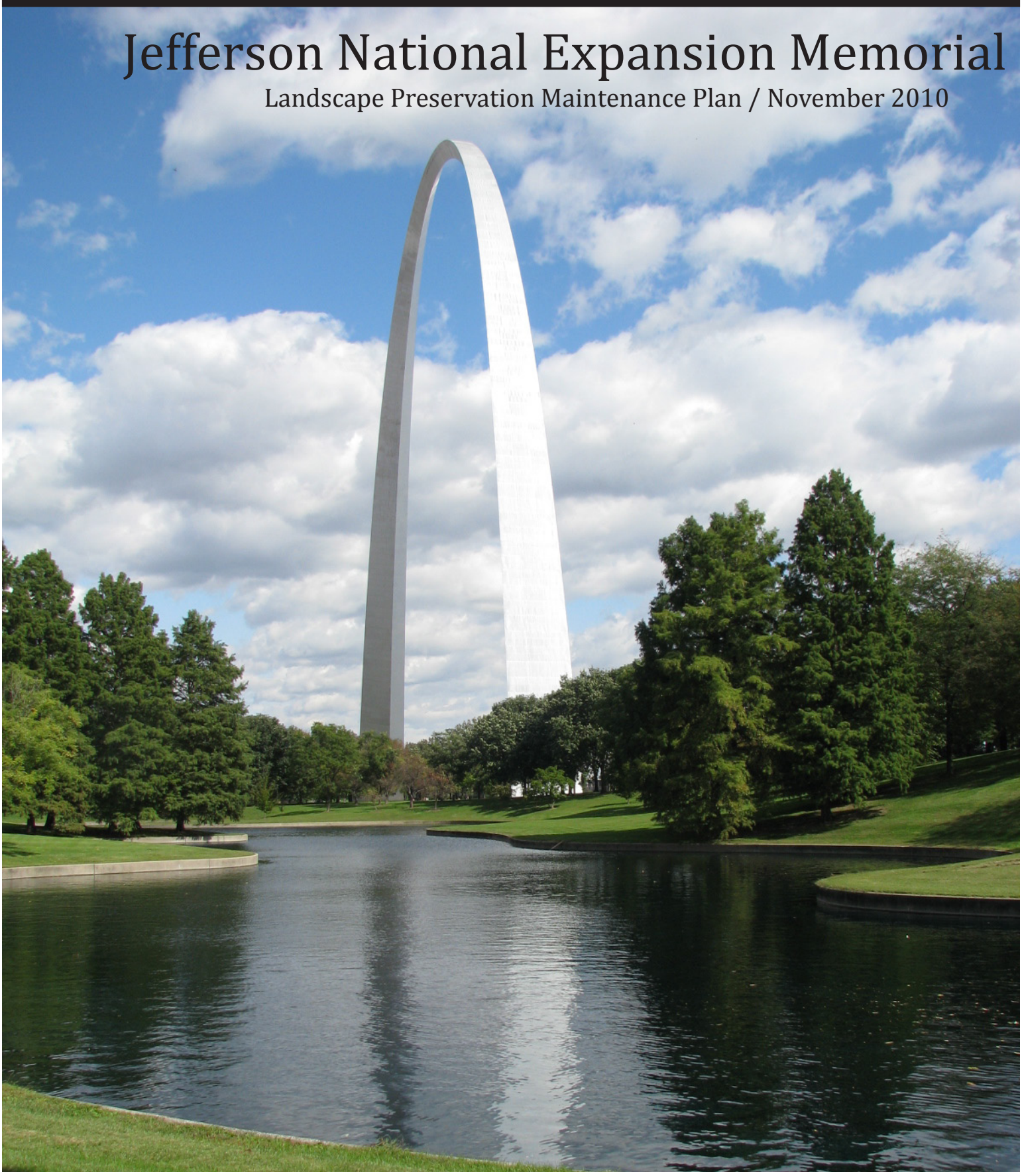
National Park Service
U.S. Department of the Interior

Jefferson National Expansion Memorial

Landscape Preservation Maintenance Plan / November 2010



LANDSCAPE PRESERVATION MAINTENANCE PLAN

JEFFERSON NATIONAL EXPANSION MEMORIAL

ST. LOUIS, MISSOURI

NOVEMBER 2010

NATIONAL PARK SERVICE

MIDWEST REGIONAL OFFICE

OMAHA, NEBRASKA

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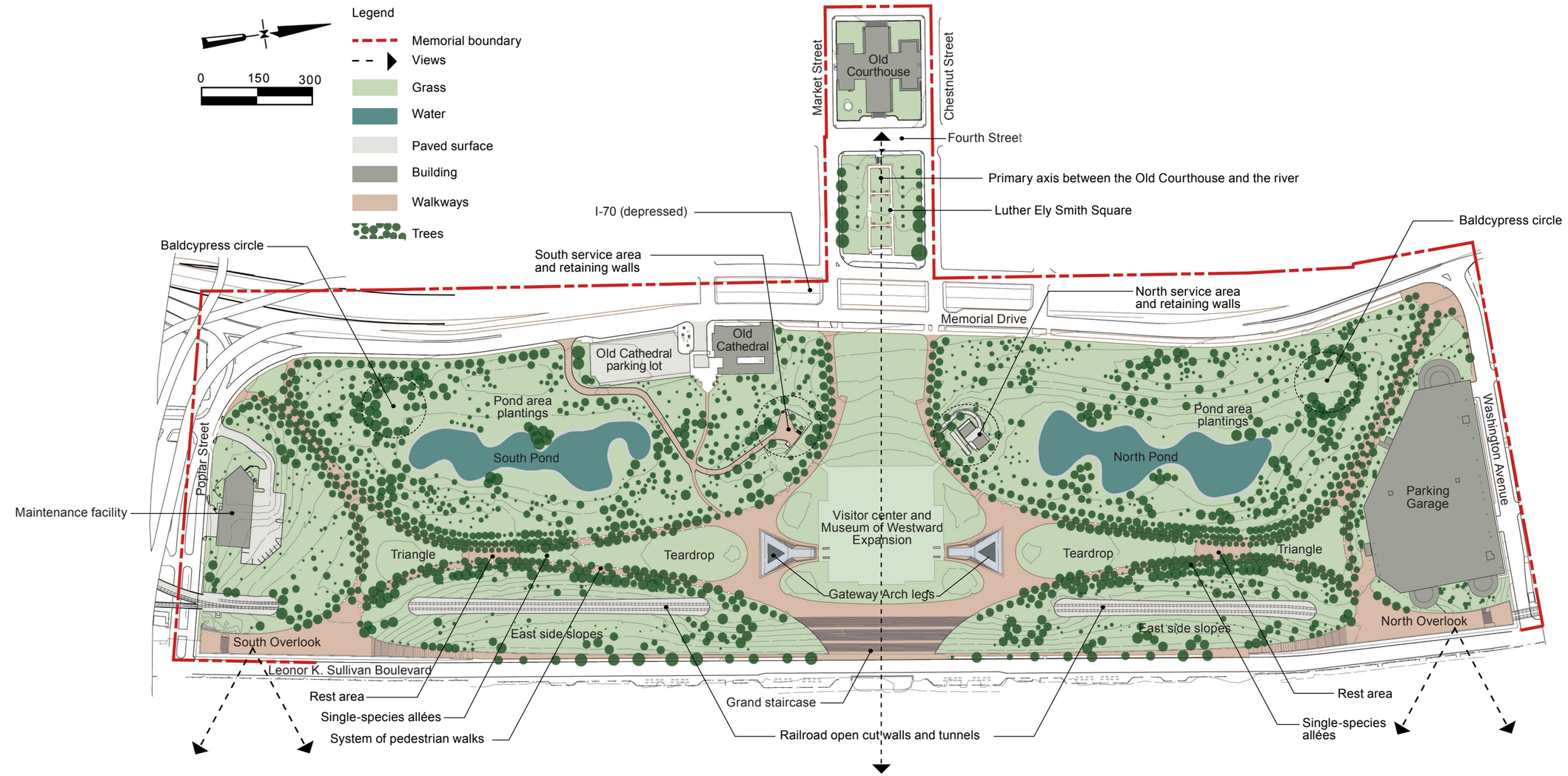
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JEFFERSON NATIONAL EXPANSION MEMORIAL: EXISTING CONDITIONS PLAN SHOWING CONTRIBUTING LANDSCAPE FEATURES, 2009.

