Rosemont-McIver Historic District

Tree Inventory Report

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Introduction

At the request of the City of Sanford, an inventory of all deciduous and evergreen trees with a trunk diameter (DBH) of at least twelve inches and all ornamental trees with a DBH of at least six inches within the Rosemont-McIver Historic District was conducted in June and July of 2008. The project was performed in order to evaluate the characteristics and condition of the District's trees and to develop a tree management program. The species composition, size, health and current maintenance requirements were identified and evaluated. This information will provide the City of Sanford with the opportunity to maximize the value and benefits of privately and publicly owned trees and minimize the problems that can be associated with them. Two significant advantages of the tree inventory are:

- Administrators, managers and property owners will have an increased awareness of the current magnitude, condition and needs of their tree resource.
- This awareness can be maintained by updating the information as work is completed and other changes occur, allowing the community to efficiently and effectively manage the future of privately and publicly owned trees.

Practical goals that can be realized are:

- Improved response to public inquiry
- More efficient scheduling of labor and equipment
- Realistic budget requests and long-term planning
- Improved relations among other municipal and private services

Data Collection and Inventory Methods

For the Rosemont-McIver Historic District Inventory, trees were individually examined, identified, measured and recorded. The information collected for each tree included: location by address and/or GPS, species, size (DBH), condition and maintenance requirements. A Certified Arborist collected the data with the use of a Trimble GPS unit. The data was downloaded from the unit to a computer in the Strategic Services Office for processing in ESRI format. The following information was recorded for each tree as described below:

Location – All trees are located by the use of a Trimble GPS unit and address if available. Each tree is assigned the number it was given during the data collection process.

Identification – Botanical and common name identifies each tree.

Tree Size – Using a Biltmore Stick, most of the trees were measured about four and one half feet above the ground in order to obtain the Diameter at Breast Height (DBH). For trees with multiple trunks, the diameter of the largest trunk was measured.

Condition Rating – "Condition" indicates the current state of a tree's health, structural soundness, overall shape and growth rate. Crown development, trunk condition, major branch structure, twig growth rate, insects/diseases and root condition all are considered. In general, the condition of each tree is recorded in one of the following categories adapted from the rating system established by the International Society of Arboriculture (ISA):

Good *– The tree has no major structural problems; no significant damage due to diseases or pests; no significant mechanical damage; a full, balanced crown and normal twig condition and vigor for the species.*

Fair *– The tree may exhibit the following characteristics: minor structural problems and/or mechanical damage; significant damage from non-fatal or disfiguring diseases; minor crown imbalance or thin*

crown; minor structural imbalance or stunted growth compared to adjacent trees. This condition also includes trees that have been topped, but show reasonable vitality and show no obvious signs of decay.

***Poor** – The tree appears unhealthy and may have structural defects. Trees in this category may also have severe mechanical damage, decay, and severe crown dieback or poor vigor.*

***Dead** – This category refers only to dead trees.*

Problematic Conditions – These essentially indicate structural flaws or signs of decline in the tree, as well as challenges resulting from the District's infrastructure that may necessitate undesirable tree maintenance. The conditions used for this particular inventory are as follows:

***Weak Fork** – This is where two or more large branches (usually at least six inches in diameter) adjoin, most often at the top of the trunk or lower portion of the canopy of the tree. These forks tend to be weakly attached due to a narrow branch angle, included bark, decayed wood or a combination of these factors.*

***Overhead Electric Wires** – This indicates the presence of overhead electrical conductors.*

***Dead Wood –** This can range from dead twigs to large, dead branches. Dead wood is divided into two categories: major and minor. Minor dead wood consists of twigs or small limbs less than four inches in diameter and is one of the first and most obvious signs that a tree is in a state of decline. Major dead wood consists of limbs greater than four inches in diameter. This is considered by most tree experts to be the threshold at which the falling limbs become a hazard to life and property below.*

***Cavity** – This is a hollowed area within the trunk or larger branches of the tree. Cavities are usually visible, however they can sometimes close, leaving the tree to appear healthy from the outside while being hollow and structurally unsound within. Cavities are a leading cause of tree failure. They are especially dangerous since they may not be visible. "Decay Conks" are a tell tale sign of decay, when a cavity is not visible. These are caused by a decay fungus and may resemble mushrooms.*

Topped – *Trees that have suffered this destructive practice have had a severe cutting back of limbs to stubs larger than three inches in diameter within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Crown reduction by a qualified arborist may be substituted, where appropriate. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where pruning practices are impractical may be exempt from proper pruning practices. However, when this occurs, it is usually best to remove the entire tree.*

