residents have taken to placing decorative tree planters and guards around the base of street trees. Although their intentions are directed at creating a more aesthetically pleasing environment, the placement of the planters chokes the root system of the tree and starves it of the nutrients it needs. Furthermore, tree guards have become repositories for trash tossed carelessly by passers-by (Bedingfield 2004). Recently, forestry officials have begun to acknowledge the damage street salt can inflict on street trees. Following winter snow and ice storms, salt crystals are thrown to aid in melting and clearing the city streets as quickly as possible. The salty slush and spray that results from the constant flow of cars and trucks penetrate to a tree's root system and devastates the tree, usually by killing lower hanging branches. Hence, mixtures of salt and sand, as well as non-traditional melting agents, are encouraged by the Forestry Division to lessen the threats posed by utilizing pure sodium chloride (Ward 2004).

The constant threat of pest infestations and disease outbreaks within Baltimore's urban forest is also a major concern for the Forestry Division. The specter of Dutch elm disease continues to haunt Baltimore's dwindling elm population, as well as the emergence of the emerald ash borer in Maryland. The ash borer, an exotic pest originating from Asia, was first detected at a nursery in Prince George's County and its identity was confirmed by the U.S. Department of Agriculture's Systematic Entomology Laboratory in August 2003. The ash tree, a popular neighborhood and landscaping tree species, is the most common tree in Baltimore – 293,000 trees – and accounts for approximately six million trees in the Baltimore metro region. According to the U.S. Department of Agriculture, estimated losses from the emerald ash borer could exceed $227,568,000 in the Baltimore area if the pest were to establish a permanent presence (Maryland Department of Agriculture, 2004).

Baltimore's street trees are subject to stresses beyond those imposed by the natural environment. Social pressures play a large role in the health and perceptions of street trees. One of the greatest social pressures evolves from the backgrounds and traditions of urban residents. Cities are melting pots of culture and, whether recent immigrants or not, residents are influenced by the attitudes and values of their immediate peers and family members. Fraser and Kenney (2000) conducted a study in Toronto in the late 1990s to determine how distinct cultural communities perceived urban forestry efforts in their neighborhoods. Their conclusions were illuminating: British communities tended to embrace shade trees and their subsequent planting along streets; on the other hand, Chinese communities preferred landscapes free of

trees and were not as willing to approve tree planting projects in their neighborhoods. Communities composed of Italian and Portuguese inhabitants preferred the planting of small fruit trees over shade trees and were especially hostile toward shade tree plantings that interfered with prized vegetable gardens. In sum, the immigrants of each community tended to express attitudes toward trees that were characteristic among citizens of their home countries (Fraser and Kenney 2000).

Baltimore struggles with similar cultural attitudes toward trees. Known as a "City of Communities," each Baltimore neighborhood has a unique approach to tree planting and fundraising, if any exists at all (Bedingfield 2004). For instance, the establishment of tree plantings in the Canton neighborhood faces on-going opposition from the community's Polish residents, who prefer barren streetscapes to tree-lined boulevards (Ward 2004). Likewise, predominantly working-class neighborhoods, such as Highlandtown, tend to express hostility toward street trees due to their perception that trees are dirty; that is, many residents do not tolerate the dropping of leaves and fruit from the trees and feel tree maintenance is not a worthwhile use of their time. Such negative attitudes are compounded by a shared lack of knowledge within the communities concerning the benefits of trees (Lavdas 2005). According to City Forester Bedingfield, the less affluence and stability in a community, the less concern is paid to trees, regardless of race or ethnicity. Furthermore, neighborhoods with healthier trees tend to have more money and influence to ensure the survival and replacement of their trees. Hence, Bedingfield has enlisted the help of community groups to reach out to distressed neighborhoods to educate the residents on the

benefits of trees and how they may improve the aesthetics, character, and reputation of their district. In addition, Bedingfield stresses the potential trees have in reducing the threat of crime in a neighborhood by infusing the area with humanity and vitality. To maintain the perception of a safe street, forestry workers ensure street trees incorporate adequate spacing and do not block lighting from street lamps (Bedingfield 2004).

Of all the challenges encountered by the Forestry Division, the extensive efforts to maintain and increase the percentage of tree canopy cover in Baltimore have proven to be especially critical given the present decline in overall tree cover in the city. Current estimates suggest 20 – 25% of Baltimore is covered by tree canopy (Bedingfield 2004). However, David J. Nowak, a U.S. Forest Service scientist, led a recent study that attempted to track the extent of urban forests in Baltimore over a number of years. The results were not promising: Nowak projects Baltimore's tree population will decrease from the current 2.6 million to 1.2 million by the year 2103, a rate of approximately 110,000 trees lost per year. Furthermore, these losses are occurring despite an aggressive tree planting program implemented by the city forestry department and volunteer organizations (Dewar 2003). City Forester Bedingfield estimates the Forestry Division plants approximately 3400 trees annually; however, to match annual tree loss and removal, the city would need to plant approximately 8400 trees a year (Bedingfield 2004).

Although on a small scale the loss of urban trees seems insignificant, the environmental impacts could be immense. For instance, Nowak's group estimated Baltimore's urban forests removed approximately 491 tons of air pollution in 2002,

saving businesses an estimated $2.7 million in clean-up and mitigation strategies (Dewar 2003). Additionally, Baltimore's urban trees reduce the heat island effect in the inner city and enhance the aesthetic qualities of the urban core. These benefits contribute to Baltimore's image among prospective residents and tourists who, in turn, sustain the economic and social health of the city. Simply put, healthy trees promote a healthy city.

Fortunately, Baltimore has a number of channels open to seek help in addressing its tree woes. One source of support for urban forestry in Baltimore is the Baltimore City Forestry Board, which is one of the 24 forestry boards overseen by the State Association of Forest Conservancy Boards. Since June 1987, the City Board has sought to improve the management of street and park trees, to facilitate school tree planting events, to promote continuing educational opportunities concerning urban forest health and benefits, and to assist the Baltimore City Forestry Division. Meetings are held monthly and are open to public participation in the discussion of pertinent urban forest issues and concerns and the planning of future community events. Projects undertaken by the City Board include the following:

- **"Greening of Your Town" Programs.** These programs seek to aid local communities in the establishment and proper management of street trees by providing assistance in the planting, care, and inventory of street trees;
- **Chesapeake Bay School Reforestation Project and School Forests.** This project entails the planting of native forests on school grounds to enrich and improve the health of the Chesapeake Bay watershed and to demonstrate to students and community members the benefits trees provide to ecosystems. These school forests allow educators to integrate environmental education into the standard academic curriculum as well as to unite the community and government agencies for a common goal;
- **Arbor Day.** The City Board celebrates Arbor Day in Baltimore by hosting tree plantings and distributing seedlings to schools and citizens;
- **Tree City USA.** By meeting the requirements set forth by the National Arbor Day Foundation and the National Association of State Foresters for a viable tree management program, Baltimore has received the Tree City USA award annually since its first designation in 1984.

(Baltimore City Forestry Board Pamphlet; Maryland DNR Forestry Service)

Another source Baltimore draws on for support is its unique membership in a regional partnership dedicated to urban forestry. Established in 1993, the partnership, Revitalizing Baltimore, is operated by the Parks and People Foundation and the Maryland State Forester and is supported by the USDA Forest Service. Over twenty organizations participate in Revitalizing Baltimore, including a number of non-profits,

watershed groups, and businesses. These partners stress collaborative stewardship to engage city residents in community forestry activities that promote the utilization and protection of trees as a tool in the restoration of neighborhoods. To accomplish its mission, Revitalizing Baltimore emphasizes applying ecosystem management principles, bridging watershed and neighborhood scales to improve natural resources, and improving watershed-based community organizations, among other initiatives (Revitalizing Baltimore: Parks and People).

For the past decade, Revitalizing Baltimore has focused its urban forestry efforts on greening culturally diverse neighborhoods through over 500 projects involving 3,000 volunteers planting over 17,300 trees and providing stewardship education to 10,700 students and 600 adults. As recently as 2002, Revitalizing Baltimore has been effective in overseeing the planting of street trees commissioned by Inner City and Title VIII grants and has expanded the demonstration project at Franklin Square Elementary School to six additional city schools in need of schoolyard restorations. Efforts have also been made to expand a pilot program, the Comprehensive Community Forestry Revitalization Strategy, to six new city neighborhoods to aid in conducting green infrastructure surveys and in integrating sanitation and waste and energy recycling in their tree planting initiatives (Revitalizing Baltimore: Parks and People).