1. Introduction and General Guidelines

INTRODUCTION AND GENERAL GUIDELINES

MANAGEMENT SUMMARY

Maintenance plays a critical role in preserving the character of America's significant historic landscapes. This Landscape Preservation Maintenance Plan (LPMP) for the Jefferson National Expansion Memorial (the Memorial or JNEM) was developed by AECOM and The Care of Trees/Davey Tree Expert Company for the National Park Service (NPS) subsequent to the completion of the Memorial's Cultural Landscape Report (CLR), updated in 2010. The LPMP provides guidance for maintaining the character-defining woody vegetation and site structures of the Memorial landscape, a National Historic Landmark (NHL), in compliance with the Secretary of Interior's Standards and other NPS policies and guidance. It also provides a format for the recordation of ongoing maintenance practices at the Memorial.

This plan provides information to help retain the historic character of the landscape, with guidance for the ongoing maintenance of character-defining features, and recommendations for solutions to various problems that, if left unresolved, could result in loss of historic integrity. The scope of this plan is focused on vegetation at the Memorial, primarily the trees that compose the Memorial's character-defining vegetation features; these are the most maintenance-intensive and significant features on the grounds. In addition, the plan addresses the maintenance of paving surfaces of the Memorial's character-defining circulation features, specifically the system of curving walks, the ramps at the Gateway Arch entrances, and the Grand Staircase. The plan also addresses the surface/exterior maintenance of the overlooks, railroad cuts, and tunnel entrances. This plan does not include guidance for buildings and structures (such as the Gateway Arch, Old Cathedral, or Museum of Westward Expansion), or for structural problems of the railroad tunnels and Overlooks. These may be addressed through other appropriate guidance such as a Historic Structures Report (HSR). The emphasis of this plan is on maintenance required to meet landscape preservation goals, rather than on the current capabilities and resources of the Memorial maintenance program. The plan is based on providing information about best practices; it will support needed changes to baseline maintenance in the future, as identified in the 2009 General Management Plan/Environmental Impact Statement (GMP/EIS). Based on planning-level estimates, the Preferred Alternative of the GMP identifies a need for an increase in facilities and grounds maintenance staff of approximately 21 full-time employees (plus likely additional partner staffing to support operations).

The Memorial staff have made a considerable effort over the years to be responsible stewards of the Memorial grounds. This LPMP recognizes the formidable challenges of maintaining such a large, intensively used, highly designed landscape in an urban setting. The Memorial's landscape, reflecting the Modern design of Eero Saarinen and Dan Kiley, requires a high level of maintenance and care. Based on information provided by the 2009 tree inventory, 2010 CLR, and current technical standards, this plan provides guidance for the enhancement of already robust maintenance practices. This will support the appropriate maintenance of the historic character of the Memorial landscape.

It is important to keep any maintenance plan up to date. To this end, the tables and calendars included in the plan are also provided to the NPS in an editable format for recording maintenance practices at the Memorial. Incremental updates to the editable spreadsheets in this report (described below) should be performed at least annually, and preferably after any construction or changes occur that result in changes to maintenance. Recordation of maintenance should be

coordinated with recordation of treatment of historic landscape features in Part 3 of the CLR for the Memorial.

A full LPMP Update should be carried out every 5 years to ensure that landscape conditions are accurately assessed, recordation is standardized, the most relevant maintenance issues at the Memorial are being addressed, and that current methods, standards, and technologies form the basis for all recommended actions. When a 5-year LPMP Update occurs, the record of maintenance in the Work Requirements table should be reviewed to identify the patterns and ongoing problems, successes, and failures of the preceding 5-year period. This will aid in focusing the updated LPMP and adjusting maintenance procedures to effectively address long-term needs.

In April 2010, a kickoff meeting was held at the Memorial for this project. In attendance were Jim Jacobs, Gardener Supervisor (JNEM); Marla McEnaney, COTR, Historical Landscape Architect, NPS Midwest Region; Bob Moore, Historian (JNEM); Adriane Fowler, Project Manager (AECOM); Laura Bandara, Project Designer (AECOM); Diane Sparks, Conservation Planner (The Care of Trees/Davey); Skip Kincaid, Senior Consulting Urban Forester (The Care of Trees/Davey); and Dave Zeitlin, Project Manager (The Care of Trees/Davey). The outcome of the meeting was the agreement upon a format for the LPMP which would best meet the needs of the maintenance staff at the Memorial. An annotated outline for the plan was developed by the AECOM/Care of Trees/Davey Tree Expert team, and provided to the NPS in May 2010. The outline was then developed into a draft submitted in August 2010. The draft, after review by the NPS, was revised and finalized.

Related Documents, Standards, and Policies

The LPMP is a type of document developed by the NPS to serve as a practical tool for integrating preservation objectives into landscape maintenance operations. The term "preservation maintenance" describes the practice of monitoring change, controlling growth, replacing contributing features in-kind, and minimizing disturbance in the landscape to ensure that features, such as vegetation, walks, walls, and furnishings are not lost or modified in ways that could compromise the character of the landscape. In 1998, the NPS Olmsted Center for Landscape Preservation produced the *Guide to Developing a Preservation Maintenance Plan for a Historic Landscape*, which provides the basic guidance for this plan. This plan is also developed in compliance with Director's Orders (DO) and other relevant policy documents, including:

- DO-28: *Cultural Resources Management*
- 36 CFR Part 68: *Secretary of the Interior's Standards for the Treatment of Historic Properties*
- DO-77-7: *Integrated Pest Management*
- DO-80: *Real Property Asset Management*
- *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*

This plan is developed within the context of numerous park-specific planning documents and processes at the Memorial that are both recent and ongoing. These include the GMP/EIS completed in 2009; the CLR for the Memorial grounds, updated in 2010; and an Environmental Assessment (EA) for the replacement of the Rosehill Ash trees (in progress in 2010). A primary action of the GMP/EIS Preferred Alternative is the Framing a Modern Masterpiece: The City + The Arch + The River 2015 International Design Competition. The ultimate design recommendations that are provided by the winning team will result in as-yet undefined changes to the landscape, with accompanying changes to maintenance and operations.

The LPMP provides guidance for care and stewardship of the landscape in a manner that is consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, the GMP/EIS, and treatment recommendations found in the CLR. The plan is to be used in conjunction with the treatment recommendations provided in the revised CLR. The CLR contains essential information about the significance, character-defining features, conditions, preservation treatment goals, guidelines, and treatment recommendations for the landscape. Key information and guidance in this preservation maintenance plan are drawn from the CLR and provided in the form of summary descriptions and references. This plan provides maintenance guidance to Memorial maintenance supervisors and staff. It does not serve as technical specifications and should not be used to undertake construction projects.

The LPMP provides a framework for maintenance operations including inspections, record keeping, scheduling, best management practices and protocols, and work procedures that maintain the historic character of the landscape. The plan focuses on maintenance of the key character-defining features of the Memorial grounds, including planted form, large concrete structures, and the system of walks. This plan does not address long-term resolution of structural, drainage, or other problems that are best addressed through larger planning and construction projects. Refer to the GMP/EIS and to the CLR Treatment Recommendations (CLR Chapter 5) and Implementation Projects (CLR Chapter 6) for guidance on these issues, which are outside the scope of this LPMP.

Other NPS maintenance standard operating procedures and practices, as well as industry standards for maintenance and preservation practices, are integrated into this plan; these are cited specifically in the document where relevant. Sustainable practices are noted where applicable.

OBJECTIVES

The objectives of this plan are to:

- Perpetuate the historic character of the Memorial landscape as defined in the CLR;
- Retain and maintain contributing landscape features in good condition;
- Replace contributing features in-kind when they deteriorate beyond repair or begin to adversely affect the landscape's historic character due to condition problems;
- Remove incompatible non-contributing features (as defined in the CLR) when they deteriorate beyond repair or begin to adversely affect the landscape's historic character;
- Provide guidance on how to monitor and record the condition of contributing landscape features over time;
- Provide supporting guidance and standards that can be used by Memorial staff; and
- Clarify the role of NPS staff and professional arborists/tree experts for certain tree care/replacement issues.

