Urban Forest Master Plan

ARLINGTON
VIRGINIA

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Executive Summary

Significant tree canopy coverage has been lost in Arlington County. Subsequently, Arlington has chosen to enhance and preserve its trees because of the benefits they provide. These benefits can be categorized as environmental, economic and social. Many steps have been taken to slow the loss of trees through preservation and planting throughout the County. However, many challenges still exist that have adverse affects on our tree canopy coverage. An urban tree canopy is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. It serves as an overall indicator of urban forest quality and quantity. This Master Plan addresses the challenges that confront our urban tree canopy and offers goals and recommendations that will help Arlington towards its vision for our urban forest.

VISION
Arlington County will strive to have a sustainable urban forest that contributes to the livability of our urban community. Our trees are recognized as part of our green infrastructure that provides economic and environmental benefits. The current trend of tree canopy loss will be slowed and efforts made to reverse this trend through best practices in tree planting, preservation, and maintenance while fostering a sense of stewardship among residents.

PURPOSE
Arlington's Urban Forest Master Plan was initiated by the Department of Parks, Recreation and Cultural Resources (PRCR) and Arlington's Urban Forestry Commission, under the direction of the Arlington County Board, to facilitate the County's ongoing commitment to enhance and preserve Arlington's tree canopy. The Master Plan has the following components: a GIS street tree inventory, tree canopy satellite analysis, long-range goals and recommendations and a final Urban Forest Master Plan report including GIS based planting plans. The plan will ultimately contribute to the attractiveness and sustainability of Arlington through enhancements to the tree canopy.

The Urban Forest Master Plan is a component of the Arlington County Open Space Master Plan. The Open Space Master Plan was first adopted by the County Board in 1994 and is currently under review. It is one of eight individual elements that comprise the County's Comprehensive Plan. The other Comprehensive Plan elements are the General Land Use Plan, the Master Transportation Plan, the Storm Water Master Plan, the Water Master Distribution System Plan, the Sanitary Sewer System Master Plan, the Recycling Program Implementation Plan, and the Chesapeake Bay Preservation Ordinance and Plan.

As a component of the Open Space Master Plan, the plan provides more detailed information and recommendations on improving Arlington's urban forest canopy coverage. Improving our urban forest is no simple task. Urban forest managers must always keep the many benefits our trees provide in mind.[7] Only then can we equitably weigh the benefits to costs value in tree preservation. Improving our urban forest involves many objectives that will need to be fulfilled if our vision for the urban forest is to take shape. The goal and objectives are presented as various chapters of the Master Plan.

The objectives of this Master Plan all support the primary goal of improving Arlington's urban forest canopy coverage. These objectives have been developed to address the challenges that confront our urban trees and their stewardship. Most of the objectives are dependent on one another and build upon the success of their implementation. The interdependence of the objectives will be brought to the readers attention where appropriate. Preservation and planting on private property, education of all stakeholders, coordination and communication among various stewards, planting and preservation of trees as elements of our streetscapes, stewardship of our urban forest in parks and natural areas and maintenance, must be comprehensive.

PRIMARY GOAL:
IMPROVE ARLINGTON'S URBAN FOREST CANOPY COVERAGE (Chapter I)

OBJECTIVES:
- Encourage the preservation and planting of trees on private property. (Chapter II)

- Ensure through education and outreach efforts that all stakeholders appreciate the value of Arlington's trees and what is necessary for their stewardship. (Chapter III)

- Improve coordination and communication regarding County tree regulations, policies and planting and preservation standards and guidelines. (Chapter IV)

- Ensure that tree planting and preservation are important elements of our streetscapes.(Chapter V)

- Preserve existing wooded parks and natural areas, and plant trees in parks, natural areas and other public open spaces to improve Arlington's overall tree canopy. (Chapter VI)

- Ensure that urban forest maintenance practices continue to improve the quality of tree canopy in Arlington so that potential benefits are maximized for the community. (Chapter VII)

BACKGROUND
Over the last three decades Arlington County has lost a significant amount of acreage with heavy tree cover (> 50%) (Appendix I). This has had a dramatic affect on the overall canopy coverage in the County. American Forests[15] has estimated that of the over 16,500 acres in Arlington over 3,000 acres were converted from heavy tree cover of over 50% to low tree cover of less than 20%.[2] Observing the state of the urban forest resource over time can aid in the development of strategies for the next generation of trees along streets, in yards and in parks. In addition, continuous efforts by staff involved in the development design review and inspection process will give better service to the community while assuring the maintenance and enhancement of the tree canopy cover. Regional coordination and cooperation are important for effective storm water management and reduction of non-point source pollution of local watersheds as well as the Chesapeake Bay. Riparian buffers along streams are effective in reducing nutrient overloading.

Arlington's urban forest resources will continue to be managed for a variety of uses. Active and passive recreation needs must be met, while at the same time wildlife habitat should be encouraged and enhanced; trees should be planted to aid in energy conservation as well as for

neighborhood beautification. Volunteer tree planting projects have historically been instrumental in fostering a sense of community pride at the same time providing critical resources in the reforestation efforts.

Arlington County has acquired and maintained Tree City USA status, as well as receiving a Growth Award in 2002 and 2003, for expanding our urban forestry program. The National Arbor Day Foundation in Cooperation with the US Forest Service and the Virginia Department of Forestry award Tree City USA status to communities that meet standards of tree stewardship. This is a source of community pride. Promotion of the benefits that trees provide can also help businesses, developers, civic associations, schools and private industry. This promotion is part of an educational outreach effort ongoing in the County and involves staff in various departments. The County has developed a Tree Preservation Ordinance, Standards for Preservation and Planting of Trees, and Tree Replacement Guidelines. The goals of these efforts are tree preservation and an increase in the current stocking and diversity of trees in Arlington. Finally, the County continues to improve maintenance practices, including cyclical pruning of street trees.

Arlington's urban forest is all of the trees and associated open spaces that are important to our community. More precisely, an urban forest can be defined as the system of trees and associated plants that grow individually, in small groups, or under forest conditions on public and private lands in our cities, their suburbs and towns. Our urban forest provides many benefits to the community. These benefits can be categorized as environmental, economic and social. The amount of tree cover and the quality and health of the trees determine the amount of benefits the community receives. A recently completed tree inventory found over 18,500 street trees in Arlington County. The urban forest also includes individual trees and canopy cover in parks, wooded areas, riparian buffers, nature centers, playgrounds, schools, local, state and federal land, private sanctuaries, country clubs, golf courses, universities, and private residences. Although a formal inventory of trees on public properties other than County street right-of-way have not been undertaken, it can be assumed there are two to three trees on these properties for each street tree which would make the total public tree population somewhere between 55,500 and 74,000 trees. According to an American Forests study it was determined that Arlington County has a tree cover of 41%.[1] This tree cover estimate includes all of Arlington County both public and private properties (Figure 1: Green Infrastructure Image). This estimate is significantly different than the data from other American Forests studies (Appendix I).[2] This is due to changes in the technology used to detect urban tree canopy coverage.
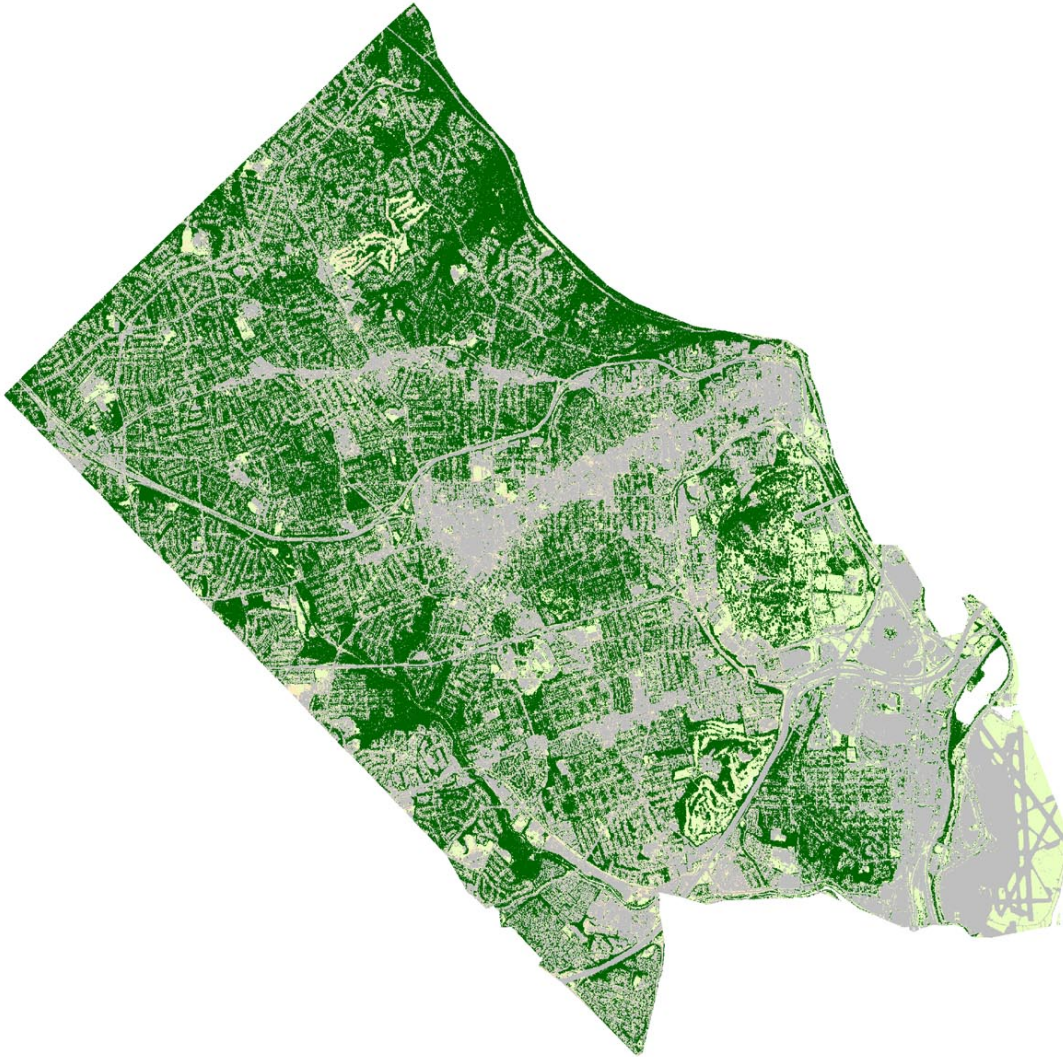
Figure 1: Arlington's Green Infrastructure