Trunk Injury – *This most often refers to mechanical damage from construction, utility maintenance, etc. Severe trunk injuries may form cavities or they may appear to heal over from the outside, while over time a growing area of decay can hollow out the inside of the trunk and make the tree susceptible to breaking in strong winds.*

Problem	Number	% Total
Weak Fork	45	3.52
Electric Lines	12	0.94
Cavity	49	3.83
Dead Wood	58	4.53
Other	1	0.08

Table 1. Problematic Conditions

Maintenance Recommendations – By applying these recommendations, some of the "conditions" affecting the tree can often times be corrected, thus improving stability. They are explained as follows:

Remove Dead Wood (Clean) *– This describes the removal of any excessive dead branches. For safety reasons, those branches four inches or greater in diameter should be promptly scheduled for removal.*

Remove Lower Branches (Raise) *– This refers to the removal of the lower most branches of the tree. This is usually performed as the tree increases in height and caliper, eventually leaving adequate space for walking beneath. These limbs should be removed gradually, over a period of years, as premature*

removal will result in a thin, spindly trunk. This practice should never result in the removal of more than 25 percent of the tree's live crown, which should be 33 to 50 percent of its height.

Reduce Crown *– This refers to the reduction of the canopy as opposed to the destructive practice of "topping" the tree. This involves removing the end of a branch at the juncture of a lateral branch that is at least one third of the size of the main limb. By using this method, the remaining lateral will become the new leader of the limb. As a result, the site of the cut will not produce a profusion of weakly attached sprouts.*

Remove *– This last resort procedure is recommended when the tree is either dead or has become a public liability due to structural unsoundness.*

Maintenance	Number	% Total
Remove	47	3.67
Clean	28	2.19
Reduce	1	0.08

Table 2. Maintenance Recommendations

Comments – This section is reserved for any comments in regards to location or additional problematic conditions such as broken branches, portion of crown split off, topped, trunk injury, root injury, competition from adjacent trees, site too wet and insects/disease.

The Rosemont-McIver Historic District Community Forest

The characteristics of the Historic District's community forest include species, diameter and condition. By identifying these aspects of the District's trees, one can learn much about the forest's composition, size and health. It is important to know the types as well as the number of trees present in a given location. Species composition data is essential because tree species vary considerably in life expectancy and maintenance requirements. The types of trees present in the Historic District greatly affect tree maintenance, activities and budgets. Similarly, tree diameter helps to define the relative size of the total

tree population. The condition of the tree population allows for the development and implementation of a plan of action in which the District's tree canopy can be restored to an improved state over a specified period of time. The following information provides a detailed analysis of the trees in this location.

Species Diversity

Of the 1280 trees inventoried, 55 species comprise the Rosemont-McIver Historic District community forest. Loblolly Pine is the most common species, consisting of over 17 percent of the tree population. White Oak ranks second at nearly 14 percent and Post Oak is the third most common species at over 11 percent. Flowering Dogwood ranks fourth at just over nine percent. The Historic District's community forest is well diversified for the most part. In general, no one species should account for more than ten percent of the population. This can be a concern if one of the dominant species becomes affected by a species-specific epidemic (related to insect or disease) or is significantly damaged by ice and wind, as the visual and economic impact could be substantial. For instance, consider the over-planting of American Elms and the resulting impact of Dutch Elm Disease or the occurrence of Chestnut Blight in American Chestnut trees. Based on these guidelines, planting selections for any of the three most common species in the Inventory should be suspended so that other native species may be utilized. Careful species and cultivar selection are necessary when addressing these concerns. When developing bid specifications for planting, it is recommended that specific cultivars be named.