USE OF THIS PLAN

Use this plan to support regular cyclic maintenance decision-making and day-to-day maintenance practice. It will assist the maintenance staff at the Memorial to more effectively maintain the significant character-defining features of the landscape through regular monitoring and care of woody plants and structural elements that together define the character of the landscape.

In an effort to ensure that this plan can be easily updated and maintained, the document is composed of a group of sub-sections (text and tables) rather than a single narrative with traditional

chapters. These are provided to the NPS as electronic files. The following is a guide to contents and an explanation of how these sections should be used.

GUIDE TO CONTENTS

The contents of this document are as follows. Bolded text highlights the parts of the document that are to be edited and updated by NPS for ongoing maintenance recordation.

- **General Guidelines** includes general maintenance information regarding appropriate standards and practices that apply to the entire Memorial landscape.
- **Table A: Features and Conditions** is an Excel spreadsheet that provides an inventory of cultural landscape features and basic information about the features of the Memorial landscape.
    - *CLR inventoried features*: This section lists the larger character-defining landscape features inventoried in the CLR as contributing features (such as "overlooks" and "single-species allée planting"). These are features of the design, and often include numerous individual trees or structural elements. This column provides a reference to the feature as described in the CLR.
    - *Components:* For purposes of this plan, most CLR inventoried features are further subdivided into *components* (e.g. south overlook staircase, etc.), which are listed and described in this table.
    - *Contributing status:* As determined in the CLR, each feature is considered "contributing" or "non-contributing" to the significance of the National Historic Landmark. See the CLR for a detailed explanation.
    - *Key characteristics and notes about historic character:* This section includes a summary of key characteristics of the feature necessary to understand in order to maintain the historic character of the feature correctly. It is summarized from the CLR.
    - C*ondition summary*: This section summarizes the baseline condition of each component, as drawn from the 2010 CLR existing conditions documentation; the 2009 tree inventory; and observations collected during site visits and meetings with Memorial personnel. The information in this table forms the basis for subsequent sections of this plan.
- **3. Table B: Work Requirements** is an Excel spreadsheet in which some fields are to be updated as changes are made over time (such as removal and replanting of trees, success or failure of maintenance initiatives, new construction occurring to meet GMP goals, or decisions to try new technologies and methods for maintenance in the future). The spreadsheet is organized by component landscape features and itemizes the condition for each. The *Updated Date*, *Updated By*, *Action Performed Date, Progress (Cumulative Assessment, Next Update Due, and FMSS Reference Number* fields are to be kept up to date by the Memorial maintenance managers in order to provide a maintenance record.
    - *Condition (specific)*: A specific, observed condition that requires maintenance attention, such as items with major impact to health and safety, site use, and historic integrity that can be addressed through cyclic maintenance practices.

- *Work Requirements*: These are tangible maintenance tasks that will address or correct the identified condition problem.
- For each work requirement, the following are identified in this table:
- *Threshold:* This includes, as relevant:
  - level of urgency or frequency with which the work should be undertaken;
  - what level of the stated condition can be tolerated;
  - when to look for the problem;
  - where the problem is found on the feature;
  - description and identification of the problem; and
  - how much of the stated work is recommended and what indications suggest the work is no longer required.
- *Recommended Actions*: Specific actions to fulfill the work requirement. It may include, as relevant:
  - what action is taken, or change in current practices is made (clean, replace, treat, prune, repair);
  - what part of the feature requires work;
  - what potential problems or safety precautions staff should be aware of; and
  - further diagnosis or assessments recommended (e.g. frequency, "sunset").
- *Criteria for Future Inspections; Further Diagnosis or Assessments Recommended; Frequency*: A recommendation for timing of further inspection to diagnose ongoing problems or assess the effectiveness of past treatments.
- *Special Considerations for Historic Appearance*: The feature-specific issues, generated by the design intent of the feature, that should be addressed to diagnose work requirements and/or actions to preserve the integrity of the designed landscape.
- *Calendar Summary*: Time of year that recommended actions should occur. Refer to Seasonal Tree Care and Maintenance Calendars for more information.
- *Technical and Standards References*: A list or link to references that are found in the Appendix as PDF documents or hard copies of documents. Links to web sites may also be listed for some reference materials.
- *Updated Date:* Date that work requirements, actions, etc. have been updated in the future by NPS staff.
- *Updated By*: Name or initials of NPS staff making updates.
- *Action Performed Date*: The date of an action can be listed here.
- *Progress (Cumulative Assessment)*: The improvement or worsening of a condition can be tracked here.
- *Next Update Due*: The recommended date of the next action.

  - *FMSS Reference Number*: Unique identifier to reference the condition and maintenance action to related entries in the NPS Facility Maintenance Software System (FMSS).

- **4. Table C: Tree Inventory Summary** The *Summary Sheet of Number of Trees by Species* provides information about the total number of trees and a breakdown by species. Data is listed alphabetically by species and by occurrence.
  - Also see the *Tree Inventory* in the Appendix. This is a full updated inventory of existing trees. An update of the 2006 inventory was performed utilizing data provided by Memorial staff. The data is also provided in a spreadsheet that can be updated as need by Memorial staff.
- **5. Calendars** There are two calendars in this section:
  - *Seasonal Tree Care Calendar* is an spreadsheet-based calendar that provides a list of recommended tree maintenance activities, identifies when the tasks can be completed operationally, and identifies when they should be performed to maintain optimum tree health.
  - *Monthly Task Calendar* is a task list by month listing maintenance tasks by feature. This calendar assists with planning for staffing, materials and supplies, and provides a "to-do" list for each month. This calendar has also been provided to NPS in editable text format so it may be updated in the future as needed by Memorial maintenance managers.
- **6. Historic Character Recommendations for Woody Plants** provides information about each tree species that occurs at the Memorial. Information includes the following:
  - *Common and Botanical Names*
  - *General Information*: a quick reference of general characteristics, including height, common uses at the Memorial, and natural form.
  - *Characteristic Use* at the Memorial (e.g. pond plantings, etc.).
    - *Design Purpose*: indicates the designer's intent for this species (per the CLR).
    - *Maintenance*: provides additional details, as relevant, for the following:
      - *Soil Care*;
      - *Roots*;
      - *Mulch*;
      - *Pruning* (refers to the Types of Pruning described in General Guidelines, page 1-22);
      - *Tree Condition Monitoring/Inspection*;
      - *Insects and Disease*;
      - *Tree Removals*;
      - *Newly Planted*;

- *Reference Information* (refers to additional information provided on USDA information sheets included in Appendix B); and
- *Notes*.

- **7. Historic Character Recommendations for Concrete** include summary information about the particular care requirements for the Memorial's historic concrete paving and surfaces. This section does not address buildings or underlying structural elements.
- **8. Appendix: Technical Information** contains copies of referenced materials, including technical information, as PDF documents, web links, or hard copy (depending upon copyright and size of documents).

FUTURE OPPORTUNITIES

Currently, the Memorial Maintenance Division does not use a GIS or database system to support park operations. This LPMP provides documents in Microsoft Word and Excel, which can be opened and edited by maintenance management using their existing computer system. However, if the opportunity arises in the future, this data can be migrated or linked to other applications or databases to expand the utility of the plan. Excel is a flexible format that can interface with many other commonly used programs, such as GIS, AutoCAD, or Access. It could be linked to such programs at the park level for site management purposes, or even linked to NPS-wide information such as the FMSS system or the Cultural Landscapes Inventory Management System (CLAIMS) (if feasible).

Information is often not updated electronically, as park staff do not always have time to undertake this work consistently or regularly, limiting the utility of the data. However, field-friendly applications are being developed so that maintenance tasks and observations can be updated on a PDA or handheld device. Such applications are very promising in that they do not require a maintenance worker to spend time at a desk in front of a computer, or filling in paper forms. Handheld devices can easily collect GPS location data, photographs, staff ID, and consistent categories of information to ensure consistency and accuracy with minimal effort by the person doing the data entry. During the writing this plan, the National Center for Preservation Technology and Training (NCPTT) was in process of developing such an application (although it is not yet available for use).