BENEFITS OF URBAN TREES

The trees of Arlington's urban forest provide numerous benefits. These benefits can be categorized as environmental, economic and psychological/social. Location and type of tree determine the potential benefits it provides. Our management goals include a consideration of desired benefits. Many benefits that were once considered qualitative and subjective are now being scientifically quantified. With adequate data individual tree species can be considered based upon their investment potential using benefit/cost ratios.[17] The planting of trees and the future economic and environmental benefits they may provide can also be modeled into the future using available computer software.[15] A brief summary of potential benefits trees provide follows:

- The environmental benefits trees provide, such as producing oxygen and removing air pollutants, may be the most obvious. Trees can also reduce air temperatures and consequently affect air quality since the emissions of many pollutants are temperature

dependent.[10] Planted in the right location around buildings, trees can reduce heating and cooling energy costs. Tree canopy can also reduce stormwater runoff and contribute to substantial savings in our construction costs for stormwater facilities.[8] The reduction in stormwater volume can help improve the water quality of Arlington's streams by reducing nutrients and other pollutants. Some components of our urban forest contribute valuable wildlife habitat as well. Of course all of these environmental benefits have an economic value. It is estimated that the trees in Arlington County provide over $1.8 million in air pollution control and over $6.8 million in stormwater control annually.[1]

- Arlington's urban forest provides significant economic benefits to the community. The environmental services the trees provide can be quantified and individual trees can be extremely valuable components of a property's landscape. The value of individual trees in the landscape can be appraised.[6] Many of the majestic mature trees of Arlington's urban forest have an estimated appraised value in the ten's of thousands of dollars (Arlington's Street Tree Inventory). Our trees and the benefits they provide also contribute to property values. It has been suggested that healthy, mature trees can add 10% to residential property values.[19] Business districts also benefit from having trees in the landscape. Consumers are more willing to frequent shopping districts with trees, spend more time there and are even willing to spend more money.[13] Our trees are one of the reasons Arlington is a desirable place to shop, work, visit and live. It makes economic sense to continue our stewardship of the urban forest.

- Trees also are valuable aesthetic components of the urban landscape. But their psychological and social value goes beyond their visual appeal. It is suggested that individuals recover from stress more quickly and completely when exposed to natural settings.[11] Hospital patients have been shown to recover quicker and with less medication when in rooms with a view of trees.[20] A barren inner city environment can be stressful. When some element of nature, such as trees, is a component of these environments studies have shown a variety of positive effects. Violence and aggression decreases, crime rates are lower, symptoms of children with attention deficit disorder (ADD) can decrease and communities are strengthened.[18] Trees can also provide a sense of place in the midst of constant change. Our Heritage trees can tie us to the past and our native trees can teach us the natural history of the region. This perspective often leads to a greater interest in stewardship.

MASTER PLANNING PROCESS
The Master Planning process has included two public forums hosted by PRCR and Arlington County's Urban Forestry Commission. At the first public forum participants were asked what topics were most important to include in the Master Plan (Figure 2). The second public forum focused on specific topics that are ongoing initiatives of Arlington's urban forestry programs. Participants were asked to provide recommendations that would improve these initiatives. The recommendations of this Master Plan reflect the input received from the community.

Question: **Which of the following do you feel are the most important topics to address in an Urban Forest Master Plan?**

Participant Responses at the March 24, 2003 Urban Forest Master Plan Public Forum*
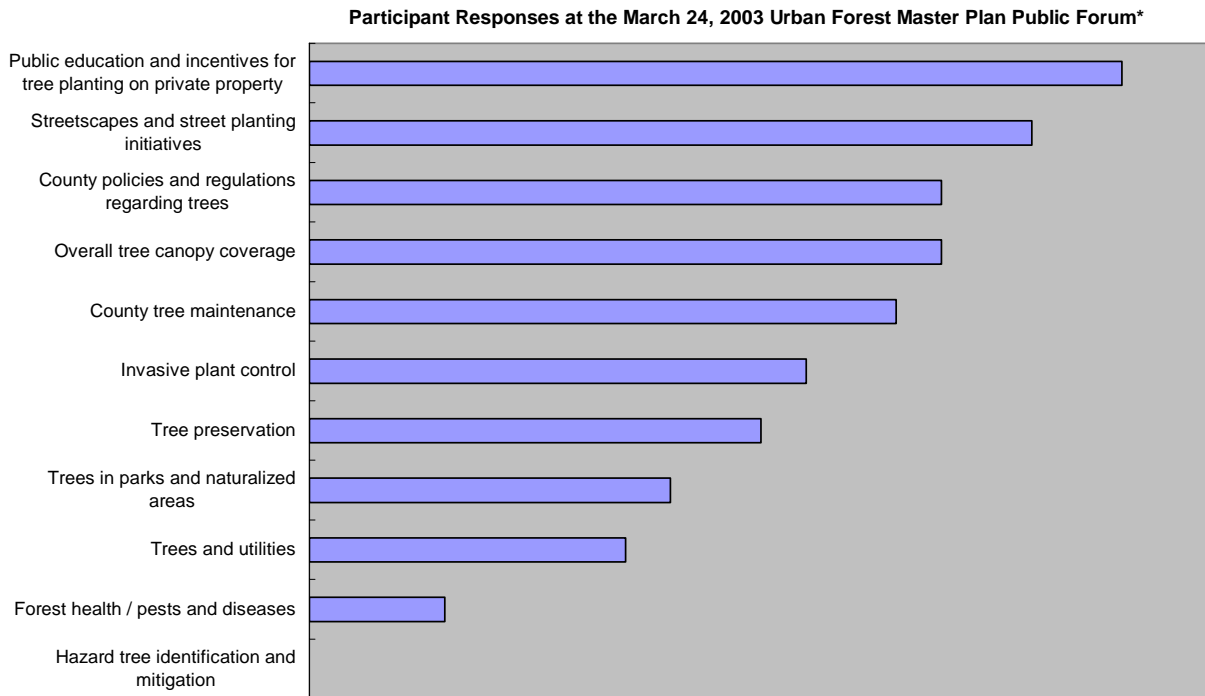

Figure 2: Community Input from the first Public Forum.

CHAPTER I

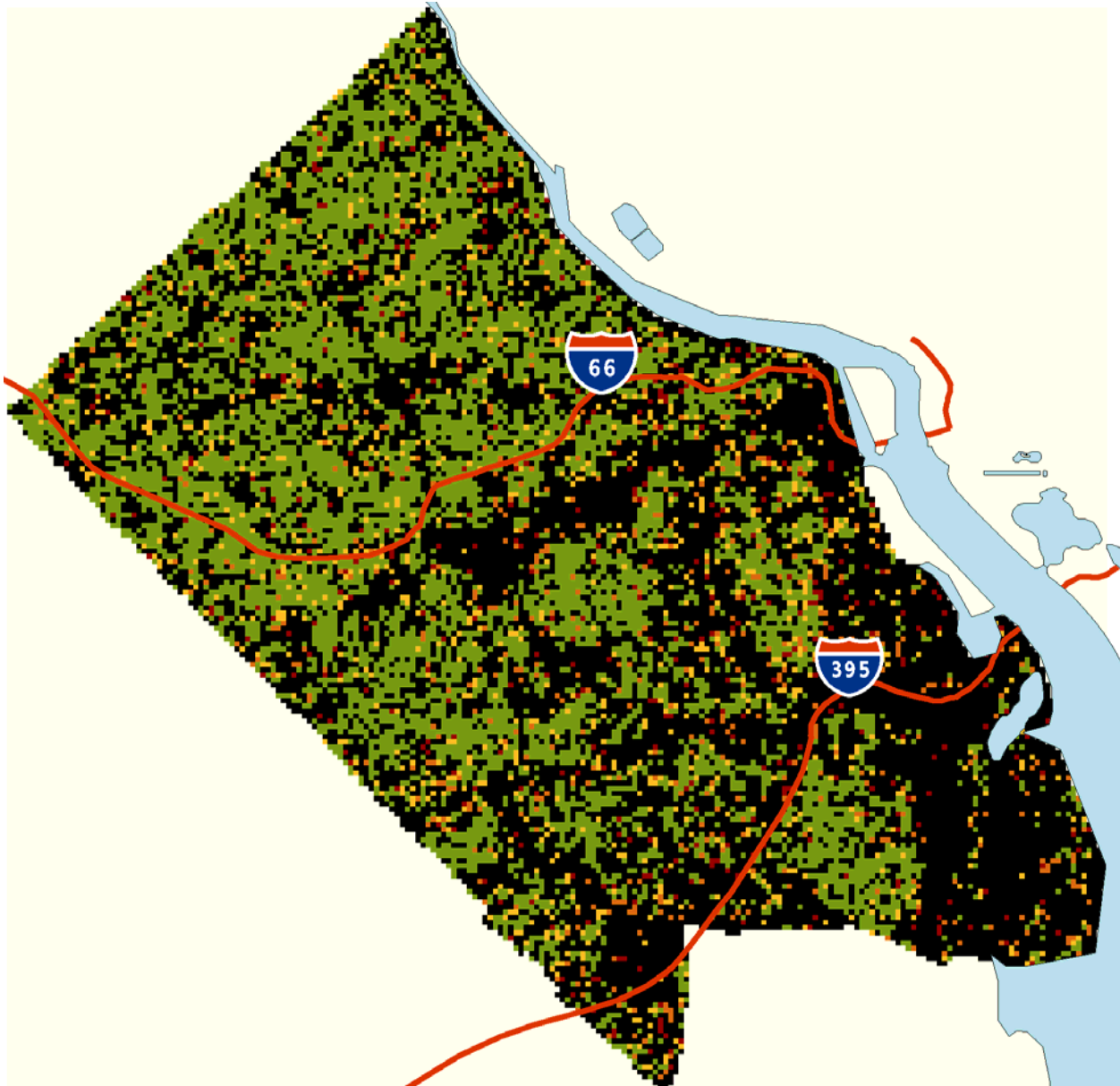**Primary Goal: Improve Arlington's urban forest canopy coverage.**