Botanical Name	Common Name	Count	% Total
Pinus taeda	Loblolly Pine	221	17.27
Quercus alba	White Oak	179	13.98
Quercus stellata	Post Oak	144	11.25
Cornus florida	Flowering Dogwood	116	9.06
Quercus phellos	Willow Oak	95	7.42
Quercus falcata	Southern Red Oak	63	4.92
Carya illinoinensis	Pecan	41	3.20
Acer rubrum	Red Maple	36	2.81
Lagerstroemia indica	Crape Myrtle	33	2.58
Pinus echinata	Shortleaf Pine	30	2.34
Carya glabra	Pignut Hickory	28	2.19
Magnolia grandiflora	Southern Magnolia	26	2.03
Liriodendron tulipifera	Tulip Poplar	20	1.56
Liquidambar styraciflua	Sweetgum	19	1.48
Ulmus americana	American Elm	17	1.33
Quercus nigra	Water Oak	17	1.33
Pinus palustris	Longleaf Pine	15	1.17
Ligustrum japonicum	Japanese Privet	14	1.09
Juniperus virginiana	Red Cedar	12	0.94
Acer saccharum	Sugar Maple	12	0.94
Pinus strobus	White Pine	11	0.86
Robinea pseudoacacia	Black Locust	10	0.78
Prunus serotina	Black Cherry	8	0.63
Ilex opaca	American Holly	7	0.55
Tsuga caroliniana	Carolina Hemlock	7	0.55
Cersis canadensis	Eastern Redbud	7	0.55
Platanus occidentalis	Sycamore	7	0.55
Fraxinus americana	White Ash	7	0.55
Pyrus calleryana	Flowering Pear	6	0.47
Juglans nigra	Black Walnut	5	0.39
Malus x spp.	Flowering Crabapple	5	0.39
Quercus rubra	Red Oak	5	0.39
Magnolia x soulangia	Saucer Magnolia	5	0.39
UNKNOWN SPECIES	UNKNOWN SPECIES	5	0.39
Pinus virginiana	Virginia Pine	5	0.39
Cunninghamia lanceolata	China Fir	4	0.31
Fraxinus pennsylvanica	Green Ash	4	0.31
Morus rubra	Red Mulberry	4	0.31
Fagus grandifolia	American Beech	3	0.23
Quercus cocciniae	Scarlet Oak	3	0.23
Morus alba	White Mulberry	3	0.23
Quercus mirilandica	Blackjack Oak	2	0.16
Pyrus communis	Common Pear	2	0.16
Cedrus deodara	Deodar Cedar	2	0.16
Ostrya virginiana	Eastern Hophornbeam	2	0.16
Quercus palustris	Pin Oak	2	0.16
Acer saccharinum	Silver Maple	2	0.16
Tilia americana	American Linden	1	0.08
Ulmus parvifolia	Chinese Elm	1	0.08
Malus sylvestris	Common Apple	1	0.08
Ginkgo biloba	Ginkgo	1	0.08
Albizia julibrissen	Mimosa	1	0.08
Catalpa speciosa	Northern Catalpa	1	0.08
Diospyros virginiana	Persimmon	1	0.08
Rhus coriaria	Sumac	1	0.08
Populus alba	White Poplar	1	0.08