TREE INVENTORY SOFTWARE

Managing more than 2,000 trees in a historic landscape like the Memorial, with millions of annual visitors, is a complex task that would be made more effective and efficient through the use of tree inventory management software.

Tree inventory data should be stored in a secure location that provides the ability to systematically analyze data and generate and track work orders. There is currently no secure location or use of tree inventory software at the Memorial, although trees are inventoried and updated in AutoCAD and Excel tables, which is a less efficient and effective method than many others available today. The Memorial should consider enhancing tree inventory and condition tracking using a software that will store tree data spatially and allow rapid updates of data utilizing hand-held computers. An appropriate tree inventory and management software should at minimum:

- Customize data fields
- Generate work orders
- Track maintenance

- Customize reports
- Utilize GIS
- Calculate tree values, etc.
- Inventory and track additional assets
- Attach photographs of trees, letters, reports, etc to each tree record
- Synchronize with field devices
- Have a web-based option (allows off site data storage and program access anywhere web access occurs)
- Have the ability to be installed on a local network

See the article "Comparison of Urban Forestry Inventory & Management Software Systems,"(Andreu et . al. 2009), which is in the Appendix of this LPMP, for more detailed information on criteria that are important to consider in selecting a tree management software system.

GENERAL GUIDELINES

MAINTENANCE RECOMMENDATIONS

INVOLVEMENT OF QUALIFIED PROFESSIONALS

Throughout this LPMP are references to consulting with qualified professionals. Such consultations may include many kinds of specializations, from structural engineers to arborists, from materials conservators to historical architects and historical landscape architects. Qualified professionals are trained in appropriate techniques for performing specialized tasks and have experience that is essential to approaching the Memorial landscape's needs. While the Memorial staff includes a number of qualified and experienced professionals who provide a high caliber of care for the grounds and facilities, there may often be particular maintenance issues and needs that are best supported through consultation with appropriate experts outside the Memorial staff (such as a structural engineer with experience in working with mid-century Modern monolithic concrete structures or consulting with the NPS Midwest Regional Historical Landscape Architect).

SUSTAINABLE LANDSCAPE MAINTENANCE PRACTICES

Sustainability is a critical consideration in current landscape management practices, and is identified in NPS policy as a desirable goal for management of cultural and natural resources . According to the NPS *Guiding Principles of Sustainable Design*, "Technical efforts to preserve cultural resources… must not contribute to degradation of the environment. The use of pesticides, fungicides, and other toxins has damaged the earth, so any preservation efforts should consider nonhazardous alternatives." This LPMP incorporates sustainability into its overall approach and into the recommended maintenance standards and practices.

Sustainable landscape maintenance practices include the following (drawn from *Sustainable Landscape Construction* (Thompson and Sorvig, 2008)):

- Be selective about mowing lawns; do not over-mow or cut grass too short. Be aware that increased lawn mowing not only increases use of gas, it also increases the use of irrigation and fertilizer.
- Use the smallest and lightest tool that can do the job (with exception of small machines that use two-stroke engines, which cause pollution).
- Whenever possible, use small equipment with newer, cleaner engines.
- Choose electric equipment over gas-powered; consider using solar rechargers.
- Increase the use of hand tools where feasible (rakes instead of leaf blowers, etc).
- Use bicycles with equipment trailers (also minimizes root compaction caused by vehicles).
- If a powered vehicle is needed, use electric and bio-based fuel vehicles when possible.
- Use biologically based products whenever possible: these can reduce total costs because of the decreased cost of environmental compliance.
- Practice sustainable fertilizer use.
    - Use organic fertilizer whenever feasible.
    - Use the minimum amount of fertilizer necessary to maintain plant health. Do not over-fertilize.

    - Use composted manure and compost as much as possible to decrease the need for chemical fertilizers.
- Reuse on-site resources such as grass clippings and waste for compost. Grind pruned branches in wood chipper and use as mulch (do not use wood that is infected with diseases or fungus).

TREES

Tree Protection Strategies

Efforts should be made to protect trees during any event or construction project that occurs on the Memorial grounds. Utilize the following strategies to improve the chances that a tree (or group of trees) will survive soil compaction, grading, root loss, or branch and trunk damage that may occur during construction and other activities.

- Prepare a tree protection plan for every project or event that involves grading or soil compaction of any kind near existing trees; this plan should result in a well-defined tree protection zone for all potentially impacted trees.
- Engage a qualified landscape architect or qualified arborist to complete the tree protection plan during the planning of the capital project, and include the plan in construction documents.
- Address the exact location, depth, and method of root pruning in the plan.
- Undertake thorough review of the tree plan with the Grounds Supervisor, in cooperation with the NPS Contracting Officer Representative (COR), event organizers, or contractors who will be on site.
- Develop clear channels of communication and continue to monitor tree protection compliance throughout the event or project.

General Construction and Special Events and Uses Staging

The purpose of placing staging and stockpiling away from the tree protection zones and within the limits of use or construction to mitigate soil compaction, root damage, trunk damage, and canopy damage to the tree(s).

- Limit construction and event staging to areas of existing pavement within the project-specific limits of use or construction except as otherwise noted.
- Direct the Project Manager or Project Engineer to identify the limits of use or construction, to act as the defining limits of the construction or use.
- Limit access by construction equipment or event vehicles to existing pavement/improved surfaces to the greatest extent possible.
- Determine an alternate path when vehicle height and tree canopies conflict.
- Where vehicle access is not on paved surfaces and within the critical root zone (CRZ) of trees, install root protection matting (RPM) or approved alternative (See Figures 1 and 5).

- Determine access requirements and RPM installation with supervision of the Memorial's Maintenance Manager.
- Require special permission and NPS oversight when allowing vehicle access to walkways with trees planted on both sides.



Figure 1. Use root protection matting when driving over the critical root zone of trees.

Demolition

- Protect trees during any type of demolition or construction activities involving ground disturbance, compaction, or other potential for damage.
- Consider hand removal of materials, air tool excavation of below-grade features, and abandonment (in place) of utilities, along with other proactive measures to minimize disruption or severing of critical tree root systems.

Root Pruning

- Engage a qualified professional such as an arborist to perform root pruning.
- Determine the exact location, depth, and method of root pruning on a project-specific basis. Different root pruning methods include: Hand Root Pruning, Mechanical Root Pruning, and Supersonic Air Tool (SSAT) Root Pruning. See Figures 2 and 3.
- Prune roots where designated on the tree protection plan. General description of situations where root pruning should be considered include: grade cuts, edge of LOC, foundation installation, utility installation, etc.
- Hand-prune roots over 1" diameter within CRZs of significant trees. Review steep slopes, deep excavations and pavement/curb removal when open for hand root pruning during construction.



Figure 2. Example of SSAT root pruning.



Figure 3. Example of mechanical root pruning for tree protection.

Tree Protection Fencing

- Install tree protection fencing after root pruning and prior to commencement of construction or other activities (see Figure 4).
- Do not use plastic snow fence.
- Recommended fencing includes:
    - Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high

with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized-steel bases for supporting posts (NPS Standard).

- 4' high, 14-gauge welded wire fence mounted on 6' steel "t" posts spaced not more than 10' apart. Fence should be attached to posts using galvanized steel clips or aluminum ties.
- 6' high chain link fence fabric mounted on 8', 1.5"diameter galvanized steel pipe line posts. Corner posts should be 2" in diameter. Fence should be attached to posts using aluminum ties.



Figure 4. Example of tree protection fence at Pennsylvania State Capitol.

- Affix tree protection area signs to all tree protection fence no less than 30' apart around the perimeter. Never affix signs directly to trees.
- Coordinate silt fence installation as needed to enhance protection and avoid unnecessary root cuts by silt fence installation.
- Remove fencing only after all activities are complete and after approval of the Gardener Supervisor and NPS Maintenance Manager.

Silt Fencing

- Consider impacts to root system as a result of silt fence installation during the planning of erosion and sediment control measures.
- Where possible, consider alternative methods to silt fencing for sediment control. Such measures may include filter socks or trenchless silt fence.