Figure 3: Arlington's Forest Cover 1973
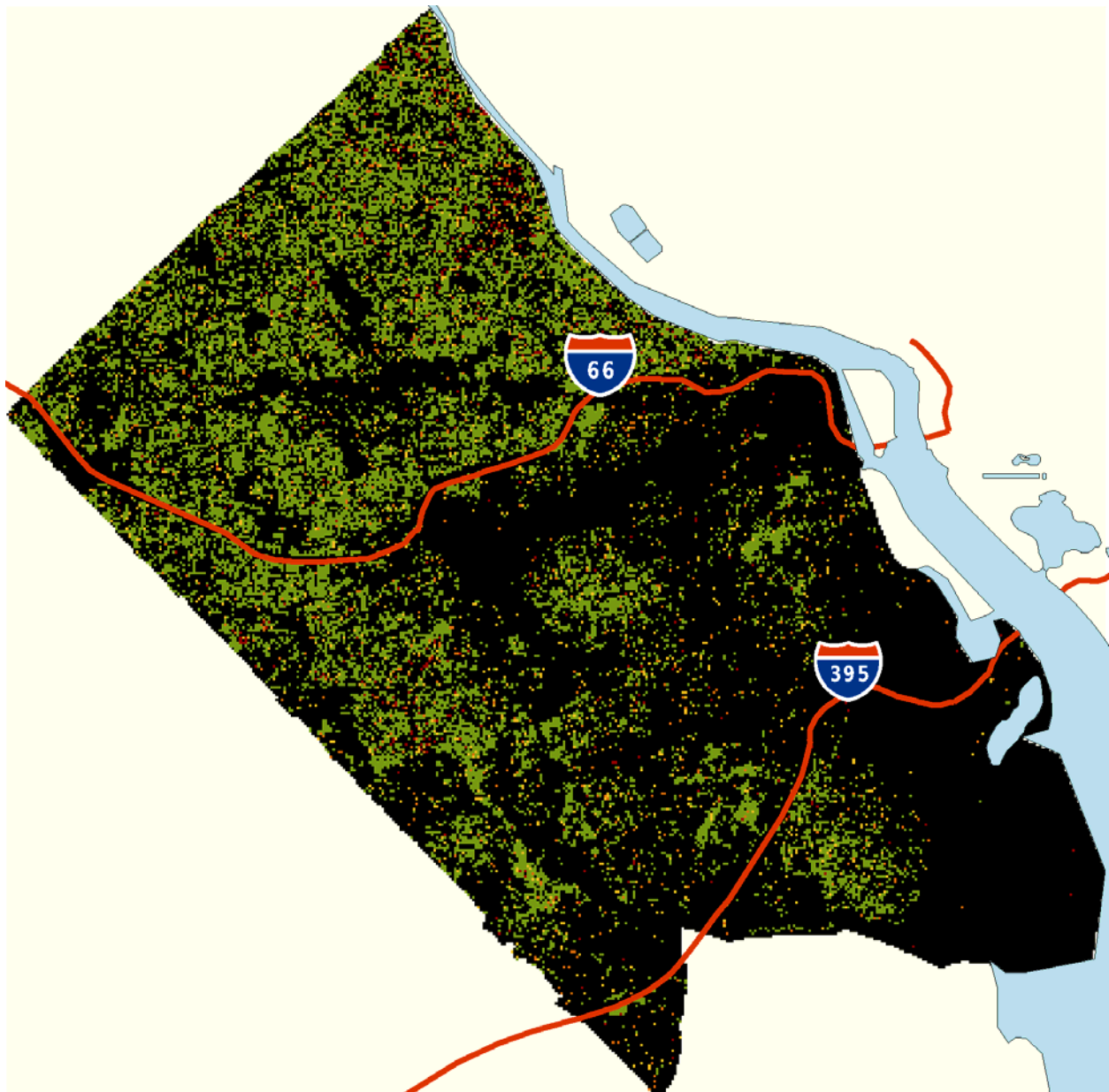
Figure 4: Arlington's Forest Cover 1985

American Forests has used satellite imagery to track changes in the amount of urban forest canopy since 1973 (Figures 3-5). Significant canopy loss has occurred in Arlington since the 1970s (Appendix I). The most densely forested areas are those that have experienced the most loss. If this trend continues, the overall canopy will decrease further and become increasingly fragmented. It is crucial that we begin to reverse this trend. Areas with greater than 50% tree cover must be preserved if our overall canopy cover is to be maintained. This will be challenging since much of the development occurring in Arlington is now in-fill. Our dense tree cover acreage is being replaced by acreage with very low tree cover density (Appendix I). American Forests recommends that communities establish tree cover targets for different land uses. Their suggested benchmarks for tree canopy coverage are: 40% overall, 50% for suburban
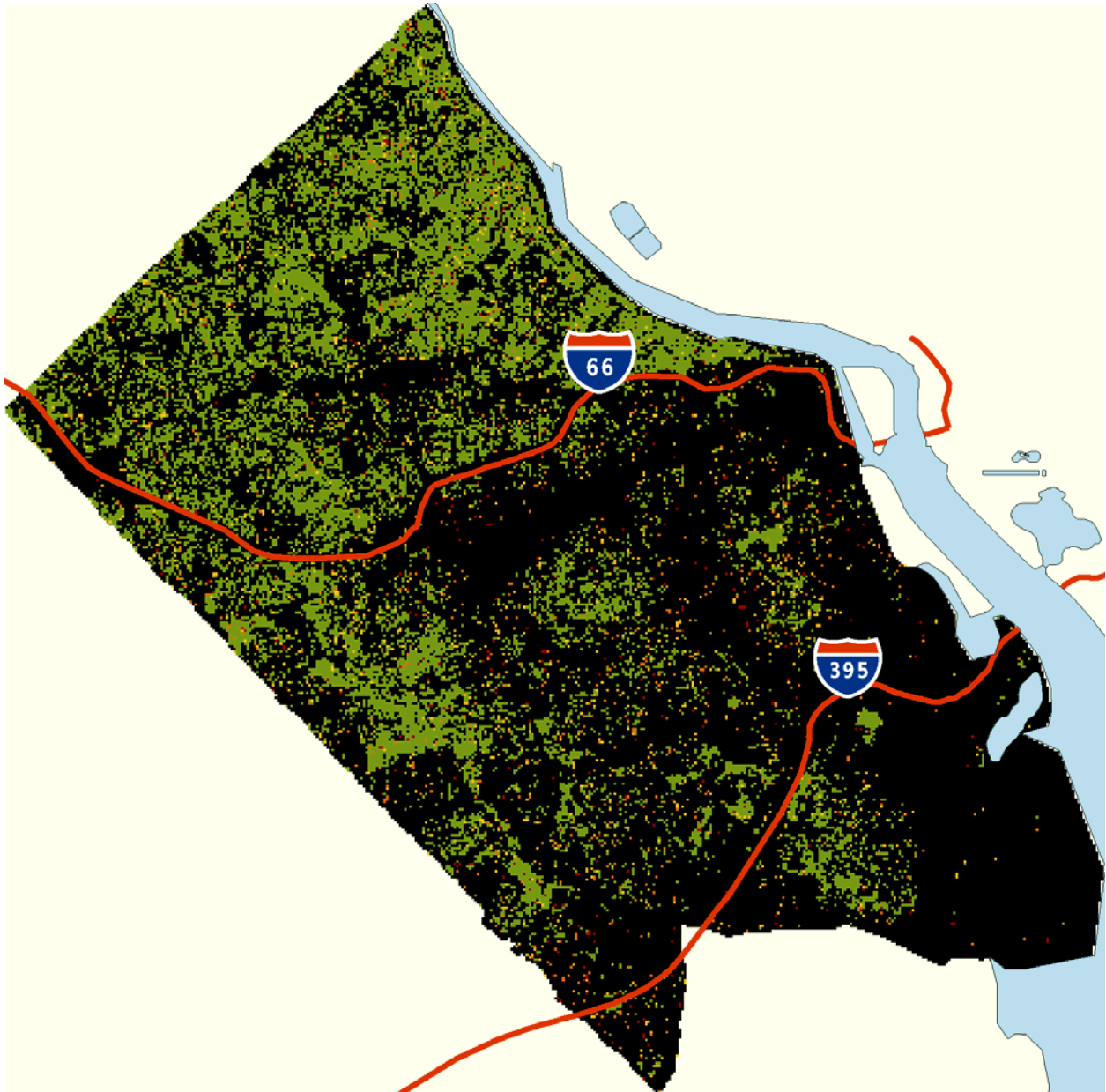
Figure 5: Arlington's Forest Cover 1997

residential, 25% for urban residential and 15% for central business districts. These benchmarks will serve as initial goals as more detailed canopy coverage analysis by land use categories are performed (as described below).