Table 3. Species Distribution

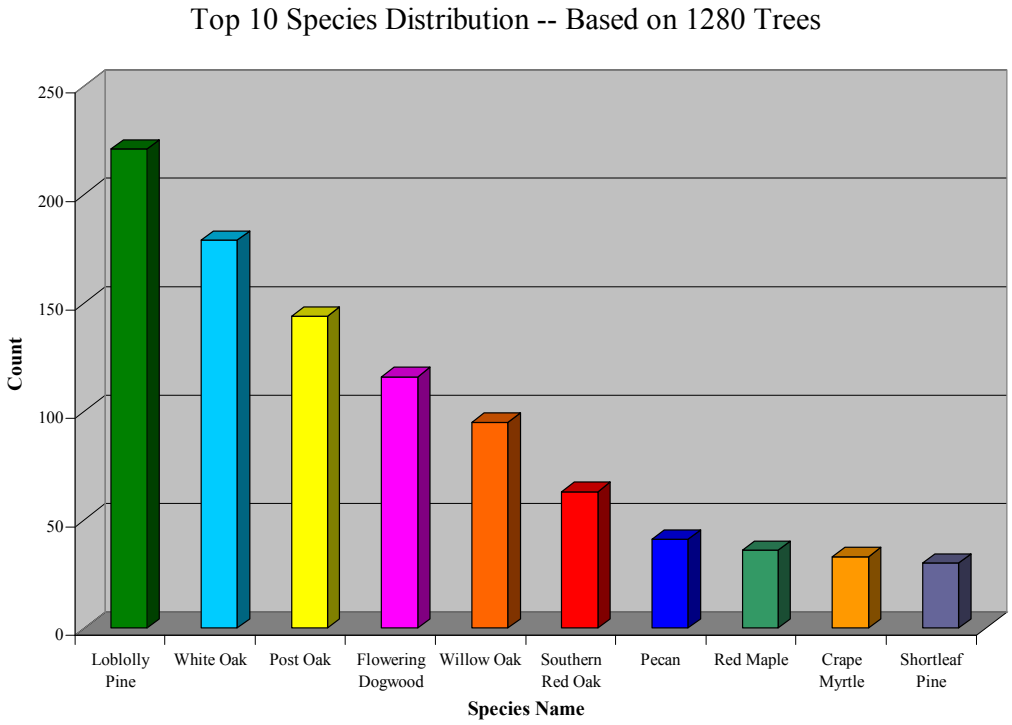


Figure 1. Species Distribution

General Health and Condition

The condition of a tree is evaluated by considering several factors, including the root characteristics, trunk, branch structure, canopy, foliage and presence of pests. Based on these factors, each tree is given a rating. Sixty-one percent of the Historic District's community forest is in good condition.

Condition	Number	% Total
Good	782	61.09
Fair	437	34.14
Poor	41	3.20
Dead	20	1.56

Table 4. Community Forest Condition

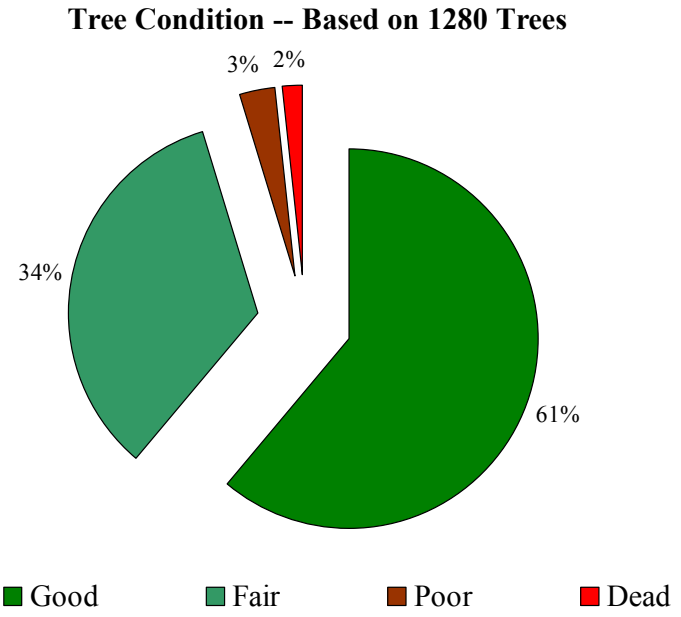


Figure 2. Community Forest Condition

Community Forest Maintenance Requirements and Recommendations

Maintenance requirements are determined from observations of the trunk, large branches and canopy of each tree. This section analyzes the maintenance requirements noted during the Inventory. Maintenance data should be used as a basis for prioritizing treatment needs. This information will allow the City of Sanford and the Historic District to develop cost-effective strategies by assisting officials and property owners with an accurate evaluation of current and future tree-related expenditures. The tree maintenance recommendations are based on the analysis of the Historic Site's community tree population. These recommendations should be followed and used in the development of appropriate and realistic management goals. Implementation of these recommendations will allow the District to realize the full potential of the community forest through the most cost-effective use of available funds.

Removals

Based on this Inventory, the Historic District has 47 trees recommended for removal. Although high short-term expenditures are required, it is encouraged that these removals be budgeted for and completed by the end of 2009 due to possible hazardous conditions and the spread of insects and disease to healthy trees.

Pruning

Three types of pruning recommendations (all of which resulted from this Inventory) are prioritized below. These would best be done in tandem, where possible, in order to reduce travel time and work costs.

Remove Dead Wood (Clean) – The trees on this list should be given highest priority for pruning. The City and District should prioritize this pruning according to the areas that have the greatest volume of pedestrian traffic, parked cars and structures beneath. This work should begin when the trees are fully leafed out so that the dead branches, normally four inches or greater in diameter, can be easily identified. The dead wood removal should be completed when the trees are fully leafed so as to easily distinguish the living twigs and branches from the dead ones.

Remove Lower Limbs (Raise) – Following the removal of dead wood, those trees in this category should be given priority.

Reduce Crown (Reduce) – Very few trees, if any, are recommended for this procedure and are normally assigned lowest priority.