Root Protection Matting (RPM)

- Utilize temporary matting to protect existing roots and soils from short term construction traffic or event-related vehicle impacts (see Figure 5).
- Engage a certified arborist to install or oversee installation of root protection matting.
- To prepare the site, remove any debris by hand and spread an even layer of wood chip mulch 4-6" thick over the entire area to receive matting.
- Install matting in a single layer on mulch.



Figure 5. Example of root protection matting.

Do not disturb or remove topsoil. Do not permit grubbing, grading, excavation or equipment traffic in the area to receive RPM. Minimize equipment travel on RPM after installation. Do not permit tracked equipment to turn on RPM in order to avoid damage.

Underground Utilities (Drilling/Tunneling vs. Trenching):

Underground utilities installed by the traditional trenching method can cause extensive damage to tree roots. Trees with severed roots can be unstable and may pose unacceptable levels of risk to visitors and workers. Careful planning the installation of electricity, water, and gas lines can minimize damage to tree roots and reduce potential risk. Drilling technology is now commonly used to dig tunnels for utility installations. Drilling vs. traditional trenching can preserve up to 40% of a tree's root system and can mean the difference between tree survival or tree decline and death, or at worst, tree collapse.

- Tunnel at least two feet below ground to avoid most roots that grow near the surface.
- Tunnel slightly to one side of the tree rather than directly below the trunk. The distance of the tunneling is dictated by the tree's diameter.
- Utilize the following guidelines developed by the Municipal Foresters of Northeastern Illinois:

Tree Diameter (at 4.5 feet above ground)	Minimum Distance From Tree to Start Tunneling
Less than 6 inches	Drip line of tree
6-9 inches	5 feet
10-14 inches	10 feet
15-19 inches	12 feet
More than 19 inches	15 feet

- Engage a certified arborist to oversee drilling and tunneling within tree's CRZ. Engage an experienced contractor to employ drilling or tunneling equipment.

TURF AND LAWN AREA

The Memorial grounds encompass large areas of turf grass. From a preservation perspective, turf grass, while it supports the character of the open landscape areas at the Memorial, is not itself a character-defining feature. The species of the grasses or groundcovers used could change from the existing, as long as the spatial qualities of the open areas are not altered. The character of the planting should be visually in keeping with the uniform and consistent Modern "form-world" of the Memorial, as depicted by Kiley/Saarinen.

From a use standpoint, there are high expectations for the quality of the Memorial's lawns, which receive much attention and heavy traffic as part of this high-profile urban park. Visitors and management alike expect the lawn beneath the Gateway Arch to have a carefully groomed appearance. Memorial maintenance staff expend great effort to maintain the grass at a high level of quality, and their efforts are evident in its lush and well-kept appearance.

To meet these expectations, Memorial maintenance staff use a larger amount of fertilizer, pesticides, aeration, and irrigation on the grass than is typical in the national park system. Though successful in the goal of maintaining the turf appearance, these practices may conflict with NPS-wide sustainability goals. The National Mall in Washington, DC is one of a few national parks with similar lawn maintenance issues.

The current high-maintenance turf grass care practices at the Memorial support, but are not integral to, the intended character of the designed landscape, which was never defined as a manicured lawn throughout the grounds. The recommendations that follow include consideration of alternative maintenance methods that better align with sustainable practices and retain the open character of the Memorial's lawn areas in a way that is compatible with the historic intent, while retaining a level of maintenance that will accommodate visitor and management expectations.

Goals for Appearance

In order to balance the goals of preserving the historic character, meeting visitor and management expectations, and sustainability, the following parameters are provided to guide the appearance of the turf grass in different areas of the Memorial grounds. These are generally aligned with, but not identical to, the former "Class A, B, C" turf management system.

These areas and their maintenance regimes are:

- "High profile" turf areas (along the east-west axis, and along the north-south axis at the triangles and teardrops)
    - Maintain uniform, carpet-like lawn area.
    - Keep grass short (2-3 inches tall).
    - Maintain lawn appearance as lush, green, and weed-free.
- "Moderate maintenance" (around pond areas, railroad open cuts, east side slopes, areas along walks)
    - Maintain a moderately uniform appearance, allowing for some variability for grass height and color.
    - Keep grass taller (4-5 inches tall) to preserve historic character and to provide erosion control.
    - Mow shorter paths within the meadow areas to direct visitors.
- "Less maintenance" turf areas (near maintenance facility and other areas away from heavy visitor use and views)
    - Maintain turf grass within broader parameters of uniformity, accepting a variety of grass height, color and plant variation.
    - Keep grass taller (minimum 4-5 inches tall, or taller).

Sustainability

The current high maintenance level of turf grass at the Memorial requires many practices that are directly or indirectly incompatible with NPS goals and policies promoting sustainability. Standard chemical fertilizers and pesticides contribute to polluted runoff, which affects the ponds as well as the urban storm water system and ultimately the Mississippi River. Overwatering by the irrigation system results in faster grass growth and increased mowing, which burns fossil fuels and contributes to urban air and noise pollution.

At the National Mall, NPS has begun to experiment with sustainable and organic lawn care practices in recent years. Consider contacting the NPS maintenance managers at the National Mall to discuss

potential ideas and learn about their successes and lessons learned (see, for instance, http://www.beyondpesticides.org/dailynewsblog/?p=205).

Seed Mixes and Climate

In the past, a special "Arch Grounds Seed Mix" was created for the Memorial, marketed throughout the Midwest based on the success of the turf. Challenge in turf establishment and ability to thrive include the site's poor soil and an inadequate irrigation system. This mix of bluegrass and fescue was originally chosen for the park because it is more tolerant of shade so the same grasses could be used throughout the landscape.

St. Louis lies within a climate transition zone where it is difficult to grow grass successfully. Cold winter temperatures are a challenge to maintaining warm-season grass species, and hot summers are likewise challenging for cool-season species. Warm-season grasses such as Bermuda and zoysia require a lower level of pesticides, fertilizers, and irrigation, but are also typically intolerant of shade and go dormant in winter; some require fungicides to control disease.

Grass that is allowed to grow taller usually has a denser root zone, which is key to erosion control. Cutting grass below a certain height will prevent root growth for nearly three weeks, which prohibits the roots from establishing a interwoven network which will hold sloped soil in place. For example, grass cut to 50% of its height will not have any impact on root growth. grass cut to 70% of its height, however, will stop 70% of the root growth for 17 days. grass cut it to 90% of its height will halt 100% of the roots from growing for a period of 17 days (USDA, Soil Conservation Service, 1971).

Turf Maintenance Recommendations

- For optimal root growth, remove no more than 1/3 to 1/2 of the grass height.
- Continue to maintain the existing cool season grasses in the shaded and lower-use areas and transition to warm-season grasses such as bermuda or zoysia in the open, sunny areas, overseeded with ryegrass to provide color in the colder months. As part of seasonal maintenance, evaluate nitrogen use level on all lawn areas throughout the Memorial landscape and determine where nitrogen use can be reduced in lower-use and lower-visibility areas. Based on current sustainability standards, only use in excess of 1 pound of actual nitrogen per 1,000 square feet annually on "high profile" turf areas.
- "High profile" turf areas are generally located away from trees. In "moderate maintenance" and "less maintenance" turf areas, which include the areas around trees and on slopes, use fertilizer more sparingly (less than 1 pound per 1,000 square feet annually). On slopes, increase erosion control by allowing grass to grow longer (4-5 inches, as noted above)and define a buffer zone to prevent runoff into the ponds.
- Consider reducing the amount of fertilizer or pursue alternative strategies (such as improved erosion control and/or a buffer area of taller grass) on the slopes around the ponds. See the discussion of groundcover on page 1-33 for more information on fertilizer alternatives. In addition, consider measures to reduce fertilizer runoff into the park-wide storm drain system, which also feeds into the ponds.
- Maintain lawns without conventional pesticides and fertilizers, if possible. In fact, organic methods have been undergoing testing at the National Mall in Washington, DC, including

some of the following. Consider integrating the following practices/products at the Memorial:

- Consider applying compost and compost tea (liquid compost mulch) to improve soil in lieu of chemical fertilizers on at least part of the grounds.
- Prepare an Integrated Pest Management (IPM) plan that includes strategies to reduce pesticide use. All turf grass should be managed as part of Integrated Pest Management practices.
- Use aeration to reduce compaction (Especially along walks in "high priority" turf areas) and improve growing conditions. While aerating or tilling, compost can be added to the soil.
- Continue to test new grass seed mixes as they become available in appropriate locations. Emphasize native/regionally adapted species.
- In "less maintenance" turf areas, consider seasonally reduced maintenance effort where lawn dormancy is accepted as part of normal seasonal changes. Adapt the following sustainable best management practices to suit the cultural needs of the specific grass species in use.
  - Avoid mowing the grass too short .
  - Time mowing to occur at the widest acceptable interval to minimize the amount of mowing.
  - Consider using smaller mowers where possible, hand-trimming where feasible, and replacing gas-powered mowers with propane-powered mowers.
  - When chemical applications are necessary, continue to use ultra-low volume sprayers.
    Make maintenance adjustments with the goal of reducing water and fertilizer use wherever feasible.