When analyzing the urban forest canopy using remote sensing data gaps in tree coverage become apparent. Using the County's Geographic Information System (GIS) we can analyze this data and determine how to apply American Forests' benchmarks for different land uses. Since different jurisdictions have their own unique distribution of land use categories it may be necessary to weigh those categories based upon their relative proportion of total land. However,

the goal of overall canopy cover should not change. Because most of our County is residential with significant tree cover it is reasonable to set a goal of maintaining 40% or more overall tree cover for Arlington County (one study estimated that we had 41% tree cover in 1999)[1]. With the level of commitment to urban forest stewardship that has been demonstrated by the County Board, staff and the community as a whole, it is a realistic goal even in light of continued development pressures. There are a variety of methods and resources available that can help refine our forest cover analysis. The proportions of our different land uses will be used to determine land use based tree cover goals. Gaps in tree cover that are elucidated through GIS canopy analysis can help determine where our potential tree planting efforts will focus.

Percent tree cover is not the only factor in determining how an urban forest contributes to a community. A healthy and abundant urban forest provides the most benefits. To realize all of the potential benefits an urban forest provides a community's tree cover must be well maintained. This ensures that the benefits the trees provide exceed the costs associated with their stewardship. The tree population must have a diversity of species to avoid the potential of catastrophic loss due to pests and diseases that often have species specific hosts. It is also important that a substantial proportion of trees should be of significant size, since larger trees provide the most benefits to the community.

The overall average condition of Arlington's street tree population, according to the street tree inventory, was rated at 60% according to Council of Tree and Landscape Appraisers Standards (CTLA). This means that the trees are in fair to good condition. Using tree inventory data to analyze condition shows us that certain tree species are consistently rated better than others as street trees. We also found that some tree species are often rated poor in condition. This information will help us make informed management decisions to improve the overall condition of the urban forest. We can choose to plant species that do well and target other species that have characteristics that predispose them to poor condition for appropriate maintenance prescriptions.

Species diversity of Arlington's street trees is excellent. The tree inventory found that no species exceeded 10 percent (Figure 6). Miller, in his text on urban forestry, suggests a general rule that no single species should be more than 10% of the overall tree population.[9] Following this rule could prevent catastrophic tree loss due to pests and disease. The tree that was found most frequently in the street tree inventory is the willow oak (10%). The willow oak is an excellent urban tree that has been planted for good reason. However, overuse of any species in the future would be a mistake that could have dramatic consequences. Infestations of the Asian Long Horned beetle and the Emerald Ash Borer, pests that attack specific tree species, have resulted in quarantines and the mass removal of certain trees in many communities.
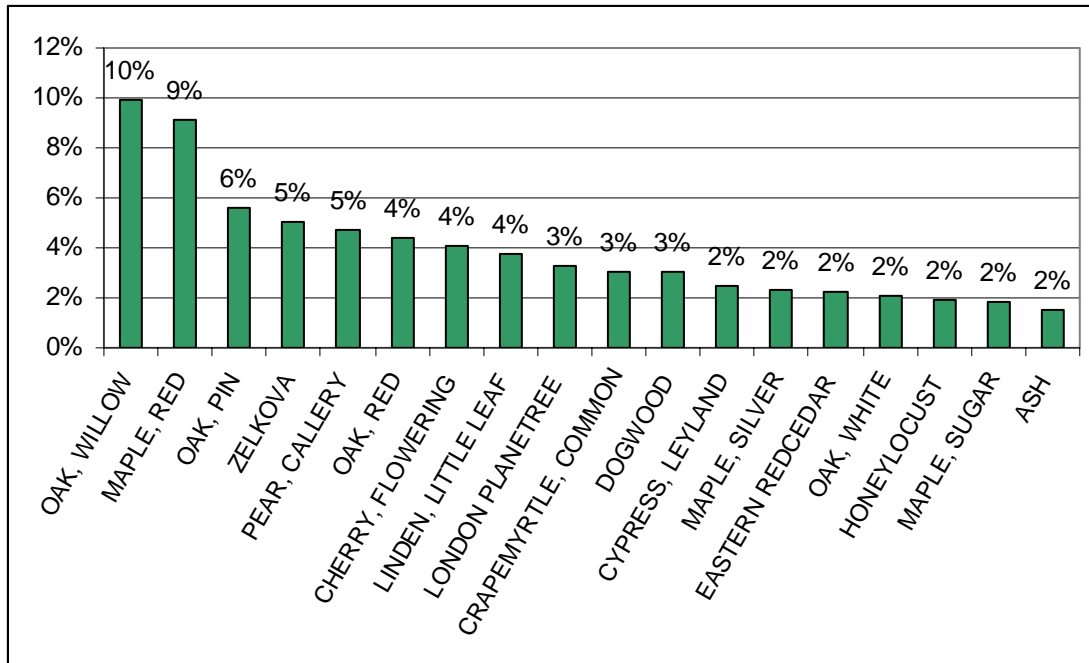
Figure 6: Arlington's Street Tree Species Distribution

In general the street trees in Arlington are small, about 78% having a trunk less than 12 inches in diameter (Figure 7). This may bode well for the future of Arlington's street trees (if these trees survive we will have many large trees) and it also demonstrates the County's commitment to tree planting in recent years. However, we should be concerned about the relative lack of larger street trees. The benefits that urban trees provide are optimized with larger trees. Research has shown that larger trees have greater benefit to cost ratios.[17] This means that even after considering the maintenance investment associated with preserving the tree, the benefits the larger tree provides far exceed those of the smaller trees. This will require careful and deliberate planning to provide adequate conditions for newly planted trees to reach their full potential and to preserve existing trees in the street right-of-way.
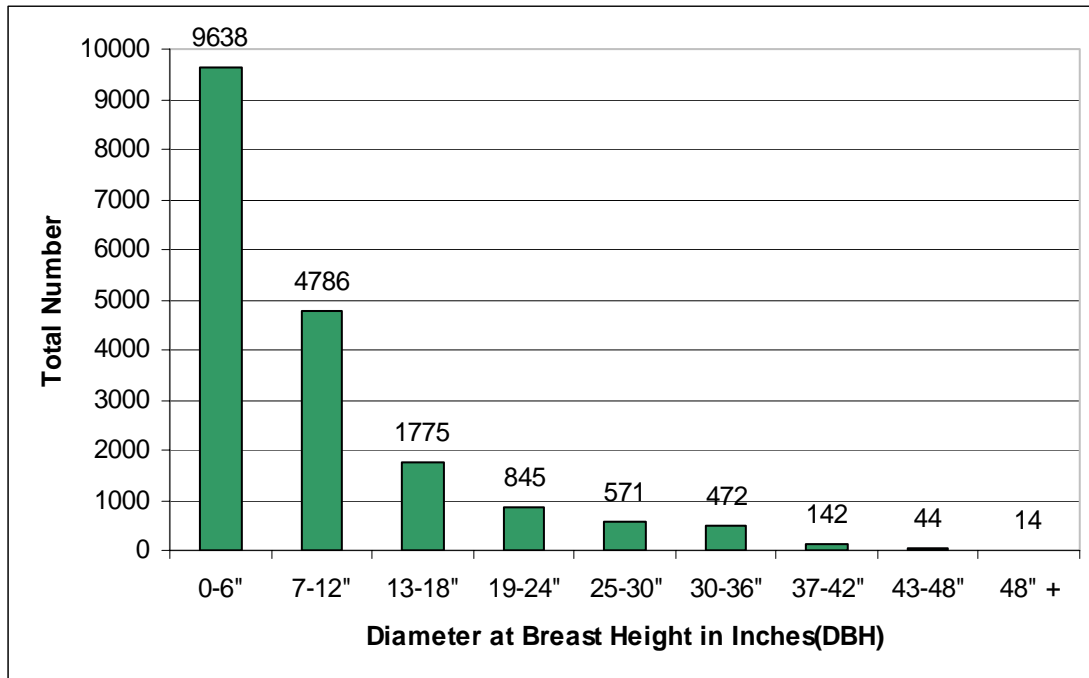
Figure 7: Arlington's Street Tree Size Class Distribution

RECOMMENDATIONS:
1) **Determine the best methodology for refining our GIS analysis of the tree canopy. The most appropriate imagery should also be determined. New higher resolution satellite imagery is becoming increasingly available for analysis of tree canopy coverage.**
2) **Establish realistic tree cover goals for different land use categories using American Forest benchmarks of 40% overall, 50% for suburban residential, 25% for urban residential and 15% for central business districts. Based on the proportions of the different land use categories, achieving the goals for each would result in meeting the overall canopy cover goal.**
3) **Implement the planting plan (Appendix II) and its recommendations.**

CHAPTER II

Objective: Encourage the preservation and planting of trees on private property.