Additional Maintenance

Some additional maintenance recommendations can result from tree inventories and others will develop over time. An example is guys (wire, etc.) that have been left intact too long and are beginning to be overgrown with wood from the tree's trunk or limbs. This "girdling," caused by the normal expansion of the tree trunk over the guy, results in permanent damage to the tree. The tree's growth will become

stunted, it will ultimately be short lived and the structural integrity will be compromised at the site of the injury. If used, these guys should always be removed at the end of the following growing season. Other examples of additional maintenance needs that could develop over time are: add mulch, re-stake, remove brush/vines and replace. Once again, many of these would best be done in tandem, where possible, in order to reduce travel time and work costs.

Summary

The Rosemont-McIver community forest is in fair-to-good condition overall. Currently there are 47 trees requiring removal and 29 recommended for pruning or other maintenance. In order to develop some level of continuity following the current maintenance recommendations, a trained in-house employee or crew would best meet the present needs of the District. In this way, staff can become more efficient in controlling the development of potential hazard and liability situations and to limit, through regular and appropriate pruning methods, the occurrence of structural conditions that could prove costly to remedy in the long run. The use of an employee or crew that already works for the City could be trained for specific tasks for those trees on Public property, which would reduce the expense of contracting. This includes any work that could be performed from the ground or with the use of a bucket truck, if available.

Three-Year Management Plan

Year One

In the first year following the submission date of this plan, the City and property owners of the Historic District should concentrate on accomplishing all maintenance requirements for the trees identified in the Inventory. Before these requirements are facilitated, it is important that pruning and inventory management training be conducted for staff that will be assigned to perform this work. Proper pruning

can reduce maintenance issues and possible costs later on, plus it is a relatively inexpensive practice that does not require large equipment and could be done in-house with a trained employee or crew for those trees on Public property. The City should also address the need for establishing procedures and staff to ensure that the Tree Inventory information is kept up to date. In addition, funds should be budgeted annually for tree replacement in the event of removals. These plantings should focus on large growing, native shade trees such as the Oaks, Maples, Tulip Poplar and Sycamore where there is adequate planting space with no overhead electric lines. The new trees should be added to the existing Inventory as they are planted.

Years Two and Three

Remove or make the necessary corrective pruning to any trees that are newly identified as potential risks to persons or property and remove associated stumps. It is important to immediately inspect all large trees following each occurrence of damage to the District's community forest due to ice and wind. Any damage should be documented and immediately entered into the Inventory with the required maintenance scheduled promptly. Continue to remove any stakes and guys for newly planted trees in the late fall of each year, after all danger of hurricanes has passed. Just after leaf drop each year (usually December) make sure the mulch layer is replenished, if needed, for the first three years of the tree's life. The mulch should not be piled up against the trunk of the tree. Any trees that have died should be promptly removed and replanted the following winter.

Routine Maintenance Cycle

Once the removal, pruning and additional maintenance of the specified trees has been completed, attention should be given to establishing a routine maintenance cycle. This on-going cycle should be structured enough to ensure inspection of all trees at a minimum of every three years. The advantages that result from establishing a routine maintenance cycle will:

- Maximize tree crew efficiency
- Reduce routine trimming costs, improve tree appearance and enhance related tree/property values
- Permit the prompt identification and removal of potentially dangerous tree conditions in order to limit liability
- Decrease tree mortality through the early identification and treatment of disease and insect conditions
- Reduce future tree damage from storms and thus, possible electrical outages caused by failure of weak or dead limbs

Sources of Funding

Funding sources for tree care range from the City's budget to joint programs with area companies and merchants as well as funds from the District property owners. The City and District are encouraged to explore the following sources of support for tree care operations:

- Government grants. Federal programs such as the Urban and Community Forestry Grant (which is funding this project) appropriate funds for tree management programs in communities throughout the United States. Another Federal program, the lntermodal Surface Transportation Efficiency Act of 1991 (ISTEA), established funding for transportation enhancement activities, including roadside beautification.
- Foundation grants. The Foundation Center, online at http://fdncenter.org/ is a good reference.
- Private donations. Area corporations and organizations may donate funds to special tree planting and maintenance programs. Local officials can generate public support of tree care through programs such as "memorial trees" or special tree improvement projects. Individuals, businesses or local men and women's groups might be a source of funding as well.