SOIL MANAGEMENT

Sustainable management of the soil composition should focus on creating a beneficial environment for plant species to thrive. Soil will have to be managed according to its key plant species' needs. The goal of management is to create and maintain the optimal soil system for that species' long-term health. Soil management promotes longevity of the existing trees that form character-defining plantings of the Memorial landscape. Soil compaction is detrimental and universal to urban trees. Correcting soil compaction increases aeration within the soil and reduces soil bulk density which provides better conditions for root growth. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines* (Watson, G. and Himelick, E., 1997) compares methods, treatments, and results for improving compacted soil structures. Recommendations to reduce soil compaction should include: applying organic mulch, vertical mulching (see Figure 6), soil removal & replacement, soil fracturing, and soil disruption.



Figure 6. Example of vertical mulching.

- Use soil samples, taken in Fall 2009, as a baseline for the long term goal of improving soils (see Appendix for more information).

- Apply soil amendments during new tree plantings and planting beds (see Appendix for more information).
- Test soil every 3 years or as specific tree issues indicate soil problems.
- Track soil amendments in the Work Requirements Table located in Section 3 of this report.

Soil testing guidelines for individual tree species are detailed in the Historic Character Recommendations for Woody Plants (found in Section 6 of this plan). In addition, management of each planting should be based on an understanding of the biological, structural, and chemical components of the soil, as follows.

  - **Management of soil biology** addresses the complex web of organisms that exist in the soil under ideal conditions. This approach measures the percentages of these organisms at the Memorial against the ideal percentage for a particular tree species and geography, and acts to increase the presence of beneficial organisms toward the ideal balance. In doing so, soil biology will use natural systems to improve soil structure, nutrient availability, and water retention through the organisms and their individual natural processes.
  - **Management of soil structure** addresses the soil texture, pore space, and related water and oxygen availability needs of plants and trees. When soil structure is poor, trees and plants may not be able to take in enough oxygen or water from the soil to support essential processes such as respiration and transpiration. This may cause a decline in tree health and longevity, as well as stress, which leads to increased insect and disease problems.
  - **Management of soil chemistry** addresses the nutrient and abiotic needs of tree species. A qualified professional should measure factors such as pH, macronutrient availability, and micronutrient availability, as well as potential pollutants in the soil. Annual testing and remediation to match specific tree species' needs is important, particularly with species with low tolerance for a variety of soil chemistry factors.

- Base all soil treatments on the results of soil analysis, and its assessment by a qualified professional familiar with each key species and their locations. Any fertilization should be consistent with the recommendations of the most current edition of ANSI a-300 (part 2) Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Fertilization) 2004.
- Do not exceed fertilizer application rates of 1 pound of actual nitrogen per 1,000 square feet annually.

MULCH

"[Mulching is] the most important post planting practice that you can do to improve the health and vitality of your landscape plants. Research has shown that wood chip mulch can nearly double plant growth in the first few years after planting." (University of Nebraska Lincoln Extension, 2004)

Mulching provides many benefits to the landscape, such as erosion control, moisture retention, moderation of soil temperatures, and improved soil structure (due to decomposition). Use of mulch and its appearance were not addressed in the original designs by Kiley and Saarinen, but it



Figure 7. Fibrous root condition under grass vs. root condition under mulch.

has come into use on the Memorial grounds in recent years based on modern arboricultural standards that recommend mulching within the root zone for long term health. Figure 7 shows the difference in fibrous roots under a mulch covered soil verses fibrous roots when in competition with grass. This depicts the importance of mulching for long term sustainable health of trees. Double shredded hardwood mulch, with aging of 6 months or more, provides the best benefit to trees. A thin layer of organic mulch may lead to an increase of weed growth because of the organic decomposition.



Figure 8. Sketch showing the root structure of mature trees.

- In efforts to reduce the cost of mulch and employ best management practices, stockpile the wood chips from on site tree removals and tree pruning to be used as mulch.
- Wherever mulch is used, follow these recommendations:
    - Install mulch to a depth of 3".
    - Engage a qualified arborist, horticulturalist, landscape architect, or landscape professional to review any mulch selections to ensure the proper balance of microorganisms, and to guard against supplies that may be tainted with pests or disease organisms.
    - Mulch should not come in contact with the trunk of trees or woody plants in order to protect the base of the tree (also referred to as the basal area) from associated problems.
- When preparing a new landscape bed or new tree planting, mulching is one of the last steps. Removing grass and weeds should be one of the first actions completed. Techniques to reduce the growth of grass within mulched areas include:
    - Apply coarse mulch to a depth of 6" (sustainable technique).
    - Apply of preemergence herbicides.
    - Apply of postemergence herbicides.
    - Combine preemergence herbicides, postemergence herbicides, and coarse mulches.

ROOT INSPECTIONS

Roots provide structure, water and nutrient absorption, and energy storage for all the above ground parts of a tree. In addition, they form complex symbiotic relationships with soil organisms that take time to recreate. Without a healthy root system, plants and trees may become pre-disposed to multiple stress factors and eventual decline. Management of trees and plants at the Memorial must consider the importance of the root zones of each key species, and ensure all impacts, from mowing to grade changes, are managed to perpetuate the existing roots and soil ecosystem. Even minimal grading or trenching can have a major impact on a tree's root system. (Harris, Clark, & Matheny, 2004)

TREE CONDITION MONITORING INSPECTIONS

As of 2010, staff monitored physiological and structural tree health annually and as needed. Tree risk assessments were conducted annually using the NPS Hazard Tree Form. Monitoring for clearwing borer occurred weekly throughout the months of April-September. Other pest issues were monitored when it coincided with the appropriate time of year. Day to day observations were written on a "working map" and entered in to database as time permitted.

- Utilize a GIS database system to monitor physiological and structural health, soil conditions, and aesthetic changes. The software stores and analyzes data, and documents notes and photographs.
- Place data on handheld devices such as PDA's (Personal Digital Assistant) that may be updated during the actual inspection, and downloaded or synchronized with the master database (A description and comparison of various tree management software can be found in the Appendix.)
- Update the maintenance log or tree inventory with observations and recommendations subsequent to each inspection.



TREE REMOVAL

- Drive trucks and mechanized equipment on pavement only in order to protect tree roots. Where vehicles must drive across landscape, turf, or root zones, use protection such as ground protection mats or RPM (geotextile-and-mulch systems).
- Grind stumps in turf/landscape areas to grade level. Use small machines specifically designed for stump grinding (See Figure 9). Do not excavate stumps unless no other alternative will suffice. Take care to minimize damage to adjacent trees roots.
- Depth of ground stump depends on a few variables including the location of tree to be removed, the location of tree to be planted, the size of tree to be removed, and the size of tree to be replanted. Guidelines are provided below; however, best judgment is required. No stump grinding or excavation should begin without first identifying any underground utilities with park staff and ONECALL.

Figure 9. Stump grinding.

    - Trees in turf to be replanted:
        - Plant new trees in the same proximity as the tree stump. Grind stump 8"-12" in depth.