Finally, Baltimore boasts a Community Forestry Program which seeks to educate city residents on urban tree benefits and care as well as offer technical assistance in the creation of parks and community gardens in community open spaces, neighborhoods,

and schoolyards. Intensive training is offered in streetscaping techniques, soil testing, and tree maintenance practices and classes are held four times a year covering topics such as fundraising strategies and developing greening projects. Interested citizens may become Community Tree Stewards by leading training programs in tree planting and tree care for volunteers and participating in neighborhood clean-up events and tree plantings. The Community Forestry Program also partners with the Baltimore City Public Schools System and the Water Quality Management Office to promote schoolyard greening projects at inner city schools. Overall, the program has been quite successful in greening the streets and lots of Baltimore. Since 1993, over 7,000 trees have been planted in 45 neighborhoods and 200 vacant lots have been transformed into community-managed gardens and parks (Community Forestry Stewardship Program: Parks and People).

Baltimore's urban forest owes much to the citizens who have advocated for nature in the city. However, the "City of Communities" does not embrace street trees uniformly across all neighborhoods. The distribution of urban trees ultimately relies on the attitudes of residents toward trees, the wealth present within the neighborhood, and the influence the community entertains with the city. These factors play a major role in attracting city involvement and were equally influential in granting urban renewal projects in the 1950s and 1960s. Baltimore's Bolton Hill neighborhood is an example of a neighborhood that has benefited from an urban renewal program that embraced the implementation of street trees in its agenda. Furthermore, this eclectic community appears to have defied the trend of decreasing tree canopy experienced

throughout Baltimore City through the collective efforts of concerned community members.

Chapter Three: Street Trees and Urban Renewal in Bolton Hill: A Case Study

Baltimore's Bolton Hill neighborhood can credit much of its present stability and atmosphere to mid 20th century efforts to revitalize the declining community. The vision of a rekindled Bolton Hill was realized through the federal urban renewal program, a controversial improvement initiative authorized in the Housing Act of 1949. In Baltimore, urban renewal projects sought to provide more than affordable housing; the installation of street lights and the planting of street trees were identified as key components in a successful renewal project. Although Bolton Hill had prided itself in the past for its collection of pocket parks and tree-lined boulevards, the emphasis on tree planting in the redevelopment plans triggered a collective response from Bolton Hill's citizens to renew their attention to the community's unique urban forest. Despite the negativity associated with urban renewal on a national level, in Bolton Hill, the federal program played a role in shaping the neighborhood's current street tree population.

Urban Renewal in the United States

The end of World War II sparked a great demand for affordable housing for war veterans and their families. As early as 1944, the Veterans Administration initiated a home loan program promising single family homes for qualified recipients. The incentive to own a piece of property drove Americans to the suburbs and precipitated a decline in the urban housing market (US Department of Housing and Urban Development). To address this growing concern, Congress passed the Housing Act of

1949 which declared every American was entitled to a "decent home and a suitable living environment" (Lang and Sohmer 2000, 291). Title I of the 1949 Housing Act targeted urban decline by authorizing funds for slum clearance and urban redevelopment programs. Although an emphasis was placed on new housing, monies were marked for activities unrelated to construction, including provision for open space land and water and sewer facilities. (US Department of Housing and Urban Development). The 1949 Housing Act set a precedent in federal policy by linking federal support with human well-being, specifically by providing quality housing to those in need through slum removal and neighborhood revitalization. The preamble to the act states:

> The general welfare and security of the Nation and the health and living standards of its people require housing production and related community development sufficient to remedy the serious housing shortage, [and] the elimination of substandard and other inadequate housing through the clearance of slums and blighted areas… (quoted in: Lang and Sohmer 2000, 293).

Title I stirred optimism among different groups invested in urban revival, including central city business interests, city councils, mayors, and social welfare advocates. Each had a unique reason to support the implementation of urban renewal projects: businesses saw potential for greater property value returns; city government officials hoped for increased tax revenues; and social welfare activists viewed renewal as a means to improve deteriorating living conditions and introduce quality housing stock. Unfortunately, the individual visions of interested parties would prove incompatible (Teaford 2000, 444).

Although Title I was an ambitious initiative, its goals were ambiguous, as evidenced by the wide range of expectations espoused by its supporters. Despite its provision of federal monies for slum removal and urban redevelopment, the federal government stipulated it would only subsidize those projects occurring in residential districts and in districts slated to become primarily residential upon reconstruction. Thus, housing issues were central to the urban renewal program. However, Title I's wording contained a loophole whereby federal subsidies could be used to raze residential slums and replace them with commercial enterprises. Furthermore, Title I never explicitly mandated constructing low- or moderate-income housing to bolster the inner city housing market. As a result, the good intentions of Title I were easily exploited by developers and planners and by the 1960s, reform activists had become disenchanted and charged that Title I had become a burden on the poor. Their claims were not unfounded; impoverished urban citizens were often displaced in the process of slum clearance and their homes replaced by infrastructure favored by the wealthy (Teaford 2000, 445–446).

Early on, Title I leveraged a number of projects aimed at developing moderate income housing in the central city. For instance, Philadelphia's first Title I initiative, the East Poplar project, sought to provide racially integrated housing, including both public housing and private rental units, for low- and middle-income residents (Teaford 2000, 446). However, housing acts passed by Congress in 1954, 1959, and 1961 allowed increasing amounts of federal urban renewal funds to be allocated for commercial development and facilitated the exploitation of urban renewal to expand

universities and hospitals in the urban core. With a wider array of options available, affordable housing initiatives began to lose favor with developers and local boosters looking to produce a more dramatic economic impact in urban redevelopment. This dwindling interest was met with disapproval from a number of concerned parties, most notably the displaced residents themselves. From Boston to Chicago to Portland, Oregon, angry citizens spoke out against urban renewal, arguing it destroyed established communities and dissolved ethnic neighborhoods in favor of the upper class. Furthermore, a number of African Americans opposed urban renewal programs and referred to them as "Negro removal" programs since many tended to eliminate housing stocks available to them (Abbott 1981; Teaford 1990, 2000; US Department of Housing and Urban Development).

In the end, Title I produced mixed results. After several years of implementation, it became clear that federal urban renewal programs were not the panacea for urban decline proponents had envisioned. Part of the problem can be attributed to project delays. In 1966, the National Commission on Urban Problems estimated that the typical urban renewal project took four years to plan and six to nine years to implement and complete (Teaford 2000, 448; Weicher 1972). Securing the approval of local and federal authorities generated a tremendous amount of bureaucratic paperwork and slowed the momentum of numerous projects. It also discouraged wary developers from committing to urban renewal contracts (Teaford 2000, 449).

Critics of urban renewal, including Martin Anderson, a future domestic policy adviser in the Reagan administration, and Jane Jacobs, attempted to illuminate the shortcomings of the program. Martin offered a conservative critique of urban renewal in his book, *The Federal Bulldozer: A Critical Analysis of Urban Renewal, 1949-1962*, in which he suggested that the program intruded on personal liberties and promoted social engineering. Jane Jacobs addressed urban renewal from a different angle, arguing that the program suffered from modern planning orthodoxy and a city's need to seek a quick fix for its urban ills. Instead, Jacobs believed the city, as an organic entity, would benefit more from gradual, small-scale investment that could be continually observed and modified to complement the character of the urban environment (Jacobs 1961; Teaford 2000, 454-455). According to Jacobs, the current grand schemes and clearance proposals carried out through urban renewal were bound to fail: "From the beginning to end, from Howard and Burnham to the latest amendment on urban-renewal law, the entire concoction is irrelevant to the workings of cities…Unstudied, unrespected, cities have served as sacrificial victims" (Jacobs 1961, 25; Teaford 2000, 455).

Even upon completion, some urban renewal projects proved to be economic failures. Across the United States, upscale apartment complexes that were designed to stem the flow of population from the city to the suburbs failed to attract the desired middle- and upper-class tenants. In many instances, the former reputations of renewal districts discouraged wealthier Americans from investing in them. As the housing market of the 1950s and 1960s grew exponentially, few citizens felt compelled to opt

for city living in a once blighted area over the lure of the suburbs. Many urban renewal projects lacked aesthetic value as well, with architects choosing a "less is more" approach in their conceptualizations. The adoption of modernist architecture produced bland, homogenous structures that lacked the ornate detail and character exhibited in earlier designs and proved to be unappealing to potential residents and employers. Consequently, the economic and aesthetic failures of urban renewal tarnished the reputations of cities instead of enhancing them as originally intended (Segrue 1996; Teaford 2000, 450-451).

Title I's failure to meet its lofty goals led many American cities to completely forgo accepting federal urban renewal monies and rely on alternative funding sources. In fact, most renewal projects that commenced in the thirty years following World War II were not influenced by Title I or any of its subsequent amendments. The revitalization of downtown Pittsburgh, Pennsylvania is an illustrative example. Begun before passage of the Housing Act of 1949, the city relied on a combination of state, local, and private sources to finance its renewal objectives. Other cities that followed Pittsburgh's lead include Dallas, Houston, and Omaha. Interestingly, those cities which participated in Title I funding and those which opted out exhibited little difference in outward appearance to the casual observer by the 1970s (Teaford 2000, 457-459).