Private property trees in an Arlington Neighborhood

The majority of Arlington's urban forest is on private property, in low density residential neighborhoods. We must educate the public regarding the value and benefits this forest provides. Also, we should encourage the preservation and planting of trees on private property. Developments under the special exception provision of the Zoning Ordinance as well as County development projects require the planting of trees as per the Tree Replacement Guidelines and the Chesapeake Bay Preservation Ordinance (Appendix III). These planting requirements alone will not maintain the overall forest canopy in the long term. Trees are preserved through approved Tree Preservation Plans or by designated protection under the County's Tree Preservation Ordinance (Appendix III). However, the greatest impact to trees occurs with by-right development (those projects not under the special exception provision) that does not require adherence to the County's tree replacement guidelines. Even though these projects are subject to the Chesapeake Bay Preservation Ordinance, the tree preservation and planting requirements

CHAPTER III

Objective: Ensure through education and outreach that all stakeholders appreciate the value of Arlington's trees and what is necessary for their stewardship.

A well directed education and outreach program is required to meet the goal of urban forest sustainability. It begins with the community's recognition of the benefits the urban forest provides. Maintenance requirements are understood in the context of the quality of trees and the health of the forest as a whole. Once the forest is maintained to the best of our ability, the benefits the urban forest provides can be optimized. Increased awareness of our standards for tree preservation and planting can help in the implementation of current regulations and build advocacy. Clear communication among property owners, developers and staff is necessary to ensure that all tree related practices are of the highest standards. Ultimately, improved education and outreach will result in a better urban forest. As a result, those who manage the resource will know what is required to optimize planting and preservation efforts. In addition, members of the community will appreciate how their actions may affect the urban forest and the benefits it provides.

Arlington County strives to have the highest tree planting specifications and tree preservation standards possible. This is reflected in our latest Landscape Standards (Appendix III). The County requires adherence to the American National Standard Institute Standard for Nursery Stock (ANSI Z60.1), Standards for Tree Care Operations (ANSI A300) and Standards for Arboricultural Operations (ANSI Z133.1). A number of PRCR staff belong to the International Society of Arboriculture and the Society of Municipal Arborists, organizations that help educate professionals in the field of urban forestry.

The County has a variety of methods for public outreach. Staff gives tree care presentations regularly to a broad range of community groups and works closely with Virginia Cooperative Extension Tree Stewards to distribute educational materials. The PRCR website is also a valuable source of information on tree care, County urban forestry programs, a list of resources and a list of who to call about trees.

RECOMMENDATIONS:
9) **Continue to pursue outside training and certification opportunities for staff including the most up to date training in hazard tree identification, tree preservation and plant appraisal.**
10) **Develop a "one-stop shopping" comprehensive web site for trees. Property owners, developer and citizens could use the site to find out how trees affect them (and how they affect trees). Access to important information regarding County regulations and programs should be available as well as read only access to the GIS tree inventory data.**
11) **Maintain a public presence at fairs, the Farmer's Markets and continue to hold events such as panel discussions and informational presentations for the community.**
12) **Continue to partner with the Urban Forestry Commission, Arlington ReLeaf and Tree Stewards and Cooperative Extension in education and outreach efforts.**
13) **Expand upon and increase the availability of our urban forestry related literature.**

CHAPTER IV

Objective: Improve inter-departmental and inter-jurisdictional coordination and communication regarding County tree regulations, policies and planting and preservation standards and guidelines.

The urban forest, within Arlington County, knows no political or ownership boundaries. However, its management involves many entities. Communication and coordination will be important if our vision and goals are to be met. There are significant portions of Arlington County that are owned and managed by the state and federal governments. We need to communicate our vision and goals and share the data we have available. At that point it will be easier to build partnerships as stewards of the urban forest. Surrounding jurisdictions and regional utilities must also be partners in the management of the urban forest. Our green infrastructures are interconnected and must be planned for and managed with a regional perspective.

The Department of Parks, Recreation and Cultural Resources (DPRCR) is responsible for coordinating the management of the urban forest in Arlington County. This involves many other departments including the Department of Environmental Services (DES) and the Department of Community Planning, Housing and Development (DCPHD). There are also external partners such as Dominion Virginia Power, Virginia Department of Transportation and the Northern Virginia Regional Park Authority. Other partners include environmental groups like Arlington ReLeaf, Tree Stewards (Arlington Cooperative Extension), the Potomac Conservancy, and Arlingtonians for a Cleaner Environment. The County Board citizen advisory groups such as the Parks and Recreation Committee, Environment and Energy Conservation Commission, and most importantly the Urban Forestry Commission also play a role.

RECOMMENDATIONS:
14) **Develop or use existing networks (Metropolitan Washington Council of Government Community Forestry Network and National Capital Society of American Foresters Urban Forestry Workgroup) to share our program objectives with potential partners in the region.**
15) **Continue to refine partnerships with Dominion Virginia Power, Northern Virginia Regional Parks Authority and Virginia Department of Transportation and expand these partnerships to other entities.**
16) **Proactively share our data, standards, regulations and policies with other stewards of our urban forest such as property owners and the development community.**
17) **Engage other property owners in Arlington County as well as surrounding urban forest managers in a cooperative effort to better steward the regions urban forest.**
18) **Coordinate, with other County departments and other entities, planting, planning and maintenance activities where appropriate to optimize our stewardship.**
19) **Ensure early review of development plans during the design process to promote tree preservation as opposed to tree replacement, when feasible.**

CHAPTER V

Objective: Ensure that tree planting and preservation are important elements of our streetscapes.

Arlington's urban forest provides many services to the community and acts as green infrastructure that contributes to the livability of the County. The right tree in the right place is an element of our infrastructure that appreciates in value over time. The benefits that the tree provides also increase over time. However, much of the development that occurs in Arlington County is done at the expense of trees. Trees need to be considered equitably and appropriate tree preservation and planting must be a priority for development projects on County property.

DPRCR works closely with DES, and DCPHD as well as Arlington County Schools to plan for tree planting and preservation. All of these entities have different objectives and responsibilities. Yet we are all working towards creating a more livable community. One of DPRCR's responsibilities is to advocate and coordinate the stewardship of the urban forest. This involves finding solutions to the challenges that arise. In general these solutions develop incrementally

over time. These solutions become opportunities to improve our stewardship of the urban forest and can result in a beneficial partnership between County Departments.

RECOMMENDATIONS:

20) **Ensure that there are liaisons for each department and/or division that has any effect on our stewardship of the urban forest.**

21) **Create more opportunities for tree planting in the public ROW such as; tree nubs; street narrowing; larger planting strips; curb, gutter and sidewalk design and material innovations.**

22) **Optimize communication between County departments and divisions so that redeveloped County ROW is planted as soon as possible.**

23) **Work with streetscape designers and planners to ensure tree species diversity.**

24) **Implement a street tree planting plan (see Appendix II).**

CHAPTER VI

Objective: Preserve existing wooded parks and natural areas, and plant trees in parks, natural areas and other public open spaces to improve Arlington's overall tree canopy.

Historically, forests have been the predominant land cover in our region. Today, the urban forest is our predominant natural resource. Urban forests are quite different than their naturally occurring counterparts. Our urban trees are not self sustaining parts of an ecosystem, but rather they are the framework of our green infrastructure that must be proactively managed.

The goal of urban forest management must be sustainability. Simply having tree cover is not enough for an urban forest to be sustainable. There are many other factors that must be considered. Diversity of species and size class as well as structural and functional diversity must be considered when managing the urban forest. Native species should be planted wherever appropriate and the control of invasive plants is crucial. Ultimately, wise planting and preservation efforts must keep pace with tree removals.

The County currently plants over 1,200 trees annually along streets, in our parks, schools and other public open spaces. The DPRCR has a policy of maximizing the planting of shade trees in

public open spaces wherever appropriate. Generally this is in areas that have been reserved for passive recreation and where there are no conflicts with other planned uses such as facilities or active recreation areas. In addition, DPRCR has developed a tree planting initiative with Arlington County Public Schools that planted over 120 trees last year. School grounds are open space resources that have many competing uses. However, they also hold great potential for future tree canopy coverage. This new planting initiative will be a valuable partnership that will increase canopy and instill a sense of stewardship in future generations.