        - If exact replacement location is required, grind trees stump as deep as required, potentially 18" in depth and 24"x24" length and width. If stump grinding is not appropriate, the tree stump may be excavated. Keep all excavation equipment on RPM. Ensure that equipment operator is aware of the objective to mitigate damage to adjacent tree roots.
    - Trees in turf not replanted:
        - Tree stump to be ground 8"-12" in depth.
    - Trees in sidewalk tree pits:
        - Remove existing trees by excavation. Ensure that equipment operator is aware of the objective to mitigate damage to adjacent tree roots.

TREE PLANTING

- Refer to *ANSI A300 and ANSI Z60.1* or the most current edition for industry's planting standards.
- When planting replacement trees, planting season is fall and early spring. Some studies demonstrate that trees planted in the fall outperform those planted in the spring because the soil is warmer, there is less daylight for transpiration, and there is more time for the roots to establish. Refer to Chapter 6, Historic Character Recommendations for Woody Plants, for tree-specific planting recommendations.

New woody plants will typically come in 3 forms: balled and burlapped (B&B), container grown, and bare root; each type has specific planting guidelines.

- Store any plants (regardless of the container) on site prior to planting in a cool, shady location and water regularly.
    - Balled and burlapped (B&B)
        - Remove excess soil on top of the root ball.
        - Proper planting depth requires the root flare to be at or slightly above finished grade.
    - Container grown
        - If girdling roots are found, prune to correct root structure.
    - Bare root
        - Consider planting bare root trees, as bare root trees can contain up to 200% more roots than B&B and container trees (Nina Bassuk, 2000).
        - Specify trees to be delivered within 24 hours of digging. Dip roots in hydrogel or soak roots in water for 12-14 hours before planting.
        - See the list of identified onsite trees recommended or not recommended for bare root plantings.

- Trees recommended for bare root planting:

  Ash *(Fraxinus* spp.*)*

  Crabapples *(Malus* spp.*)*

  Honeylocust *(Gleditsia triacanthos inermis)*

  Linden *(Tilia* spp.)

  Sugar Maple *(Acer saccharum)*

  Red Oak *(Quercus rubra)*

- Trees not recommended for bare root planting :

  Hawthorn (*Cratagus* spp.)

  Hackberry (*Celtis occidentalis)*

  Ginkgo (*Ginkgo biloba)*

Proper planting techniques for all new trees include:

- Preparing the planting hole:
  - Dig a hole at least two times the diameter of the container or root ball.
  - For bare root trees, dig a hole large enough to support the tree without crowding the roots.
  - Do not create glazed sides on a planting hole. A shovel or auger can compact the soil and create an impenetrable barrier for tree roots.
  - Roughen the sides and bottom of the hole in order to mix the soils and provide access for young developing roots to grow.
  - Refer to Figure 10 and to the appendix, which illustrate the recommended proportions of the planting hole. When compacted, soils are closer to the root ball and may cause the roots to circle within the planting hole. This results in poor root structures and potentially girdled roots.
  - After the hole is dug, apply soil amendments.

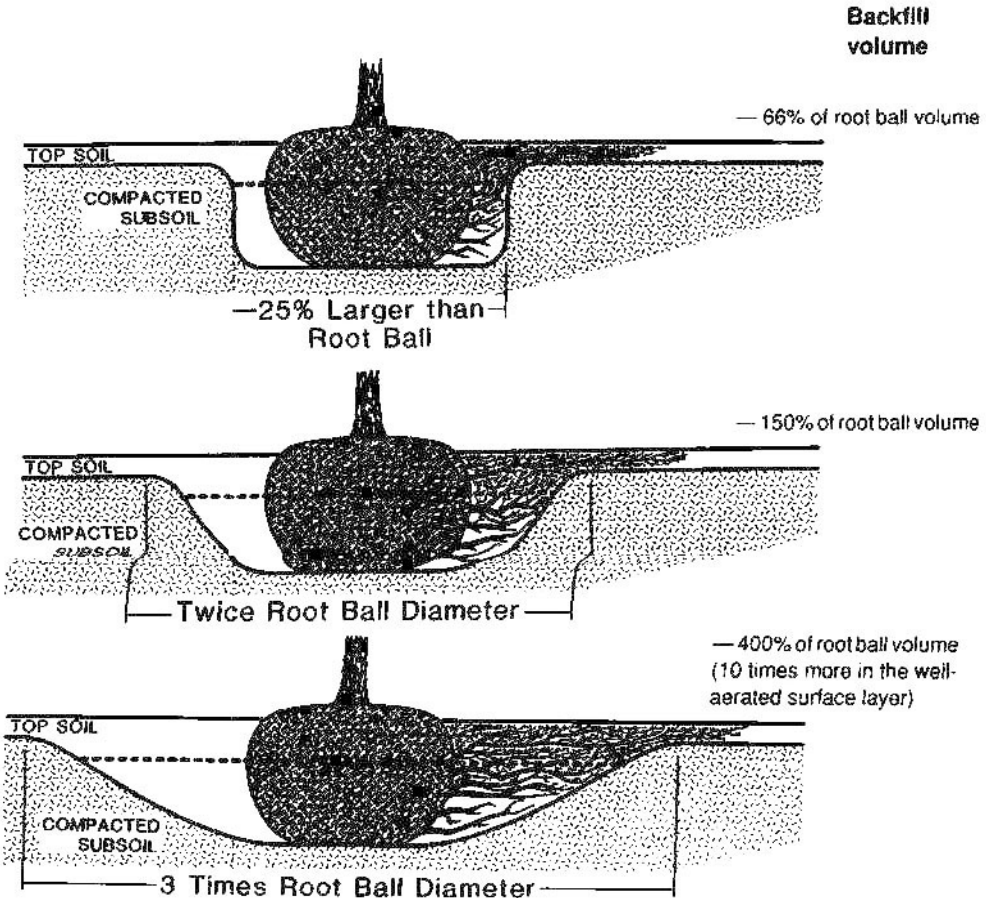


Figure 10. Tree pit backfill volume diagrams. (Watson & Himelick, 1997)

- Determine the appropriate relationship of the tree to the planting hole size.
  - Identify the first lateral root; prune any girdling roots.
  - Place tree into planting hole with the top surface of the first lateral root just visible at soil surface.
  - Adjust height of hole as needed.
- When planting on a hill follow the guidelines below (see appendix for illustration):
  - Create a small swale on the uphill side of the tree to collect and divert runoff water around the tree.
  - Place first lateral root just visible at the backfill soil surface.
  - Planting hole should be 2-3 times the root ball.
  - Roughen/loosen sides of planting hole
  - Create soil hump to make a level surface for the planting hole.
  - Staking may be required on both sides. Uphill staking may require 2 stakes.

- Backfill Soil
  - Existing topsoil may be used if approved after soil testing. If imported topsoil is being used, use loamy soil with 1.5% dry weight organic matter, free from subsoil, refuse, roots, heavy or stiff clay, stones larger than 25mm, noxious seeds, sticks, brush, litter, and other deleterious substances. The pH value should typically be between 5.5 – 6.5 (ISA) unless otherwise specified on the tree cut sheets.
- Staking
  - The need to stake trees depends on trunk strength, tree species, expected site weather conditions, and planting location. A general guideline is to support bare root trees larger than 8' high and container and B&B trees 6' high or 1" DBH. (Evans, 2000)
  - Container and B&B support staking requires two stakes to be driven 18" into the ground approximately 1' on opposites sides of the tree. Stakes should be roughly two-thirds the height of the tree after being driven into the ground. In order to protect the trunk of the tree, cover the 12 gauge wire with a rubber hose. Loosely loop rubber-covered wire around the trunk and securely attach the wire to the stakes.
  - Bare root staking requires one stake driven into the ground on the southwest side before the tree is planted. Stake should be 2-4" away from the trunk of the tree and should be three-fourths the height of the tree (See Figure 11). (Evans, 2000)
  - Remove stakes after one growing season.

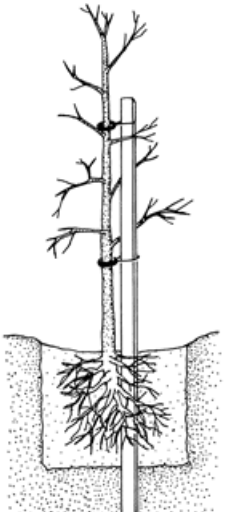


Figure 11. Bare root staking.