Despite the negative publicity heaped upon Title I and urban renewal programs, there were some successes. Projects like Detroit's Lafayette Park, an apartment complex targeting middle- and upper-income tenants, proved urban renewal

could produce well-planned, appealing housing that fit within a city's urban fabric. However, some cities benefited more from Title I than others, garnering disproportionate amounts of funding to complete projects worthy of national recognition. New Haven, Connecticut serves as an example. In 1966, under Mayor Richard Lee, the city led the nation in per capita federal urban renewal funding with $745 per person (Garvin 1996; Teaford 2000, 451). Another successful urban renewal project, Society Hill in Philadelphia, honored the Housing Act of 1954's provision of allowing federal funds to finance the rehabilitation of existing structures, in addition to the clearance of slums. Although the Society Hill neighborhood acquired its share of modern apartment complexes, the majority of urban renewal monies was concentrated on rehabilitating the numerous brick townhouses dating from the 18th and 19th centuries. As a result, Society Hill was able to attract more affluent residents and wealth. Within the first ten years of redevelopment, the neighborhood experienced a net private investment of $180 million. Tax receipts experienced a boost as well. Before initiation of urban renewal, Society Hill produced $454,000 in property taxes a year; by 1974, the community was generating $2.47 million (Garvin 1996; Teaford 2000, 452).

The era of urban renewal under Title I came to a close in 1974 when Congress introduced the Community Development Block Grant (CDBG) program. CDBG sought to grant localities greater flexibility over their share of federal funds with the stipulation that low- and moderate-income residents be the prime targets of the grant money. Under the new program, cities could utilize CDBG funds for rehabilitation or

removal of slum buildings, construction of neighborhood centers, public works projects, and public services. A complementary program, the Urban Development Action Grant (UDAG) was authorized by Congress in 1977 and allocated funds for private development that produced new jobs and increased local tax revenues (e.g., infrastructure improvements) (Black et al. 1980; Teaford 2000, 459). Overall, the federal government had relinquished much of the control it enjoyed over urban renewal by the end of the 20th century. Furthermore, current redevelopment projects have sought to respect the immediate urban context and to preserve and repair existing historic structures and street patterns wherever possible (Teaford 2000, 460-461).

A Brief History of the Bolton Hill Neighborhood

Baltimore's Bolton Hill neighborhood is situated northwest of downtown (Figure 1) close to the cultural district and is regarded as one of the more affluent communities in the city. As depicted in Figure 2, Bolton Hill is contained within an area of nine blocks by five blocks defined by North Street, Mt Royal Avenue, Dolphin Street, and Eutaw Street. Its situation at a higher elevation than surrounding neighborhoods was intended to promote an environment of "healthfulness," free of the disease and filth plaguing lower income neighborhoods. Consequently, Bolton Hill's settlement conveniently imposed an implicit separation of the upper and lower classes in northwest Baltimore (Olson 1997, 114). Initially dominated by mansion homes dating to the late 1700s, Bolton Hill experienced an explosion of growth in population and infrastructure between 1850 and 1900. Soon, row houses lined Bolton Hill's

streets, each reflecting the dominant architectural style of the time period in which it was built. Today, residents are proud of their community's diverse architecture, as well as the neighborhood's diverse array of common spaces and monuments. In the late 1800s and early 1900s, Bolton Hill boasted many well-landscaped and tree-lined boulevards, as well as small pocket parks. The area was also graced by a number of notable statues and monuments, including the Francis Scott Key Monument and several war memorials (Live Baltimore Home Center, Inc: Bolton Hill; Olson 1997, 167; Shoken 2003).

Bolton Hill's residents have been, and continue to be, as diverse as the architectural and cultural elements of the neighborhood. Dating back to the late 18th century, Bolton Hill has been home to a number of prominent citizens, professors, and old Baltimore families. The presence of former plantation owners and ex-Confederate soldiers contributed to its Southern character and pattern of social segregation, with wealthy residents residing in mansion homes and African Americans, who worked as servants, occupying alley housing. Unfortunately, many of the southern transplants brought their problems as well, including alcoholism and racial prejudice. Crime and "white flight" gripped Bolton Hill at the turn of the 20th century, initiating a slow unraveling of the neighborhood fabric (Live Baltimore Home Center, Inc: Bolton Hill; Shoken 2003). Before World War I, 60% of Baltimore's Social Register families resided in the Bolton Hill / Mt. Royal vicinity; by 1932, only 33% remained (Olson 1997, 303). In 1928, the Mt. Royal Improvement Association was founded to address

Figure 1: Map depicting the Bolton Hill community in relation to the other neighborhoods that comprise Baltimore City. (Source: Bolton Hill Online)

these issues, as well as to arrest the continued transformation of single family homes into apartments run by absentee owners. Unfortunately, the underlying motive of the association was to uphold the aforementioned pattern of racial segregation by reserving all property for white occupancy and by claiming the Mt. Royal District a "protected area." An example of Bolton Hill's deep seated prejudice occurred in 1910 when, upon receiving notice that an African American family intended to move into a home on Eutaw Place, a mass neighborhood meeting was held to strategize and prevent their settlement in Bolton Hill. By the end of the year, a segregation

ordinance was proposed and enacted by Baltimore City Council. In 1917, a similar ordinance in Louisville, Kentucky was ruled unconstitutional by the U.S. Supreme Court. The termination of Louisville's ordinance marked the demise of Baltimore's legislation as well (Live Baltimore Home Center, Inc: Bolton Hill; Olson 1997, 278; Power 1983; Shoken 2003).

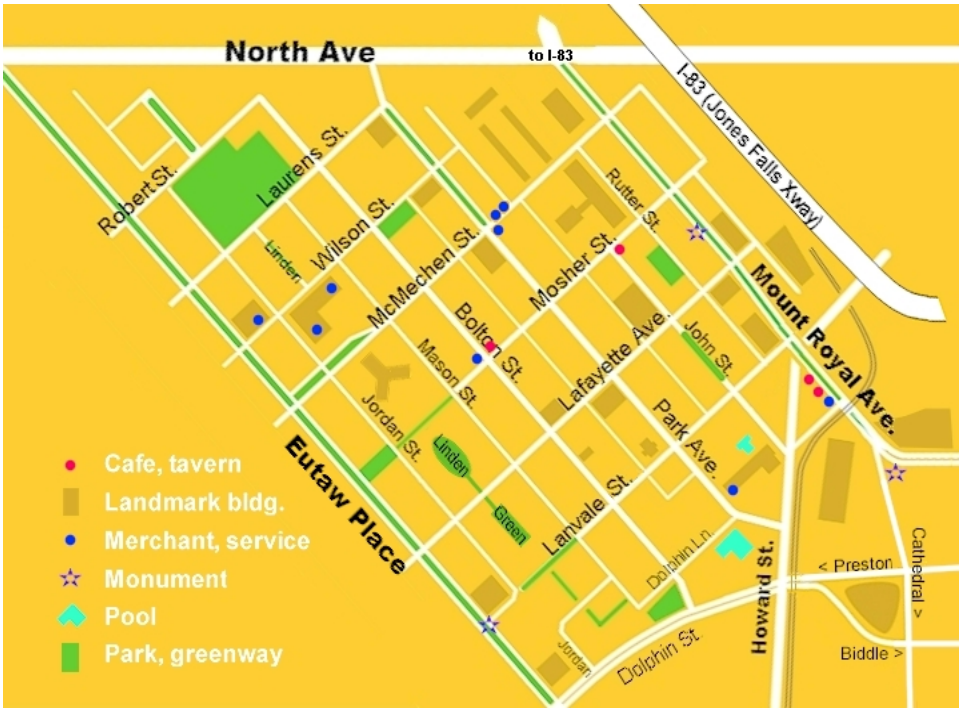

Figure 2: A map depicting the major street layout of Bolton Hill. (Source: Bolton Hill Online)

Minority divisions in Bolton Hill were further strained by the practice of racial redlining whereby "mortgage lenders figuratively draw a red line around minority neighborhoods and refuse to make mortgage loans available inside the red lined area"

(Brown and Bennington 1993). In addition to refusing to lend in minority neighborhoods, banks and mortgage companies refused to accept mortgage loan applications from minority areas and excluded these areas from marketing strategies (Brown and Bennington 1993). Maps detailing red lined neighborhoods aided lenders in deciding loan allocations. Initially, these documents were not intended to facilitate such practices; however, they acted to institutionalize redlining through the patterns of residential settlement already occurring in "risky neighborhoods" (Hillier 2003). In May 1937, a residential security map of Baltimore was issued for use by the Home Owner's Loan Corporation (Figure 3). The map graded neighborhoods according to residential desirability based on four classifications: A, B, C and D. "A" regions were identified as favorable neighborhoods for loan lending while "D" regions were identified as risky neighborhoods for lending based on a low rate of homeownership and an unstable social fabric. "B" and "C" regions were identified on a sliding scale of quality, with "B" regions being more desirable than "C" regions for loan lending. Bolton Hill falls within sectors C5 and D4 on Baltimore's residential security map, reinforcing the decay of the community's once prominent standing within the city (Home Owner's Loan Corporation 1937).