- Volunteer groups. Local officials can encourage community organizations to donate funds or organize fund-raising activities or other support for community tree planting and maintenance programs.
- Cooperative tree-planting programs. In such programs, homeowners are offered a selected choice of street trees at a reduced price. In effect, a cooperative tree-planting program allows the homeowner to assume some of the cost of street tree planting while the City can limit the species choices. Again, the key to the success of such a program is a detailed plan for implementing and publicizing the project. Raleigh's "NeighborWoods" program is an excellent example of such an organization.
- Automobile Damage Reimbursement: The City and property owners should be reimbursed for any tree damage caused by an automobile accident, if the provision is in the City Ordinances.
- Establish a tree donation or memorial tree program, using Arbor Day as a focal point for promoting citizen interest in contributing to the community. For example, first establish where and when memorial trees will be planted. Decide the form of memorial, such as a plaque at the tree or a listing in a community register. Set a donation price per tree that includes the cost of purchasing and planting the tree, as well as any recognition given the donor. Determine how donations will be collected and set a time frame for the project. Take the same steps for publicizing the project: determine how, when and where it should be announced and how application forms will be distributed -- consider a kick-off ceremony, brochures, public service announcements, press releases and other avenues of communication with the general public.

Appendix

Pruning Young Trees

Proper pruning is essential in developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require little corrective pruning when they mature.

Keep these few simple principles in mind before pruning a tree:

- Each cut has the potential to change the growth of the tree. Always have a purpose in mind before making a cut.
- Proper technique is essential. Poor pruning can cause damage that lasts for the life of the tree. Learn where and how to make the cuts before picking up the pruning shears.
- Trees do not heal the way people do. When a tree is wounded, it must grow over and compartmentalize the wound. As a result, the wound is contained within the tree forever.
- Small cuts do less damage to the tree than large cuts. For that reason, proper pruning (training) of young trees is critical. Waiting to prune a tree until it is mature can create the need for large cuts that the tree cannot easily close.

Making The Cut

Where you make a pruning cut is critical to a tree's response in growth and wound closure. Make pruning cuts just outside the branch collar. Because the branch collar contains trunk or parent branch tissues, the tree will be damaged unnecessarily if you remove or damage it. In fact, if the cut is large, the tree may suffer permanent internal decay from an improper pruning cut.

If a permanent branch is to be shortened, cut it back to a lateral branch or bud. Internodal cuts, or cuts made between buds or branches, may lead to stem decay, sprout production, and misdirected growth.

Pruning Tools

When pruning trees, it is important to have the right tool for the job. For small trees, most of the cuts can be made with hand pruning shears (secateurs). The scissor-type, or bypass blade hand pruners are preferred over the anvil type. They make cleaner, more accurate cuts. Cuts larger than one-half inch in diameter should be made with lopping shears or a pruning saw.

Never use hedge shears to prune a tree. Whatever tool you use, make sure it is kept clean and sharp.

Establishing a Strong Scaffold Structure

A good structure of primary scaffold branches should be established while the tree is young. The scaffold branches provide the framework of the mature tree. Properly trained young trees will develop a strong structure that requires less corrective pruning as they mature.

The goal in training young trees is to establish a strong trunk with sturdy, well-spaced branches. The strength of the branch structure depends on the relative sizes of the branches, the branch angles, and the spacing of the limbs. Naturally, those factors vary with the growth habit of the tree. Pin oaks and Sweetgums, for example, have a conical shape with a central leader. Elms and Live Oaks are often wide spreading without a central leader. Other trees, such as Lindens and Bradford Pears are densely branched. Good pruning techniques remove structurally weak branches while maintaining the natural form of the tree.

Trunk Development

For most young trees, maintain a single dominant leader growing upward. Do not prune back the tip of this leader. Do not allow secondary branches to outgrow the leader. Sometimes a tree will develop double leaders known as co-dominant stems. Co-dominant stems can lead to structural weaknesses, so it is best to remove one of the stems while the tree is young.

The lateral branches growing on the sides contribute to the development of a sturdy well-tapered trunk. It is important to leave some of these lateral branches in place, even though they may be pruned out later. These branches, known as temporary branches, also help protect the trunk from sun and mechanical injury. Temporary branches should be kept short enough not to be an obstruction or compete with selected permanent branches.

Permanent Branch Selection

Nursery trees often have low branches that may make the tree appear well proportioned when young, but low branches are seldom appropriate for large-growing trees in an urban environment. How a young tree is trained depends on its primary function in the landscape. For example, street trees must be pruned so that they allow at least 16 feet of clearance for traffic. Most landscape trees require only about 8 feet of clearance.

The height of the lowest permanent branch is determined by the tree's intended function and location in the landscape. Trees that are used to screen an unsightly view or provide a windbreak may be allowed to branch low to the ground. Most large-growing trees in the landscape must eventually be pruned to allow head clearance.