Our urban forest is the most immediate connection we have with nature. The urban forest provides valuable habitat for wildlife. Wherever appropriate and feasible the County leaves snags (standing trunks) after tree removals to contribute valuable wildlife habitat. Riparian forest buffers and large contiguous forest areas must be managed properly to maximize their value to wildlife. Native plant species are generally the best choice to attract wildlife since they provide the habitat that our native wildlife requires. A riparian forest buffer is "a permanent area of trees, usually accompanied by shrubs and other vegetation, that is adjacent to a body of water and is managed to maintain the integrity of the stream channels and shorelines; to reduce the impact of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals; and to supply food, cover, and thermal protection to fish and other wildlife." (Virginia Cooperative Extension 2000)

RECOMMENDATIONS:
25) **Continue to monitor tree health, forest structure and the occurrence of invasives in Parks and naturally forested areas throughout the County.**
26) **Begin to inventory trees in parks, natural areas and other public facilities.**
27) **Wherever possible manage forested areas on public lands so that there is adequate species diversity and size class distribution to maintain a sustainable urban forest.**
28) **Control and manage invasive plant species and tree pests and diseases in an environmentally responsible manner.**
29) **Manage and enhance areas adjacent to existing streams as riparian forest buffers wherever possible and appropriate.**
30) **Continue the partnership between DPRCR and DES as well as local environmental groups to ensure that the best management practices (BMPs) are used to maximize the habitat benefits the urban forest provides.**

CHAPTER VII

Objective: Ensure that urban forest maintenance practices continue to improve the quality of tree canopy in Arlington so that potential benefits are maximized for the community.

DPRCR is responsible for the maintenance of County trees. Normal maintenance activities include ongoing pruning, removal, stump grinding, gypsy moth suppression, invasive plant control as well as guying, mulching and watering of newly planted trees (when not installed by contract). Work is done primarily on a response basis with some work done on a scheduled preventive basis. When a call is received, it is investigated, trees are inspected, and necessary work is prioritized and scheduled if needed. Except in cases of emergency, notification of upcoming work is given to residents the week before through the use of door hangers. The County is using a contractor to prune on a scheduled systematic basis. This is in an effort to move towards a cyclical pruning approach for the trees in the street ROW. It will reduce the incidence of emergency work in the ROW and it is more cost effective.

Emergency tree work, usually storm related, is done by County staff and by contract. The aim of emergency work is to eliminate any immediate hazard to individuals or property and/or restore safe traffic flow. Trees (public or private) blocking streets or walks are removed to the property line, usually at the curb or back of sidewalk.

The County only has direct control over how we maintain public trees. However, there are maintenance requirements for trees associated with Site Plan projects, including some street trees in the public ROW, as well as landscape requirements for commercial properties. Since the maintenance of private trees not associated with Site Plans is not regulated, education will be a primary focus of the County to affect the health of the urban forest.

The control of invasive plant species is a maintenance issue that must be addressed in order to achieve urban forest sustainability. DPRCR and the Virginia Cooperative Extension have created a partnership to provide staff to coordinate an invasives plant program. Staff efforts and expertise are complimented by Remove Invasive Plants (RiP) a group of volunteers that plays an important role in our stewardship of the urban forest. The control of invasive plants is very labor intensive requiring subsequent treatments (physical removal or the use of herbicides) to achieve measurable progress. RiP provides much needed resources by contributing physical labor as well as helping to spread the message of problems associated with invasive plants.

RECOMMENDATIONS:
31) **Ensure that best management practices (BMPs) are used when providing tree maintenance in critical areas such as riparian stream buffers.**
32) **Use the street tree inventory to determine conflicts with the built environment (sidewalks and tree grates) and prioritize their mitigation.**
33) **Update the GIS street tree inventory with tree maintenance and removal data.**
34) **Continue to systematically review potential tree hazards using the tree inventory. Consider the development of a Tree Risk Management Plan.**

35) **Using the tree inventory, develop a realistic plan for a five year pruning cycle of the trees in the street ROW.**

36) **Create a GIS mapping program for invasives to track progress and assist with management.**

	1973				**1985**				**1997**		**1973-1997**
Category	Acres	Percent	Category	Acres	Percent	Category	Acres	Percent	**% gain/loss**
< 0.20	9049	54.0%	< 0.20	12453	74.3%	< 0.20	12644	75.5%	39.7%
0.20 - 0.29	352	2.1%	0.20 - 0.29	93	0.6%	0.20 - 0.29	112	0.7%	-68.2%
0.30 - 0.39	493	2.9%	0.30 - 0.39	164	1.0%	0.30 - 0.39	163	1.0%	-67.0%
0.40 - 0.49	763	4.6%	0.40 - 0.49	295	1.8%	0.40 - 0.49	277	1.7%	-63.7%
0.50 - 0.59	1028	6.1%	0.50 - 0.59	473	2.8%	0.50 - 0.59	369	2.2%	-64.1%
0.60 - 1.00	5068	30.2%	0.60 - 1.00	3278	19.6%	0.60 - 1.00	3190	19.0%	-37.1%
Total	16754	100%	Total	16754	100%	Total	16754	100%	
Average Tree Cover:		36.8%			26.6%			26.5%	-10.3%
Heavy Tree Cover (=> 50%)									
	6096	36.4%		3750	22.4%		3559	21.2%	-41.6%
Moderate Tree Cover (20-49%)									
	1608	9.6%		551	3.3%		552	3.3%	-65.7%
Low Tree Cover (< 20%)									
	9049	54.0%		12453	74.3%		12644	75.5%	39.7%
Note: Low Tree Cover area (< 0.20 Category) includes all area with little tree cover, such as lawns.									

Appendix I: Percent Canopy Cover Trends 1973-1985-1997 (American Forests)

Appendix II
PLANTING PLAN

Planting strategies will be different for each component of the urban forest. Goals, site constraints and available resources are some of the factors that require different planting strategies. Arlington County currently plants about 1,200 trees annually. Formal planting programs exist for street trees in the County rights-of-way and on public properties. Tree replacement is required for site plan projects as well as County development projects. There are also tree planting initiatives on public and private property. However, tree removals from development and natural attrition are having a negative impact on the overall canopy coverage. Mature trees are being lost and replaced by smaller nursery stock. Aggressive planting strategies must be sustained on all fronts to maintain the level of forest canopy coverage in Arlington.

Of the available planting spaces in the County street ROW over 93% are occupied by trees. At current planting rates the County ROW should be fully stocked in 2-3 years. However, trees are removed from the ROW each year and these will need to be replaced where appropriate. The County's GIS based street tree inventory is now used to determine where these appropriate spaces exist and planting plans are drafted accordingly (Figure 9). Initially, planting strategies will be implemented that use the tree inventory to target the largest available planting spaces. These large planting spaces provide the opportunity for a planted tree to flourish and reach its greatest potential. This will increase our stocking level and has the potential for the most impact to overall canopy enhancement. The inventory will prove to be a useful tool for planning plantings in the ROW. Conflicts can be avoided in the future by learning which tree species cause problems for our infrastructure. Tree and site selection can be optimized to insure that the right tree is planted in the right place.

The County works with environmental groups such as Arlington ReLeaf, Potomac Conservancy and American Forests to plant trees throughout the County. In addition, Arlington County PRCR has partnered with Arlington County Public Schools to plant trees on school grounds. The schools tree planting initiative targets schools with the capacity to be active stewards for the planted trees. Arlington County Tree Stewards help to facilitate acting as liaisons between County staff and the stewardship team that each school develops. The stewardship team at a given school consists of any combination of available participants including: PTA members, teachers and other staff, environmental clubs and organizations, students, custodians, Trees Stewards and community members.

Staff will work with the Urban Forestry Commission and Arlington County Tree Stewards to approach Civic Associations for the purpose of developing planting programs on private property. Many opportunities are converging that will result in greater planting potential on private property. Existing efforts such as the Neighborhood Day Tree Giveaway and the Civic Association cost share programs for planting trees have created a foundation to build on. Use of a tree fund to facilitate planting of trees on private property is being actively pursued. This will provide a source of funding for tree planting that was unavailable in the past. It will also help in our efforts to enhance canopy for a component of the urban forest that is crucial to sustainability.

RECOMMENDATIONS:

37) Use the GIS street tree inventory to target available planting spaces in the County streets ROW. Planting levels for the ROW are based on a goal of having a full stocking level for public street trees in three years.
38) Plant Parks and other County facilities at the optimal level. Passive open space will be forested wherever appropriate.
39) Use the GIS to evaluate the overall urban forest canopy to determine where planting opportunities exist on public property.
40) Continue to work with Schools to plant and maintain trees on their grounds.
41) Establish a tree fund (funds from special exception projects that can not plant required replacements on-site) that will be dedicated to planting on public and private properties.
42) Develop opportunities and partnerships with environmental organizations such as Arlington ReLeaf, American Forests, and the Potomac Conservancy to plant more trees with volunteers.