The advent of World War II and the housing shortages that followed prompted the further conversion of spacious mansions into apartment flats, most of which were rented to working class African Americans and Appalachian transplants. This immense population turnover occurred in conjunction with the out migration of affluent whites to suburban communities and accelerated the decline of Bolton Hill's

prestigious character, replacing it with a neighborhood besieged by substandard housing, slumlords, crime, and domestic woe. By the late 1950s, residents of Bolton Hill, along with the Baltimore City government, were looking for ways to reverse Bolton Hill's declining reputation and restore the neighborhood to prominence (Shoken 2003).

Figure 3: A residential security map of Baltimore prepared for use by the Home Owner's Loan Corporation to determine which neighborhoods are suitable for making for loans to prospective home buyers. Bolton Hill is located within the rectangular box indicated by the arrow.
(Source: Home Ownership Loan Corporation 1937, National Archives, College Park, MD)

The late 1950s marked the beginning of the pursuit of urban renewal projects in major metropolitan cities. In 1957, Baltimore passed an Urban Renewal Ordinance with the intention of renovating and improving existing inner city neighborhoods. The goal was to draw suburban populations back and create stable, livable communities. Under Baltimore's urban renewal program, federal funds were to be distributed throughout the city via an established Urban Renewal Agency. One of the first residential neighborhoods to benefit from the ordinance was Bolton Hill (Figure 4). Designated Redevelopment Area 12, the neighborhood's storied past and once dominant political power influenced the decision to aid in its renovation. Participation in the project was announced in February 1960 along with the specific details of the plan as envisioned by its designers. Among other things, the Bolton Hill urban renewal project called for the complete demolition of housing blocks along segments of Linden Avenue and Eutaw Place, the widening of Dolphin Street and McMechen Street, the construction of a new school and shopping center, and the installation of a neighborhood park.

The plan met with immediate public opposition from citizens who decried further commercial development in the neighborhood, as well as the replacement of the housing stock, most of which dated back to the Civil War and reflected the affluent tastes of its once wealthy inhabitants. Urban renewal proponents eventually prevailed and plans moved forward to reform Bolton Hill's image. Despite the demolition of historic row houses and the construction of several modern townhouse developments and high-rise apartment complexes, groups of concerned citizens acted to renovate and

restore several of the original mansion homes remaining in the district. The efforts undertaken through these projects resulted in Bolton Hill being named a Baltimore City historic district in 1967, as well as being listed on the National Register of Historic Places in 1971 (Shoken 2003). Today, the Bolton Hill community's commitment to maintain a pleasant environment is reflected in the cost of living for the neighborhood. In 1998, the average cost of a home in Bolton Hill was $136,442; by 2004, the price had increased to $357,718. According to data provided by First American Real Estate Solutions, the average home in Baltimore sold for $63,837 in 1998 and $130,160 in 2004 (Live Baltimore Home Center, Inc: Home Sales Statistics).

Urban Renewal and Street Trees in Baltimore's Bolton Hill Neighborhood

The urban renewal project in Bolton Hill brought about a transformation in the aesthetics and character of the neighborhood and stimulated a renewed interest in the collective welfare of the community among its residents. Many people were moved to participate in planning and implementing a variety of initiatives intended to bolster Bolton Hill's image. Adoption of a formal street tree program was one project Bolton Hill residents embraced as an ideal investment in the revitalization of the neighborhood. Citywide, a renewed interest in neighborhood street tree programs had emerged with the passage of the Urban Renewal Ordinance in 1957, which advocated the installation of street lights and street trees in neighborhoods as small, but important, investments in the overall revitalization of a community. Although Bolton Hill had maintained an unofficial street tree program in the past, in June 1963,

Baltimore City Council passed an ordinance establishing a formal, city-wide Street Tree Planting Program (Ward 2004). The first installment of street trees for Bolton Hill came in March 1962, when 75 trees were distributed primarily throughout two areas: the first bounded by Bolton, Laurens and Mosher streets and Park Avenue and the second by Mosher, McCulloh and Lanvale streets and Madison Avenue. Most of the trees selected for the initial planting were American hornbeams, little-leaf lindens,

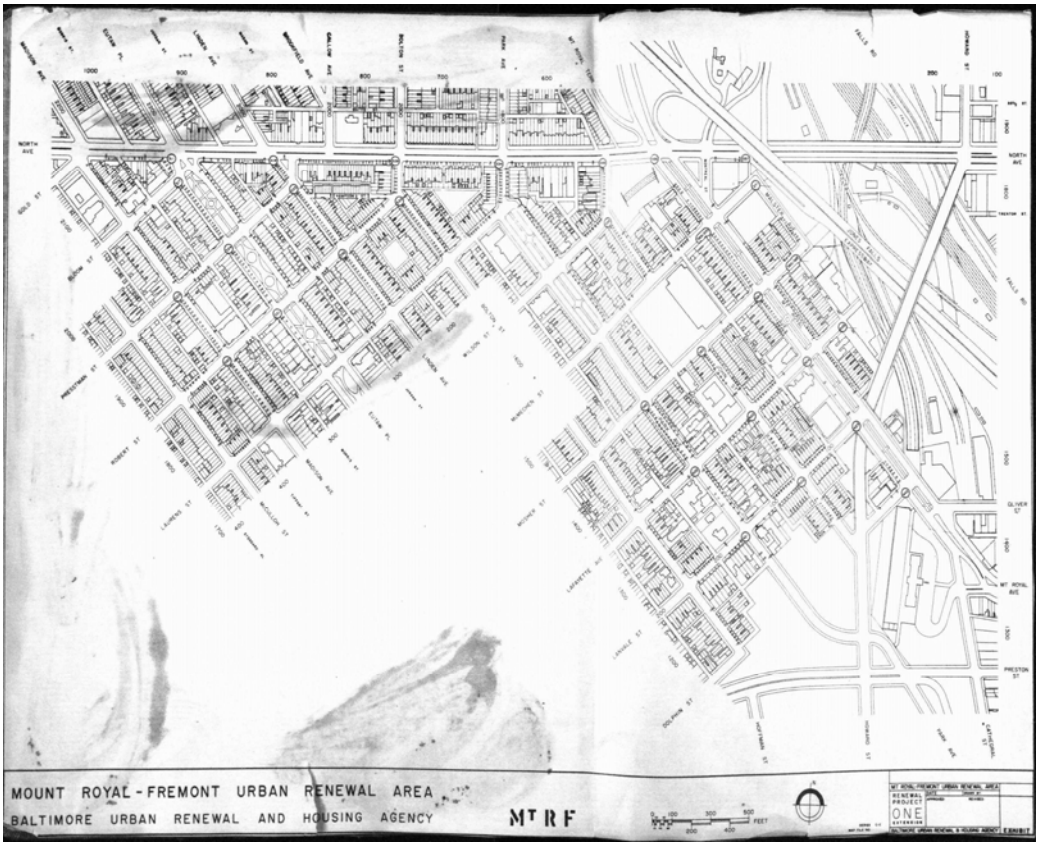

Figure 4: A map depicting the Mount Royal-Fremont Urban Renewal Area (Redevelopment Area 12), which contains the Bolton Hill neighborhood. (Source: Courtesy of the Maryland Hall of Records, Annapolis, MD)

and Buisman elms. A second installment of plantings was scheduled to occur in the fall of 1962 across an additional twenty blocks ("Renewal Areas Will Get Trees" 1962). Overall, a total of 185 trees were planted in the Bolton Hill neighborhood in the spring and fall of 1962 (Annual Report of the Department of Recreation and Parks 1962, 34). By 1995, over 1000 street trees had been planted in Bolton Hill, including oaks, chestnuts, maples, and lindens (Bedingfield 2004).

Unfortunately, the new street tree program suffered from several setbacks, including a waiting list for trees requested by city residents and an inadequate budget. In 1963, Councilman Thomas Ward, himself a resident of Bolton Hill, negotiated a street tree budget of $540,000 which was expected to cover expenses including staff salaries and the cost of purchasing, planting, and maintaining trees. In addition to influencing the street tree budget, Ward actively recruited manpower to boost the capacity of the Forestry Division and solicited requests for trees from neighborhood residents citywide. Despite minor protests from the Canton Polish community, most people embraced the street tree program and genuinely desired more trees along the streets of their neighborhoods. Bolton Hill residents, most of whom were of European American descent, highly educated, and upper middle class, were especially enamored of their street trees and tolerated potential problems that would arise from tree plantings. Determined to maintain Bolton Hill's tree population, a substantial number of residents lobbied the Forestry Division to plant and replace trees in their community (Ward 2004).