The spacing of branches, both vertically and radially, in the tree is very important. Branches selected as permanent scaffold branches must be well spaced along the trunk. Maintain radial balance with branches growing outward in each direction.

A good rule of thumb for the vertical spacing of permanent branches is to maintain a distance equal to 3 percent of the tree's eventual height. Thus, a tree that will be 50 feet tall should have permanent scaffold branches spaced about 18 inches apart along the trunk. Avoid allowing two scaffold branches to arise one above the other on the same side of the tree.

Some trees have a tendency to develop branches with narrow angles of attachment and tight crotches. As the tree grows, bark can become enclosed deep within the crotch between the branch and the trunk. Such growth is called included bark. Included bark weakens the attachment of the branch to the trunk and can lead to branch failure when the tree matures. You should prune branches with weak attachments while they are young.

Avoid over-thinning the interior of the tree. The leaves of each branch must manufacture enough food to keep that branch alive and growing. In addition, each branch must contribute food to grow and feed the trunk and roots. Removal of too many leaves can "starve" the tree, reduce growth, and make the tree unhealthy. A good rule of thumb is to maintain at least half the foliage on branches arising in the lower two-thirds of the tree.

Newly Planted Trees

Pruning of newly planted trees should be limited to corrective pruning. Remove torn or broken branches, and save other pruning measures for the second or third year.

The belief that trees should be pruned when planted to compensate for root loss is misguided. Trees need their leaves and shoot tips to provide food and the substances that stimulate new root production. Un-pruned trees establish faster with a stronger root system than trees pruned at the time of planting.

Wound Dressings

Wound dressings were once thought to accelerate wound closure, protect against insects and diseases, and reduce decay.

However, research has shown that dressings do not reduce decay or speed closure and rarely prevent insect or disease infestations. Most experts recommend that wound dressing not be used. If a dressing must be used for cosmetic purposes, use a thin coating of a material that is not toxic to the plant.

Pruning Mature Trees

Pruning is the most common tree maintenance procedure. Although forest trees grow quite well with only nature's pruning, landscape trees require a higher level of care to maintain their safety and aesthetics. Pruning should be done with an understanding of how the tree responds to each cut. Improper pruning can cause damage that will last for the life of the tree, or worse, shorten the tree's life.

Reasons for Pruning

Because each cut has the potential to change the growth of the tree, no branch should be removed without a reason. Common reasons for pruning are to remove dead branches, to remove crowded or rubbing limbs, and to eliminate hazards. Trees may also be pruned to increase light and air penetration to the inside of the tree's crown or to the landscape below. In most cases, mature trees are pruned as a corrective or preventive measure.

Routine thinning does not necessarily improve the health of a tree. Trees produce a dense crown of leaves to manufacture the sugar used as energy for growth and development. Removal of foliage through pruning can reduce growth and stored energy reserves. Heavy pruning can be a significant health stress for the tree.

Yet if people and trees are to coexist in an urban or suburban environment, then we sometimes have to modify the trees. City environments do not mimic natural forest conditions. Safety is a major concern. Also, we want trees to complement other landscape plantings and lawns. Proper pruning, with an understanding of tree biology, can maintain good tree health and structure while enhancing the aesthetic and economic values of our landscapes.

When to Prune

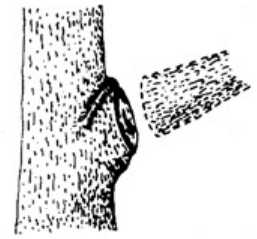
Most routine pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place before the spring growth flush. Some trees, such as maples and birches, tend to "bleed" if pruned early in the spring. It may be unsightly, but it is of little consequence to the tree.

A few tree diseases, such as oak wilt, can be spread when pruning wounds allow spores access into the tree. Susceptible trees should not be pruned during active transmission periods.

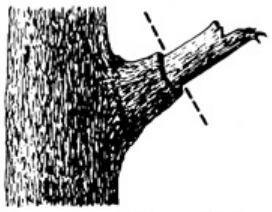
Heavy pruning just after the spring growth flush should be avoided. At that time, trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at that time can stress the tree.

Making Proper Pruning Cuts

Pruning cuts should be made just outside the branch collar. The branch collar contains trunk or parent branch tissue and should not be damaged or removed. If the trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar. Do not cut the collar.