Planting Initiative	2004	2005	2006
Arlington County Street ROW	600 Trees	600 Trees	600 Trees
County Parks and Natural Areas	600 Trees	600 Trees	600 Trees
Arlington County Schools	~120 Trees	~120 Trees	~120 Trees
Private Property	100 Trees	150 Trees	200 Trees
Volunteer Tree Plantings	Variable	Variable	Variable
Neighborhood Day	800 Trees	800 Trees	800 Trees

This is a conservative estimate of projected plantings for the next three years. Minor adjustments are made to the planting plan each year as necessary. One initiative may be progressing well and it may be prudent to shift resources to another initiative that needs attention. The planting plan should be revisited every three years to account for new initiatives, planting increases or decreases that become apparent depending on the status of the urban forest. Available planting spaces in the street ROW are projected to be filled, at the current rates of tree planting and removal, in the next three to five years. Plantings associated with grants (volunteer tree planting) are difficult to forecast. In addition, unfortunate large scale tree loss due to storms or pests and disease is generally unpredictable.
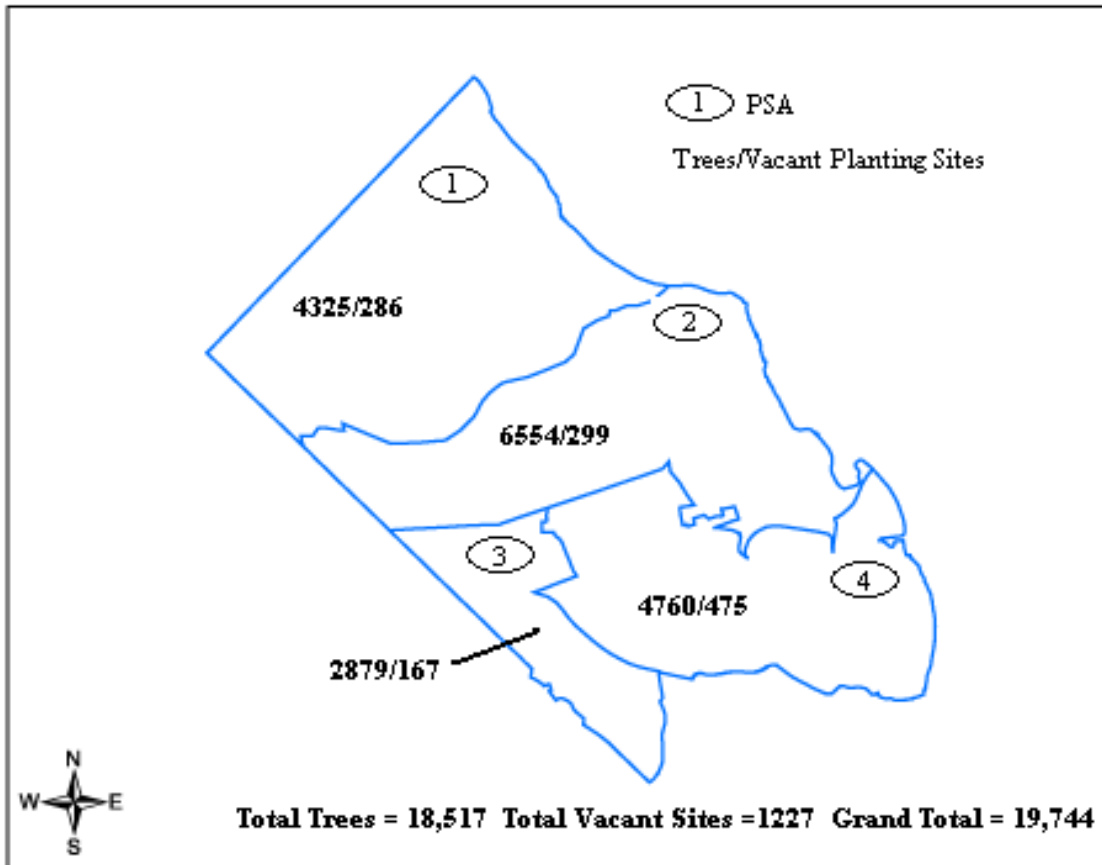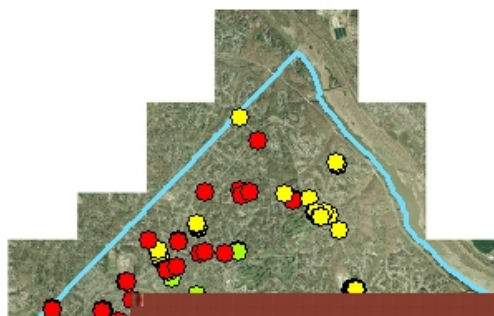
Figure 8. Total number of trees and vacant planting sites in each Park Service Area (PSA)

Available Street Tree Planting Spaces

Park Service Area 1

32

74

177

Park Service Area 2

127

110

Appendix III
REGULATIONS

Arlington County has a number of regulations regarding trees. Many of the regulations deal with public trees. However, there are also regulations that determine how trees are managed on private property. The existing regulations represent a "toolbox" that is available for tree preservation and planting, ensuring that the County's tree canopy exists for future generations.

TREE PRESERVATION ORDINANCE

http://www.co.arlington.va.us/prcr/scripts/parks/tree_ordinance.htm

The Tree Preservation Ordinance was adopted in November 2002 by the Arlington County Board. The Urban Forestry Commission, a citizen advisory group to the County Board, drafted the Ordinance with the following purpose and intent. "There is hereby established a Tree Preservation Ordinance to ensure that the tree cover within Arlington County's boundaries is maintained and improved in order to protect the health, safety, and welfare of County citizens and the general public, to safeguard the ecological and aesthetic environment necessary to a community, to preserve, protect, and enhance valuable natural resources, and to conserve properties and their values." There are two mechanisms by which the ordinance aims to meet this purpose and intent: the regulation of trees on public property and the regulation of designated trees on private property.

Regulation of Trees and Shrubs on Public Property

Article 2 of the ordinance deals with the treatment of trees and shrubs and the injury to and removal of trees and shrubs on County owned public lands. The ordinance establishes that any unlawful actions are considered a Class 3 misdemeanor. It also describes the circumstances under which trees may be injured or removed and establishes how the trees will be paid for or replaced as per the County Tree Guidelines (*County Landscape Standards, Guide for Plant Appraisal*).

Regulation of Heritage Trees, Memorial Trees, Specimen Trees, and Street Trees on Public or Private Property

Article 3 of the ordinance provides a mechanism for the designation of Heritage Trees, Memorial Trees, Specimen Trees and Street Trees. Trees can be nominated on public or private property. The individual trees, after having met the criteria for their nomination category, are designated by ordinance by the County Board. Once designated the tree is legally protected from injury or removal. This protection carries with the deed of the property. Violation of these protections is considered a civil penalty punishable by fine.

ROW PERMIT REVIEW

Any work being done in the County Street ROW requires a permit. These permits are reviewed by PRCR staff regarding potential impacts to trees. County Tree Replacement Guidelines,

Guidelines for Installing Utilities around Trees and the County's Tree Preservation Standards are used where appropriate

ADMINISTRATIVE REGULATION 4.1

Landscape Standards Packet including:
- Zoning Regulations,
- Supporting Documents,
- Standards for Preservation and Planting of Trees on Site Plan Projects,
- Tree Replacement Guidelines,
- Design Guidelines,
- Invasive Species, Etc.

http://www.co.arlington.va.us/cphd/planning/applications/site_plans/pdfs/ac_landscape_standards_032003.pdf

The Landscape Plan Review Committee, which consists of CPHD, DES and PRCR staff, reviews landscape plans associated with Site Plan and other development projects. The Committee reviews landscape plans for compliance with the Standards for Preservation and Planting of Trees on Site Plan Projects, Tree Replacement Guidelines, Design Guidelines, Site Plan conditions and Sector Plans. Site Plan projects are required to plant street trees where appropriate and replace any trees removed on site. Trees are replaced according to the County's Tree Replacement Guidelines. Staff insures that the appropriate species are chosen and that they are planted according to County Standards. The Standards and Guidelines are also used for Unified Residential Development projects and all County projects.

ADMINISTRATIVE REGULATION 4.3

This is the County's old regulation that referred to tree planting on public and private property. However, it has become outdated. The recently adopted Tree Preservation Ordinance and the newly approved Landscape Standards including the Standards for Preservation and Planting of Trees on Site Plan Projects and the Tree Replacement Guidelines have made Regulation 4.3's usefulness questionable. This regulation should be reconciled with the County's more recent regulations and policies.

CHESAPEAKE BAY PRESERVATION ORDINANCE

http://www.co.arlington.va.us/des/epo/pdffiles/InterimCBPOguide.pdf

The Chesapeake Bay Preservation Ordinance requires a Landscape Conservation Plan for any site disturbance greater than 2,500 sq. ft. The Department of Environmental Services administers the Ordinance and coordinates with PRCR staff to review and enforce the requirements of the Landscape Conservation Plan. The Landscape Conservation Plan uses County tree standards to preserve existing trees. Residential properties must demonstrate how the site will have 20% forest canopy in twenty years. This can be achieved by using existing trees or trees proposed for planting. Canopy calculations for select tree species is provided as an attachment to the Chesapeake Bay Preservation Ordinance Interim Guidance Manual. Properties that have Resource Protection Areas (generally a 100' stream buffer) within their boundaries are subject to additional vegetation preservation and management requirements.