One Bolton Hill citizen, Ken Williams, was particularly dedicated to the "greening" of the neighborhood. A lifetime tree advocate and a former member of the Baltimore City Forestry Board, Williams was disappointed with the urban renewal project's approach to street tree planting. Lacking a proper plan and a personal investment in the neighborhood, urban renewal proponents chose and installed species, such as Norway maple, which functioned poorly as street trees. Many of the trees bore fruit, flowers, and seeds that dropped onto pavement and cars and posed slipping hazards to pedestrians. Determined to revamp and preserve Bolton Hill's urban forest, Williams sought funding from a variety of sources, such as garden clubs and sympathetic civic groups, which he applied toward obtaining additional trees from the urban renewal agency. Williams's connections to city government allowed him to solicit help from the Forestry Division in planting the trees. Williams's ambitions drove him to oversee the formation of a formal tree committee for Bolton Hill in 1975 and the creation of a tree plan that focused on planting, fertilizing, and elevating (i.e. trimming lower branches to avoid damage from passing trucks) street trees. Neighborhood members who requested trees for their property agreed to pay half the cost of expenses, the second half being supplied through committee funds. The success of the tree committee planting campaign can be attributed to the residents' desire for trees. Many recognized the intangible benefits, beyond shade and aesthetic appeal, that street trees brought to the community, including their ability to improve the neighborhood's image from transitional to established and to foster closer relationships among Bolton Hill residents. In fact, Bolton Hill's program was so

successful that other Baltimore neighborhoods adopted similar tree initiatives (Williams 2005).

Of course, not all Bolton Hill residents were initially won over by Williams's tree planting campaign. Many were skeptical of his commitment to street trees and did not wish to be burdened with the task of caring for them. As a result, there was a period of time when several areas of Bolton Hill were scarcely planted with street trees. However, Williams was able to convince the neighborhood hold-outs that he was sensitive to their individual needs and concerns. By gaining their trust, Williams was able to ensure a relatively even distribution of trees across Bolton Hill's streets. One way Williams demonstrated his dedication to street trees was through the daily maintenance activities he performed throughout the neighborhood. Some of these activities, especially trimming, aggravated some members of the community. For example, Williams would leave freshly trimmed branches by the street since he lacked the proper equipment and time to dispose of the tree debris. As time passed and most complaints went unaddressed, Williams's practices were eventually tolerated by even the most disgruntled residents. Another important maintenance activity Williams organized was a neighborhood watering program. With the cooperation of the Forestry Division and the city, Williams was able to obtain a water truck for residents to water their street trees provided they placed requests in advance. Again, Williams utilized his position on the Baltimore City Forestry Board and his contacts within the city government to ensure the vitality of Bolton Hill's urban forest.

Despite Williams's generous attention, problems did persist. Two of the most common concerns were the levels of pollution the trees were exposed to and the relatively small spaces reserved for tree wells in the sidewalk. The issue of tree well size was particularly troubling given that earlier specifications were failing to provide the necessary surface area for optimum nutrient absorption. Many of Bolton Hill's trees had extensive root systems that were restricted by pavement from receiving adequate levels of nourishment. As a result, a typical street tree in Bolton Hill, even a well-tended one, could be expected to live only half as long as a similar tree located in a park or on a residential lawn (Williams 2005).

In 1989, Williams began to mentor another man, George Lavdas, to succeed him as Bolton Hill's tree advocate. Unlike his predecessor, who promoted a vigorous trimming and fertilizing agenda, Lavdas took a more conservative approach to tree care. One of Lavdas's first tree projects was initiated in 1989 and involved the removal of excess concrete and brick paving to allow for additional tree spaces. From 1989 to 1996, Lavdas led efforts in the neighborhood to collect money to fund the necessary labor, including the hiring of a contractor to remove concrete. Bricks were also removed from sidewalks by Bolton Hill residents who, in turn, saved the bricks for use in projects elsewhere in the community. Lavdas ensured that the newly installed tree wells were larger than their predecessors to allow for a greater surface area for root systems to thrive. By creating these additional tree wells, Lavdas was able to facilitate the planting of 50 new trees, thus permanently expanding Bolton Hill's tree canopy (Lavdas 2005).

Lavdas's commitment to Bolton Hill's street trees is further demonstrated in a second, on-going project: a summer tree survey[2]. Each year, Lavdas canvases the tree population in Bolton Hill, noting which trees are diseased, damaged, or dying. A list is compiled and submitted to the City Forester detailing the state of Bolton Hill's trees including which trees are in trouble and need to be replaced. With a population of approximately 1000 trees, it is not uncommon for Bolton Hill to lose 30 to 60 trees a year. Fortunately, by cultivating a good relationship with the Forestry Division and providing the necessary information for officials concerning problem trees, the replacement and treatment of trees in Bolton Hill has been quick and effective, thus preserving the healthy condition of the tree population and the aesthetic appeal of the neighborhood. Lavdas's tree survey initiative reinforces the continual need to maintain the current tree population and the importance of healthy trees in a community, especially since Bolton Hill does not possess additional space to plant new trees. However, as a result of consistent upkeep and observation, the present tree crop is of high quality and suffers from few acts of vandalism and disease infestations. In fact, Bolton Hill's dedication to street trees has distinguished itself as one of the greenest, tree-lined 19th century urban neighborhoods in Baltimore, a unique distinction that draws praise from civic groups and government officials alike. (Lavdas 2005). Although George Lavdas has been vigilant in maintaining an impressive tree population in Bolton Hill, his attention to overall tree care has not been as thorough as Ken Williams, who stressed the need for fertilizing and watering all

[2] A more comprehensive street tree survey was conducted by the Davey Tree Company in 1980; however, the survey results were not available for further analysis.

street trees in the neighborhood. According to City Forester Marion Bedingfield, who has worked with both Williams and Lavdas throughout his tenure with the Parks Department, Ken Williams functioned as a tree steward while Lavdas acts more as a "tree guru" (Bedingfield 2005).

Perhaps the best evidence of Bolton Hill's thriving urban forest is demonstrated through photographs. A photograph presents us with a snapshot in time that documents particular conditions at a particular moment. Study and comparison of photos taken over several decades can tell a powerful story of the evolution of a place. To better understand the current status of Bolton Hill's trees and how it compares to the situation during the urban renewal years of the 1950s and 1960s, I obtained a set of photographs documenting street scenes from 1959 to 1961 and compared them with images taken in 2005 (Figures 5-9).

One of the most noticeable aspects of these photographic comparisons is the increased density of street trees present in the 2005 photos. This is particularly apparent in Figures 5 and 8. In Figures 6 and 9, one can see that several of the trees captured in the 1960s-era photos remain. Their presence suggests Bolton Hill residents have succeeded in preserving mature trees responsible for the benefits attributed to urban forests. Although the casual observer may not be able to distinguish whether any of the trees are dead or dying due to the time of year these photos were taken, it can be surmised that Bolton Hill's street tree population is defying the odds imposed by daily urban stresses and pollution. Nevertheless, Bolton Hill's trees do appear to exhibit traits characteristic of urban trees, including stunted

growth, small diameter trunks, and a restricted space for nutrient absorption. Additionally, the presence of street parking increases the potential for vehicular damage to trunks and low-hanging branches. These issues are being addressed through continued lobbying by Lavdas and fellow Bolton Hill residents for adequate tree care and replacement, as well as a neighborhood commitment to protect and promote their urban forest as a unique and distinguishing feature. One positive aspect reflected by these photographs is the apparent cleanliness of the streets and adjacent sidewalks. Perhaps the attention paid to the trees translates into a parallel desire to maintain attractive, garbage-free spaces where people feel safe to congregate with neighbors and walk to work or to shopping. One of the unique features of Bolton Hill,

Figure 5: Photographs depicting Mount Royal Avenue between Lafayette Avenue and Mosher Street: 1959 (left) and 2005 (right). (Source: Photo on left courtesy of the Maryland Hall of Records, Annapolis, MD; photo on right taken by author)

Figure 6: Photographs depicting Bolton Street between Lafayette Avenue and Mosher Street: 1961 (left) and 2005 (right). (Source: Photo on left courtesy of the Maryland Hall of Records, Annapolis, MD; photo on right taken by author)