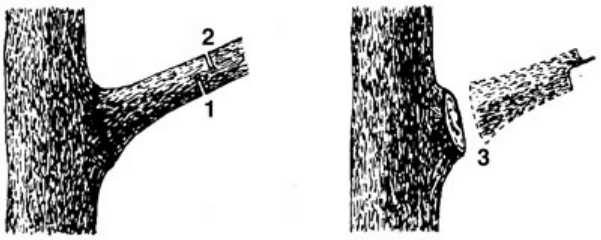


Pruning cuts should be made just outside the branch collar.



On a dead branch that has a collar of live wood, the final cut should be made just beyond the outer edge of the collar

If a large limb is to be removed, its weight should first be reduced. Making an undercut about 12 to 18 inches from the limb's point of attachment does this. Make a second cut from the top, directly above or a few inches farther out on the limb. Doing so removes the limb, leaving the 12- to 18-inch stub. Remove the stub by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.



Use the three-cut method to remove a large limb.

Pruning Techniques

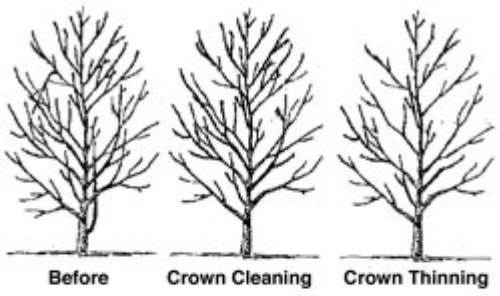
Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe, and attractive condition.

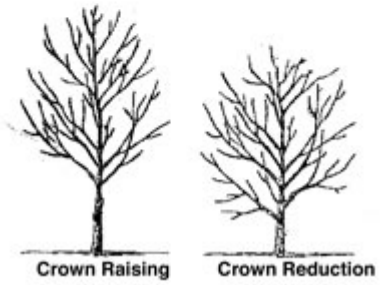
Cleaning is the removal of dead, dying, diseased, crowded, weakly attached, and low-vigor branches from the crown of a tree.

Thinning is the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.

Raising removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians, and vistas.

Reduction reduces the size of a tree, often for clearance for utility lines. Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least one-third the diameter of the cut stem). Compared to topping, reduction helps maintain the form and structural integrity of the tree.





How Much Should Be Pruned?

The amount of live tissue that should be removed depends on the tree size, species, and age, as well as the pruning objectives. Younger trees tolerate the removal of a higher percentage of living tissue better than mature trees do. An important principle to remember is that a tree can recover from several small pruning wounds faster than from one large wound.

A common mistake is to remove too much inner foliage and small branches. It is important to maintain an even distribution of foliage along large limbs and in the lower portion of the crown. Over-thinning reduces the tree's sugar production capacity and can create tip-heavy limbs that are prone to failure.

Mature trees should require little routine pruning. A widely accepted rule of thumb is never to remove more than one-quarter of a tree's leaf-bearing crown. In a mature tree, pruning even that much could have negative effects. Removing even a single, large-diameter limb can create a wound that the tree may not be able to close. The older and larger a tree becomes, the less energy it has in reserve to close wounds and defend against decay or insect attack. The pruning of large mature trees is usually limited to removal of dead or potentially hazardous limbs.

Wound Dressings

Wound dressings were once thought to accelerate wound closure, protect against insects and diseases, and reduce decay. However, research has shown that dressings do not reduce decay or speed closure and rarely prevent insect or disease infestations. Most experts recommend that wound dressings not be used. If a dressing must be used for cosmetic purposes, then only a thin coating of a nontoxic material should be applied.

Hiring an Arborist

Pruning large trees can be dangerous. If pruning involves working above the ground or using power equipment, it is best to hire a professional arborist. An arborist can determine the type of pruning necessary to improve the health, appearance, and safety of your trees. A professional arborist can provide the services of a trained crew, with all of the required safety equipment and liability insurance.

There are a variety of things to look for when selecting an arborist:

- Membership in professional organizations such as the International Society of Arboriculture (ISA), the Tree Care Industry Association (TCIA), or the American Society of Consulting Arborists (ASCA)
- Certification through ISA's Certified Arborist program
- Proof of insurance
- List of references (don't hesitate to check)

Avoid using the services of any tree company that:

- Advertises topping as a service provided; knowledgeable arborists know that topping is harmful to trees and is not an accepted practice
- Uses tree climbing spikes to climb trees that are being pruned; climbing spikes can damage trees, and their use should be limited to trees that are being removed

Source: International Society of Arboriculture

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September 15, 2008

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