Appendix IV
IMPLEMENTATION PLAN

Implementation Item	Timing	Implementing Agency	Funding
Improve Arlington's urban forest canopy coverage			
1) Determine the best methodology for refining our GIS analysis of the tree canopy. The most appropriate imagery should also be determined. New higher resolution satellite imagery is becoming increasingly available for analysis of tree canopy coverage.	ST	DPRCR, DES (Mapping)	Already funded, Grant
2) Establish realistic tree cover goals for different land use categories using American Forest benchmarks of 40% overall, 50% for suburban residential, 25% for urban residential and 15% for central business districts. Based on the proportions of the different land use categories, achieving the goals for each would result in meeting the overall canopy cover goal.	ST	DPRCR, DCPHD	N/A
3) Implement the planting plan (Appendix II) and its recommendations.	ST	DPRCR	Already funded
Encourage the preservation and planting of trees on private property.			
4) Establish a tree fund that is dedicated to planting trees on private property and educating citizens about the value and stewardship of trees. The tree fund could be established through contributions for special exception projects that cannot meet planting requirements on-site.	ST	DPRCR, UFC	private
5) Establish a program working with Civic Associations, in cooperation with volunteers, to plant trees on private property.	ST	DPRCR	TBD, Tree fund, participating Civic Associations
6) Explore options for establishing a funded County program to plant trees on private properties that abut street ROW.	MT	DPRCR	TBD
7) Explore the options to offer incentives to preserve canopy and encourage planting on private property.	MT	DPRCR, DES	TBD
8) Explore reviewing the Tree Replacement Guidelines to ensure that the tree replacement formula better reflects an equitable calculation for the value of trees lost. This should take into consideration the weight of alternative valuation methods such as the landscape appraised value of the tree and the monetary value of the benefits the tree provides.	ST	DPRCR, DCPHD	N/A

Ensure through education and outreach that all stakeholders appreciate the value of Arlington's trees and what is necessary for their stewardship.			
9) Continue to pursue outside training and certification opportunities for staff including the most up to date training in hazard tree identification, tree preservation and plant appraisal.	ongoing	DPRCR	N/A
10) Develop a "one-stop shopping" comprehensive web site for trees. The developer and the citizen could use the site to find out how trees affect them (and how they affect trees). Access to important information regarding County regulations an programs will be available as well as read only access to the GIS tree inventory data.	ST	DPRCR, Libraries	N/A
11) Maintain a public presence at fairs, the Farmer's Markets and continue to hold events such as panel discussions and informational presentations.	ST	UFC, Tree Stewards, DPRCR	N/A
12) Continue to partner with the Urban Forestry Commission, Arlington ReLeaf and Tree Stewards and Cooperative Extension in education and outreach efforts.	ongoing	PRCR, UFC, Tree Stewards,Arl.ReLeaf	N/A
13) Expand upon and increase the availability of our urban forestry related literature.	ST	DPRCR, Coop. Ext.	N/A
Improve coordination and communication regarding County tree regulations, policies and planting and preservation standards and guidelines.			
14) Develop or use existing networks (Metropolitan Washington Council of Government Community Forestry Network and National Capital Society of American Foresters Urban Forestry Workgroup), to share our program objectives with potential partners within Arlington County and the surrounding region.	ongoing	DPRCR	N/A
15) Continue to refine partnerships with Dominion Virginia Power, Northern Virginia Regional Parks Authority and Virginia Department of Transportation and expand these partnerships to other entities.	ongoing	DPRCR, UFC	N/A
16) Proactively share our data, standards, regulations and policies with other stewards of our urban forest.	ST	DPRCR	N/A
17) Engage other property owners in Arlington County as well as surrounding urban forest managers in a cooperative effort to better steward the regions urban forest.	ST	DPRCR	N/A
18) Coordinate with other County departments and other entities, planting, planning and maintenance activities where appropriate to optimize our stewardship.	ST	DPRCR, DES, DCPHD	N/A
19) Ensure that staff review of development plans is early enough in the design process that trees may be preserved and considered equitably	ST	DPRCR, DCPHD	N/A
Ensure that tree planting and preservation are important elements of our streetscapes.			
20) Ensure that there are liaisons for each department and/or division that has any effect on our stewardship of the urban forest.	ongoing	DPRCR, DCPHD, DES	N/A
21) Create more opportunities for tree planting in the public ROW such as; tree nubs; street narrowing; larger planting strips; curb, gutter and sidewalk design and material innovations.	ongoing	DPRCR, DCPHD, DES	TBD

22) Optimize communication so that redeveloped ROW is planted as soon as possible.	ongoing	DPRCR, DES	TBD
23) Work with streetscape designers and planners to ensure tree species diversity.	ongoing	DPRCR, DCPHD	N/A
24) Implement street tree planting plan (as described in Appendix II).	ST	DPRCR	Already funded, TBD

Preserve existing wooded parks and natural areas, and plant trees in parks, natural areas and other public open spaces to improve Arlington's overall tree canopy.

25) Continue to monitor tree health, forest structure and the occurrence of invasives in Parks and naturally forested areas throughout the County	ongoing	DPRCR, Coop. Ext.	N/A
26) Begin to inventory trees in parks, natural areas and other public facilities.	ST	DPRCR, Coop. Ext.	TBD
27) Wherever possible manage forested areas on public lands so that there is adequate species diversity and size class distribution to maintain a sustainable urban forest.	ongoing	DPRCR, DCPHD	N/A
28) Control and manage invasive plant species and tree pests and diseases in an environmentally responsible manner.	ongoing	DPRCR, Coop. Ext., volunteers	TBD, grants
29) Manage and enhance areas adjacent to existing streams as riparian forest buffers wherever possible and appropriate.	ongoing	DPRCR, DES	TBD
30) Continue the partnership between PRCR and DES as well as local environmental groups to ensure that the best management practices (BMPs) are used to maximize the habitat benefits the urban forest provides.	ongoing	DPRCR, DES	N/A

Ensure that urban forest maintenance practices continue to improve the quality of tree canopy in Arlington so that potential benefits are maximized for the community.

31) Ensure that best management practices (BMPs) are used when providing tree maintenance in critical areas such as riparian stream buffers.	ongoing	DPRCR	N/A
32) Use the street tree inventory to determine conflicts with the built environment (sidewalks and tree grates) and prioritize their mitigation.	ST	DPRCR	N/A
33) Update the GIS street tree inventory with tree maintenance and removal data.	ST	DPRCR	N/A
34) Continue to systematically review potential tree hazards using the tree inventory. Consider the development of a Tree Risk Management Plan.	ST	DPRCR	TBD
35) Using the tree inventory, develop a realistic plan for a five year pruning cycle of the trees in the street ROW.	ST	DPRCR	TBD
36) Create a GIS mapping program for invasives to track progress and assist with management.	ST	DPRCR, Coop. Ext.	TBD

Planting Plan

37) Use the GIS street tree inventory to target available planting spaces in the County streets ROW. Planting levels for the ROW are based on a goal of having a full stocking level for public street trees in three years.	ST	DPRCR	Already funded
38) Plant Parks and other County facilities at the optimal level. Passive open space will be forested wherever appropriate.	ongoing	DPRCR	Already funded

39) Use the GIS to evaluate the overall urban forest canopy to determine where planting opportunities exist on public property.	MT	DPRCR	TBD
40) Continue to work with Schools to plant and maintain trees on their grounds.	ongoing	DPRCR, Schools	Already funded
41) Establish a tree fund (funds from special exception projects that can not plant required replacements on-site) that will be dedicated to planting on public and private properties.	ST	DPRCR	private
42) Develop opportunities and partnerships with environmental organizations such as Arlington ReLeaf, American Forests, and the Potomac Conservancy to plant more trees with volunteers.	ST	DPRCR	Grants

ST = short term (1-2 years),

MT = mid term (3-5 years),

DPRCR = Department of Parks, Recreation and Cultural Resources,

DES = Department of Environmental Services,

DCPHD = Department of Community Planning and Housing Development,

UFC = Urban Forestry Commission,

Coop. Ext. = Virginia Cooperative Extension Service,

TBD = to be determined.

End Notes

1) American Forests. February 2002. Urban Ecosystem Analysis for the Washington DC Metropolitan Area: An Assessment of Existing Conditions and a Resource for Local Action.

2) American Forests. 1999. from a Report prepared for Arlington County.

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5) American National Standards Institute. 2000. Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements. ANSI Z133.1 – 2000.

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7) Dwyer, John F., McPherson, Gregory E., Schroeder, Herbert W. and Rowan A. Rowntree. 1992. Assessing the Benefits and Costs of the Urban Forest. *Journal of Arboriculture* 18(5).

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9) Miller, Robert W. 1996. Urban Forestry Planning and Managing Urban Greenspaces. Prentice Hall, Upper Saddle River, New Jersey.

10) Nowak, David J. 2004. The Effects of Urban Trees on Air Quality. USDA Forest Service, Syracuse , NY. (http://www.fs.fed.us/ne/syracuse/TREE%20Air%20Qual.pdf)

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13) Wolf, Kathleen. 1998. Trees in Business Districts: Positive Effects on Consumer Behavior! - *Fact Sheet 5. http://www.cfr.washington.edu/research.envmind/consumer.html*

14) Zimar & Associates, Inc. 2003. Arlington County Street Tree Inventory Summary Report & Long Range Management Plan.

Web Sites:

15) American Forests: http://www.americanforests.org/productsandpubs/citygreen/
"American Forests is a world leader in planting trees for environmental restoration, a pioneer in the science and practice of urban forestry, and a primary communicator of the benefits of trees and forests. American Forests (americanforests.org) is the nation's oldest nonprofit citizens' conservation organization."

16) Arlington County, Department of Parks, Recreation and Cultural Resources: www.co.arlington.va.us/prcr/scripts/parks/trees.htm

17) Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service (Summer 2003 Newsletter) http://cufr.ucdavis.edu/

18) Human – Environment Research Laboratory, University of Illinois at Urbana Champaign: http://www.herl.uiuc.edu/

19) National Arbor Day Foundation: http://www.arborday.org/

20) Urban Forestry South. USDA Forest Service, Southern Region**:** http://www.urbanforestrysouth.usda.gov/