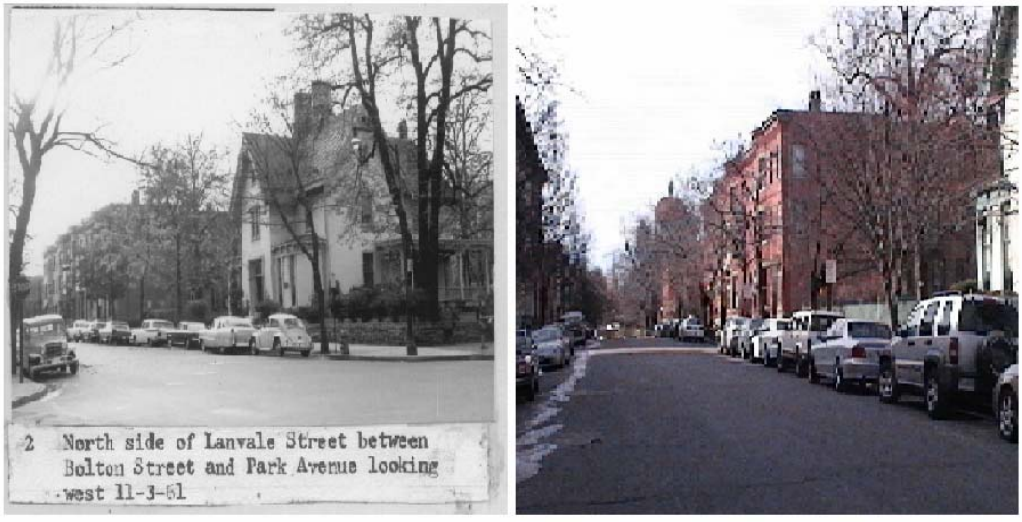

Figure 7: Photographs depicting Lanvale Street between Bolton Street and Park Avenue: 1961 (left) and 2005 (right). (Source: Photo on left courtesy of the Maryland Hall of Records, Annapolis, MD; photo on right taken by author)

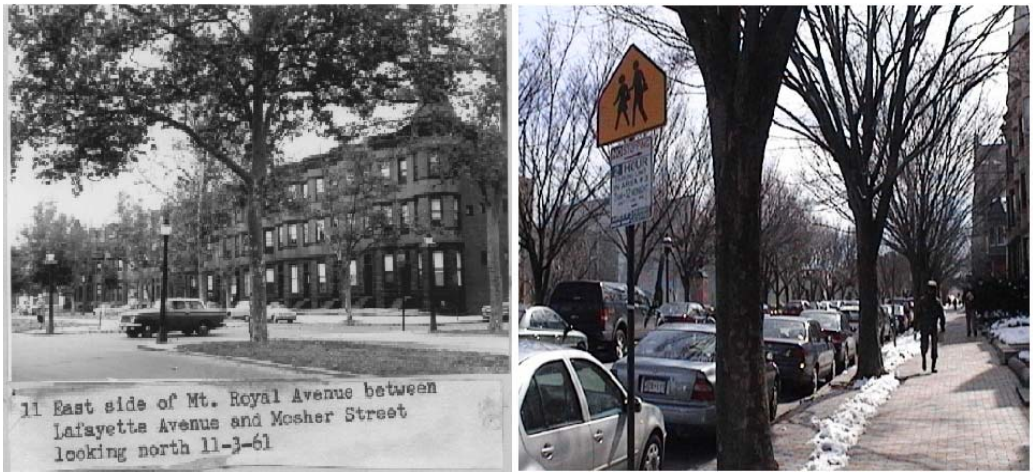

Figure 8: Photographs depicting Mt. Royal Avenue between Lafayette Avenue and Mosher Street: 1961 (left) and 2005 (right). (Sources: Photo on left courtesy of the Maryland Hall of Records, Annapolis, MD; photo on right taken by author)

Figure 9: Photographs depicting pocket park on John Street between Lanvale Street and Lafayette Avenue: 1961 (left) and 2005 (right). (Source: Photo on left courtesy of the Maryland Hall of Records, Annapolis, MD; photo on right taken by author)

the pocket park, is illustrated in Figure 9. These parks are maintained and enjoyed by the immediate residents and serve as focal points for children's play, block parties, and quiet contemplation. Their presence adds variety to Bolton Hill's urban forest and showcases the residents' need for nature in the city environment.

Compared to other neighborhood districts, Bolton Hill has been able to sustain an impressive street tree presence through citizen activism and daily maintenance. Unfortunately, Bolton Hill's success is overlooked in Baltimore's Vital Signs data compilation project. Developed in 2002 by the Baltimore Neighborhood Indicators Alliance (BNIA), Vital Signs is composed of forty specific indicators, divided into seven topical categories, which aim to "take the pulse" of Baltimore's neighborhoods and determine their progress toward common community goals of strong neighborhoods and a healthy quality of life. To analyze the data on a city-wide scale, Baltimore was broken down into 55 community statistical areas (CSAs) as illustrated in Figure 10; Bolton Hill was grouped into the Midtown CSA (35 in Figure 10). (Baltimore Neighborhood Indicators Alliance 2005).

One of the seven categories in Vital Signs, urban environment and transit, measures the percentage of tree canopy cover, obtained through analysis of satellite imagery, as an indicator of air quality in Baltimore. Overall, approximately one third of the city has over twenty percent tree coverage (Figure 11) with 2500 new and replacement trees planted since 2001 in areas of high demand (Vital Signs 2004, 58). In contrast, the Midtown CSA reports 3.22 % tree canopy coverage (Vital Signs 2004, 57). Although this result appears to contradict Bolton Hill's claim of a rich urban

forest, the data must be considered in context. Besides Bolton Hill, the Midtown CSA encompasses the downtown core, Charles North, and Mount Vernon (Vital Signs 2004, 7). These sections of the city experience a tremendous amount of vehicular and commuter traffic and pollution, urban stresses known to be harmful to the well-being and longevity of street trees. The overall impact of existing in such a hostile environment on a daily basis affects the placement of trees. Economically, it would be an expensive proposition to maintain an abundant crop of street trees in such a setting. Consequently, the tree cover reported could very well mask Bolton Hill's abundance of street trees. Nevertheless, the lack of canopy cover in the Midtown CSA is troublesome and should continue to be a target of tree planting projects in the future.

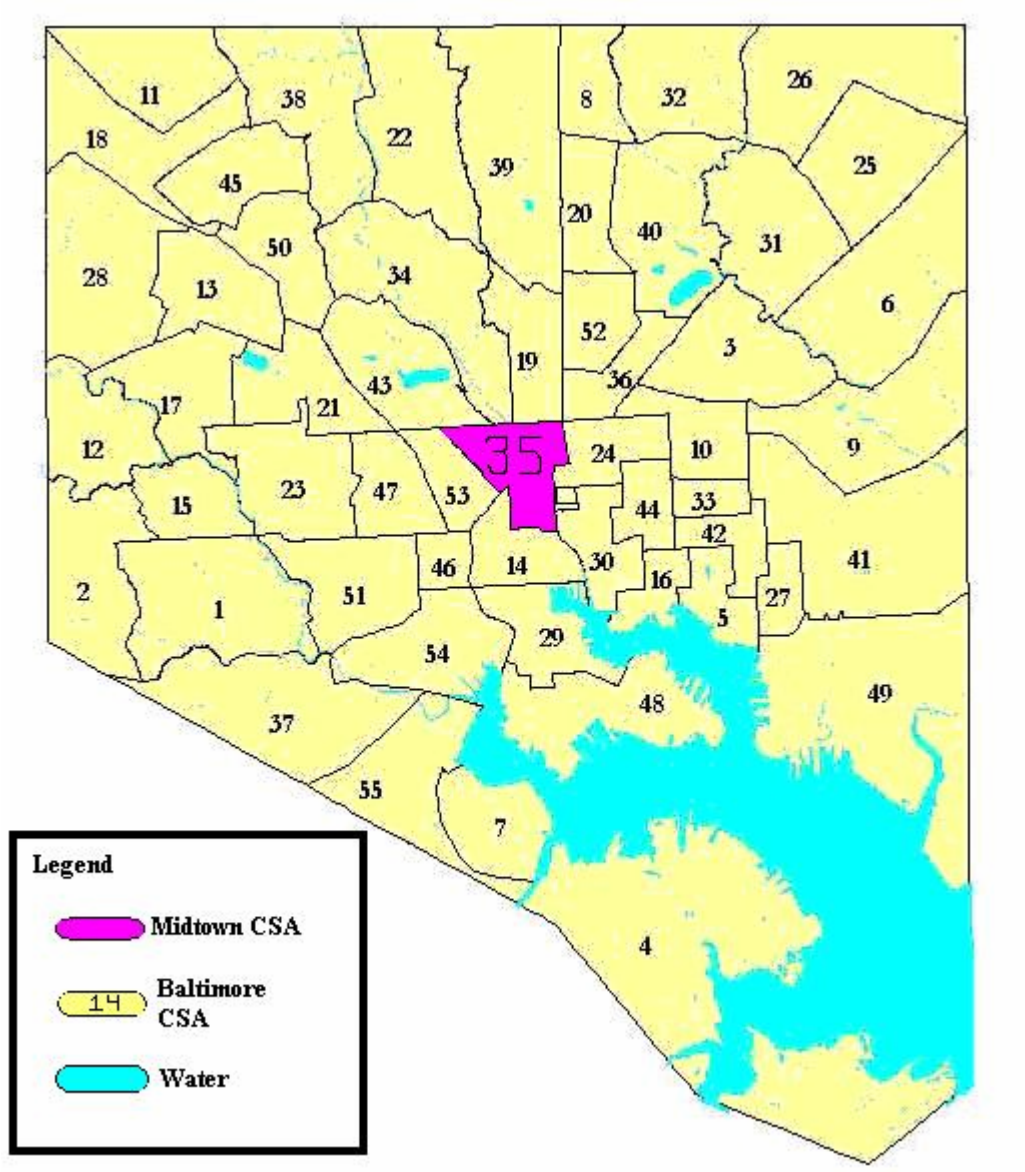

Figure 10: Map illustrating Baltimore's 55 Community Statistical Areas (CSAs) used to report data in Vital Signs; Midtown, which contains Bolton Hill, is shaded. (Source: Baltimore Neighborhood Indicators Alliance 2005)

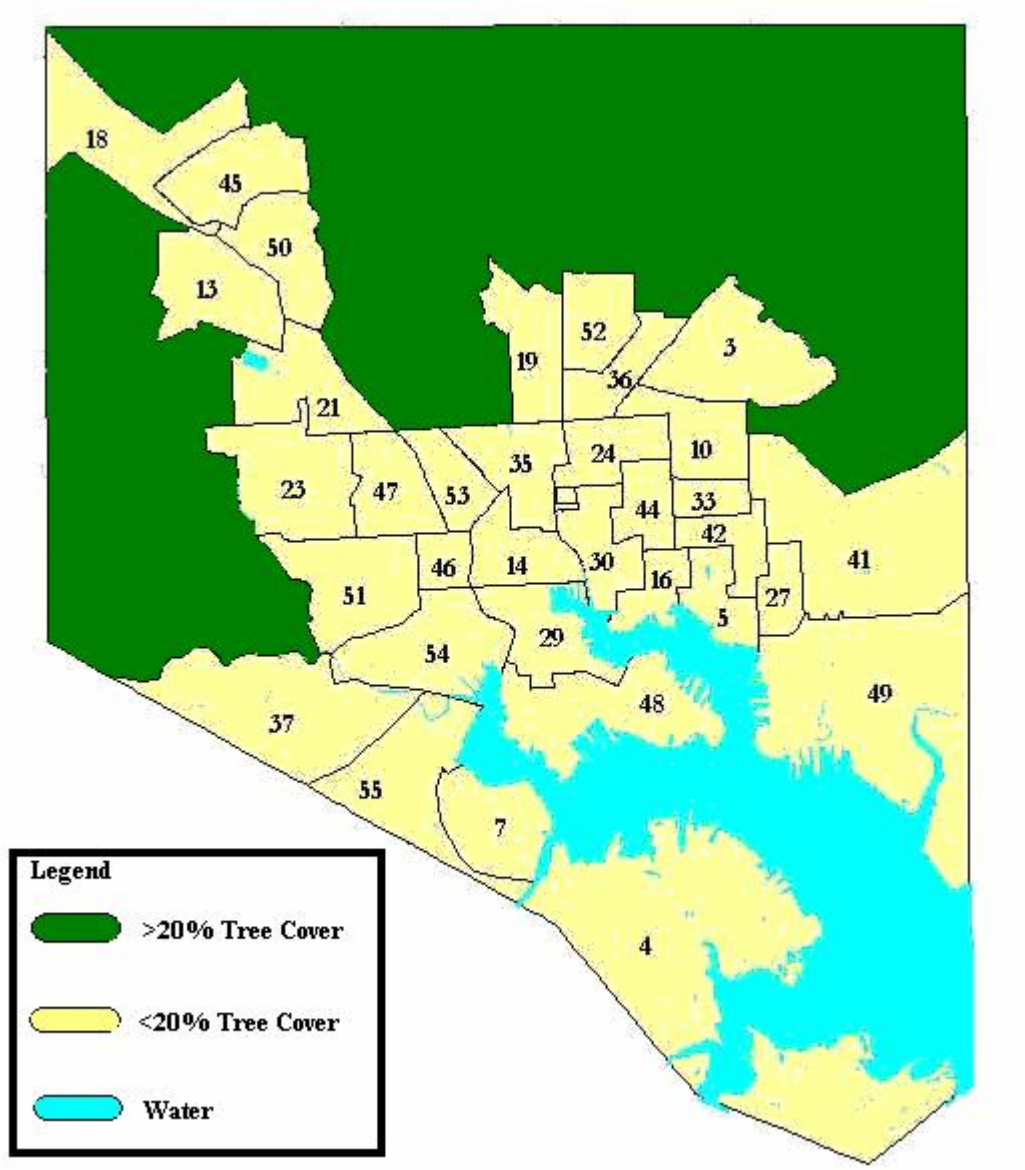

Figure 11: Map illustrating Community Statistical Areas (CSAs) with over twenty percent tree canopy cover. (Source: Baltimore Neighborhood Indicators Alliance 2005)

Conclusion

It has been said all trees have a story to tell. Whether this statement holds truth is debatable; however, all trees possess the potential to contribute positively to a landscape. Rural, urban, or suburban, all landscapes benefit from incorporating nature into their ecosystems. For many, trees represent the forest primeval, an intimate connection to our ancestors who relied on the forest to sustain their livelihood, and an unadulterated symbol of the pureness of the natural world. From the tiergartens and boulevards of Europe to the urban parks embraced by American cities, trees have played a defining role in shaping a city's infrastructure (Lawrence 1995; Tuason 1997). They are as much a part of the city environment as the skyscrapers, taxies, and mazes of asphalt streets (Botkin and Beveridge 1997; Grove and Burch 1997). Furthermore, the presence of trees in our cities serves a significant purpose to its citizens by mellowing the frenetic atmosphere and exposing residents to nature in an otherwise built-up environment (Dwyer et al 1994; McPherson 2000).

In addition to contributing to the unique character of a city, urban trees are responsible for a wide range of social, environmental, and economic benefits that impact both urbanites and the immediate surroundings. Acting as natural filters, trees have absorbed particulate and gaseous pollutants from the atmosphere, including carbon dioxide, nitrogen oxide, and ozone (Botkin and Beveridge 1997; Cool Communities; Nowak 1993). In addition, trees intercept precipitation and reduce the incidence of soil erosion and stormwater runoff (Coder 1996; McPherson 2000; USDA Forest Service Northeastern Area). The presence of trees has been linked to

higher property values, increased pedestrian traffic in commercial districts, and reduced energy costs for homes, offices, and businesses (Cool Communities; Ebenreck 1989; Wolf 2003). Finally, the inclusion of trees in urban residential districts, especially in public housing projects, has decreased the frequency of violent crimes and has strengthened the relationships shared among community residents (Kuo 2003; Prow 1999).

The important position urban trees occupy necessitates diligent maintenance and attention. Hence, many cities have established forestry programs and tree ordinances to tend to the needs of the urban forest. Community groups and non-profit organizations have arisen as well to address urban tree issues at a grassroots level and to foster an understanding among city residents regarding the influence of urban trees. National programs, such as Tree City USA, have helped foster an appreciation for the practical benefits and aesthetic beauty trees provide in our modern metropolises. Through the collaborations encouraged among citizens, city forestry departments, and government officials, the urban forests of American cities have the potential to thrive amid the various urban stresses present in the city environment.

Of the many cities that boast vibrant urban forests, Baltimore, Maryland has a particularly rich history in urban forestry and has set the standard for many American cities in urban forest care. Established in 1913, Baltimore's street tree ordinance and Forestry Division predated Maryland's roadside tree law and sought to address the concerns expressed by citizens advocating for healthy street trees. Despite experiencing an array of obstacles and challenges, including inadequate budget

allocations and chronic labor shortages, the city's Forestry Division has implemented and influenced a number of successful street tree initiatives, including a nationally recognized Dutch elm disease eradication program, community outreach education workshops, and the improvement of inner city neighborhoods through tree planting events. Unfortunately, Baltimore continues to experience a decline in tree canopy city wide. Extensive research conducted by David J. Nowak projects a loss of 110,000 trees a year through 2013 (Dewar 2003). Regardless of the enthusiasm exhibited by tree planting volunteers and the dedication of the Forestry Division, it does not appear these losses can be reversed easily in the near future (Bedingfield 2004).

In the course of my research, I have discovered a positive development in street tree planting and cultivation in the Baltimore neighborhood of Bolton Hill. In the late 1950s, Bolton Hill was selected to participate in an urban renewal project to restore the community's infrastructure, as well as heal its social well-being. Street trees played a large role in the implementation of the program's objectives and led to a neighborhood wide effort to protect and maintain Bolton Hill's urban forest. Residents joined together to establish a street tree program specific to the Bolton Hill neighborhood and in 1962 saw the first installment of tree plantings occur (Annual Report of the Department of Recreation and Parks 1962, 34). Over the course of three decades, Bolton Hill has been the recipient of over 1000 street trees (Bedingfield 2004) and has benefited from citizen advocates and "tree gurus" dedicated to sustaining a viable tree population in the community.

Bolton Hill's urban forest defies the exhibited trends of decline in tree cover and quality in Baltimore. I propose several reasons for Bolton Hill's success in street tree management and preservation. First of all, there is a collective community desire to pursue an attractive, eclectic atmosphere that is appealing to residents and visitors alike (Bedingfield 2004; Lavdas 2005; Williams 2005). Street trees appeal to all the senses and boost the aesthetic quality of an area if properly maintained. Bolton Hill is fortunate to have a history of embracing "nature in the city" through a patch work of common spaces and pocket parks, many of which continue to thrive after more than 100 years of existence. Thus, these unique neighborhood attributes give Bolton Hill character and make it a desirable place to live. This final point is evident from home sale statistics that indicate Bolton Hill homes sell for upward of $300,000 while a typical Baltimore home sells for an average of $130,000 (Live Baltimore Home Center, Inc: Home Sales Statistics).

Along with a common desire to live in a stable, active community, Bolton Hill has a tradition of residents willing to advocate on behalf of trees. Since the founding of Bolton Hill's street tree program, there has been at least one neighborhood citizen pressing the city government and the Forestry Division to provide trees, support, and maintenance for their urban forest. Despite the occasional controversy over minor inconveniences such as a lack of watering, tree litter, and a backlog for pruning work, residents embrace the benefits their street trees impart on their quality of life and are willing to tolerate the nuisances trees pose daily. In a community where over three quarters of the residents are high school graduates and half have a bachelor's degree or

higher (Johns Hopkins University Sheridan Libraries), Bolton Hill citizens are generally well educated and have the capacity to appreciate their trees and demand a high level of attention be paid to their needs. Utilizing simple tools, such as a tree inventory, helps residents "take the pulse" of their urban forest and identify potential hazards, diseased and dying trees, and any special needs that deserve attention (e.g., branches blocking street lighting and tree damage from vandalism). Community participation, from pooling funds for seedlings to engaging in preparation and maintenance projects, has allowed Bolton Hill residents claim ownership of, as well as demonstrate accountability for, their urban forest. Moreover, by maintaining a presence through verbal and face-to-face communication, Bolton Hill tree advocates have secured good relationships with city foresters and councilmen who have been willing to satisfy their requests when feasible.

Of course, Bolton Hill residents have resources many other Baltimore neighborhoods lack: money and influence. Historically an affluent community, Bolton Hill has been able to utilize financial and political resources to obtain the attention and services it desires. Without the influence of Thomas Ward on City Council and the connections Ken Williams maintained within city government and the Forestry Department, Bolton Hill would not have been able to manage its street trees in such a diligent manner. However, the economic status of a community should not stand as an obstacle in the pursuit of a vibrant street tree population in a neighborhood. Concerned citizens can receive help through a number of local programs including Revitalizing Baltimore and the Community Forestry Program. In exchange for "sweat

equity," volunteers are willing to provide materials, education, and assistance for anyone interested in "greening" their community (Parks and People). Similar initiatives exist across the United States in other major metropolises including Houston, Texas and Baton Rouge, Louisiana (Baton Rouge Green; Trees for Houston). Most of these voluntary efforts emphasize community responsibility and require participating neighborhoods to assist in fundraising and long-term maintenance of their trees (Atkin 2003). Some cities, such as Sacramento, California, employ partnerships among city government officials, businesses, and citizens to work at a grassroots level in cultivating a broad base of public awareness and support for urban forestry initiatives (McPherson and Luttinger 1998). Vitosh and Thompson (2000) found that the provision of external funding dedicated to tree planting in Illinois communities encouraged citizens to plant and maintain trees, as well as establish tree boards and tree ordinances to guide their tree management efforts. In a survey conducted among participating community members, 82% stated that tree planting would not occur without external funding and 45% stated that tree planting programs would stop if funding was no longer available (Vitosh and Thompson 2000, 116). Bolton Hill has employed many of these tactics over the years and the resultant monies and support for Bolton Hill trees have had significant influence over the quality and sustainability of the urban forest and have set the neighborhood apart from those communities aspiring to improve their image through tree planting.

Bolton Hill is privileged to have so many factors working in its favor in sustaining its urban forest. This begs the question: Is Bolton Hill succeeding in spite

of itself? Compared to most other Baltimore neighborhoods, Bolton Hill has been blessed with an historically prominent reputation and has been called home by a long list of distinguished individuals, including novelist F. Scott Fitzgerald, senator Paul Sarbanes, and former U.S. President Woodrow Wilson (Bolton Hill Online). The community's rich history influenced its choice among city officials as the first neighborhood to benefit from urban renewal funds in the late 1950s. Councilman Thomas Ward's residence in Bolton Hill further helped the neighborhood gain the respect and support it needed to reverse declining living and housing conditions. Urban renewal proved to be the hook to precipitate Bolton Hill's reemergence as a desirable community and was the defining event to reintroduce its residents to the benefits of embracing street trees in their neighborhood. These achievements might not have been possible if Bolton Hill did not have such an illustrious reputation among politicians and influential Baltimore citizens.

In addition to offering Baltimore government a reason to make urban renewal efforts work successfully, Bolton Hill was fortunate to have a history of formal and informal attention to street trees. Photographs taken to document street conditions before urban renewal commenced show many Bolton Hill streets lined with mature trees. Although some streets photographed exhibited a lack of trees, it appears from the photographic evidence that Bolton Hill boasted a healthy foundation of street trees upon which to improve through urban renewal (Maryland Hall of Records). Bolton Hill did not have to begin from scratch in implementing a street tree program. Furthermore, Bolton Hill's "green" tradition could have played a significant role in

encouraging residents to advocate on behalf of street trees, establish a formal tree committee, and stress the unique character trees lend to the neighborhood.

Bolton Hill's successful approach to the cultivation and preservation of street trees is a convenient model for Baltimore to emulate in its attempt to reverse the loss of tree canopy; however its results are more idealistic than realistic. The ingredients that contributed to Bolton Hill's success may be completely unique in their combination as to prevent their replication elsewhere in Baltimore, or in other American cities. In such a case, Bolton Hill is an anomaly; it stands alone among the neighborhoods that surround it. However, this should not dissuade other communities from looking to Bolton Hill as a role model in street tree initiatives. Citizen support and advocacy on behalf of street trees is possible among all populations, regardless of educational attainment or cost of living. The challenge for Baltimore is to convince its neighborhoods of the power they hold to make a difference in tree planting. Granted, a majority of city residents may be more occupied with earning a paycheck and providing for their families to express an interest in "greening" their streets. Trees are secondary concerns when daily activities revolve around survival; in fact, trees are considered luxuries in this regard. Thus, street tree programs in these communities need to start small and establish a foundation. Achieving the urban forest present in Bolton Hill will take many years; no one can expect instant results in communities suffering from poverty and high population turnover.

Moreover, education is key in shifting attitudes toward street trees. The more citizens know regarding the benefits of urban trees, the greater the likelihood citizens

will embrace trees as an integral component of their neighborhood fabric. Educational opportunities are available through Baltimore's Parks and People Organization and do not have to be large scale schemes. A community tree planting event or a children's educational program are simple steps that may be taken to foster an interest in the community. By teaching residents the proper techniques for managing urban trees and communicating with city officials concerning tree welfare, citizens will feel empowered in their responsibilities for street tree care and can claim an "ownership" in the urban forests of their communities. When citizens feel they have an investment in a project, they are willing to devote time and energy to ensure their efforts are fruitful. Investing in the urban forest can increase the desirability of a neighborhood, reduce crime, and build relationships among residents that may not have existed before. Urban forestry proponents recognize that reaching out to low-income communities and enlisting their residents as "citizen foresters" is a challenge; however, according to Jim Lyons, executive director of GCA Casey Trees, an endowment fund of the Garden Club of America, the results are worth the time: "Trees represent the fabric that helps pull communities together and gives them something to care about and commit to in terms of their own love of neighborhoods" (Atkin 2003).

The cultivation of spirited and committed attitudes toward trees among residents rightly justifies their beneficial presence in Baltimore and demonstrates to city government the importance of trees in Baltimoreans' lives. Citizens must act as advocates for street trees and convince city officials that trees play a crucial role in the infrastructure of the modern city and are worthy investments for the future. Persistent

lobbying and advertising are two of the strongest methods available for arguing for larger forestry budgets, tree ordinances, and penalties for intentionally harming street trees. As ecosystem and regional planning becomes more prevalent in metropolitan centers, the role of urban forests will assume a greater level of significance. It is hoped Baltimore will continue to cultivate its urban trees so they may be prepared to embrace an ecologically-friendly vision over the next several decades.

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