- After-Planting Care
  - Watering
    - Keep soils moist; apply approximately 1-2" of water per week (5-10 gallons per week). (University of Nebraska Lincoln Extension, 2004) (University of Nebraska Lincoln Extension, 2004)
    - Do not overwater.
  - Pruning
    - Remove only damaged or dying branches during planting.

TREE PRUNING

Pruning efforts should consider risk reduction and its potential impact on the design intent of the tree's location and use. The objective of pruning may differ for a species or for individual trees. Some pruning practices may not be appropriate for all tree species. Pruning properly has many benefits, just as improper pruning causes damage to trees. See the tree inventory table for guidance regarding the planting with which individual trees are associated (listed under "Feature" column); refer to the related entry on Table A: Feature and Condition for details about character, and Table B: Work Requirements for guidance on appropriate pruning where applicable.

- Prune in conformance with current ANSI A300 standards and ISA best management practices.
- Install support cables in conformance with current ANSI A300 standards and ISA best management practices. Decisions about cabling should be made on a tree by tree basis utilizing overall tree health and potential benefits criteria.
- When undertaking foliage removal, do not exceed 25% of the total live canopy volume of any tree in a single season.

Types of Pruning:

These pruning types are referred to in Section 6, Historic Character Recommendations for Woody Plants, under the "Pruning" entry for each tree.

- **Structure pruning:** Pruning to influence the orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems.
- **Pruning to clean:** Selective pruning to remove dead, diseased, and broken branches and foreign objects. All selective pruning specifications shall be prescribed with a minimum diameter branch/twig for attention.
- **Pruning to thin:** Selective pruning to reduce the density of live branches. All thinning specifications shall be prescribed with a maximum percentage of density reduction; and shall not exceed 25%. Current health and condition should be taken into account for any reduction of more than 10% of the live canopy.
- **Pruning to raise:** Selective pruning to provide vertical clearance. All crown raise specifications shall provide a set distance above a specific feature in order to ensure appropriate treatment.
- **Pruning to reduce:** Pruning to decrease height or spread on entire tree or one section. All crown reduction specifications shall provide a set distance below a specific feature in order to insure appropriate treatment.
- **Pruning to restore:** Pruning process to improve the structure of a tree that was previously topped, damaged, vandalized, lion tailed, or over thinned. (International Society of Arboriculture, 2002)
- **Design driven pruning:** Pruning to maintain or rehabilitate a specific character-defining feature; pruning style may differ from standard recommendations or arboricultural norms . See Historic Character Recommendations for Woody Plants (Section 6 of this plan) for appropriate pruning methods.

Typical Pruning Recommendations based on the age of the tree:

Young Trees

Pruning Objective: To maintain health and structure, improve views, and maintain role of individual tree within designed planted form.

Pruning Types: Structural Prune, Prune to Clean, Prune to Raise, Prune to Shape.

Medium Aged Trees

Pruning Objective: To maintain health and structure, improve views, and maintain role of individual tree within designed planted form.

Pruning Types: Structural Prune, Prune to Clean, Prune to Thin (Prune 10-15% Canopy Crown not to exceed 25%), Prune to Raise, Prune to Shape (not to exceed limbs greater than 4").

Mature Trees

Pruning Objective: To maintain health and structure, improve views, and maintain role of individual tree within designed planted form.

Pruning Types: Prune to Clean, Prune to Thin (Prune 10-15% Canopy Crown not to exceed 25%), Prune to Shape (not to exceed limbs greater than 4").

Design Driven Pruning

Pruning Objective: To maintain the form and the role of the individual tree within the larger plantings; and maintain the character-defining features of the Memorial's landscape through the appropriate care of planted form.

Pruning Types: See the appropriate tree cut sheets for specific design driven pruning styles.

GROUNDCOVER MANAGEMENT AND EROSION CONTROL STRATEGIES

Groundcovers are not a character-defining vegetation feature at the Memorial grounds. Kiley's plan and description of his design did not include the use of groundcovers aside from portraying generally open areas with grass or similar low vegetation; species were not defined. Today, some areas on slopes and shaded locations suffer from erosion and are difficult places to grow grass. Shade-tolerant groundcovers are a feasible planting alternative in these locations that will not substantially alter the character of the space.

Before an implementation project or the design competition addresses larger problems with erosion at the Memorial, groundcovers should be considered for use as a strategic, temporary interim solution to control or reduce erosion on steep slopes. Erosion on the steep slopes around the ponds has been a persistent problem at the Memorial, one that the use of shade tolerant groundcovers may be able to address and correct. The ideal groundcover at the Memorial would be an evergreen species with a strong root system and a low profile.

Groundcover management at the Memorial presents challenges. Because of their dense, low growth habit, groundcover plantings often become habitat for rodents and other pest species on urban sites. Integrated pest management is essential to sustainable groundcover management. An Integrated Pest Management (IPM) plan should be considered as the Memorial continues to integrate sustainability into its management practice. Other sustainable groundcover management practices include, in addition to the development of an IPM plan, hand removal of weeds within the groundcover beds (performed systematically during different growing seasons) and the targeted use of organic pesticides.

- Consider removal of invasive groundcover plants such as Euonymus or Bulgarian ivy.
- Aggressively prune groundcover plantings to prevent their growth on structures or over walks, or climbing into trees.
    - Prune as needed to remove damaged or dead stems, which should be cut away and removed.
    - Prune in the late winter or early spring.

- If aggressive pruning is unsuccessful, establish a buffer zone (e.g. a strip of approximately 2' in width, planted in lawn) between groundcovers and contributing features to contain the ground cover and prevent damage and staining to contributing features.
- Test width of buffer zone to determine appropriate dimensions for prevention of damage to contributing features.
- If efforts to contain groundcover are unsuccessful, consider removal and replacement with another evergreen groundcover.
- If groundcover needs to be replanted, clear all existing groundcover from the area, then add humus and compost to the soil for aeration before replanting.
- Amend soils to suit the needs of the plant.
- Plant test plots of different species on the slopes to ascertain which will fare best in the Memorial's particular conditions.
- When the best performing species is identified, remove test plots and establish uniform plantings of a single groundcover.
- Before planting any new areas of groundcover, consult with a historical landscape architect to confirm the plan meets the historic character goals of the CLR.
- Groundcovers should be installed to be as visually unobtrusive as possible. Plant only a single species in each area and maintain the edges of the planting in a manner that aligns with existing features such as walk edges. Maintain groundcover bed edges in gentle curving forms that align with the topography, such as running perpendicular to the slope.
- Do not create a highly visible new line or pattern on the landscape.

Suggestions for temporary stabilization of shady slopes include the following low-growing, shade-tolerant, spreading groundcovers:

- Grow-low (*Rhus aromatica* "grow-low")
- Partridge berry (*Michella repens*)
- Bearberry (*Arctostaphylos uva-ursi*)
- St. John's wort (*Hypericum sp*.)
- Coral berry (*Symphoricarpos orbiculatus*)

INSECT PESTS AND DISEASES

A detailed IPM plan specific to the Memorial grounds should be developed. An IPM plan is a valuable tool to support maintenance and protection of contributing vegetation and structures as well as enhance the visitor experience. Any IPM plan should comply with *NPS Director's Order 77-7: Integrated Pest Management*. The chart below lists major tree species at the Memorial, and the pests and diseases known to affect them in the greater St. Louis area; these should be considered for specific inclusion in an IPM plan.

Species	*Targeted Pest/Disease*
Ash, 'Rosehill'	Emerald Ash Borer (EAB); Ash-Lilac Borer; Blackheaded Ash Sawfly, Bacterial Leaf Scorch (BLS)
Baldcypress	-
Birch, River	Birch Leaf Miner (BLM); Dusky Birch Sawfly
Birch, River 'Heritage'	Birch Leaf Miner (BLM); Dusky Birch Sawfly
Blackgum	-
Coffeetree, Kentucky	-
Corktree, Amur	-
Crabapple, Profusion	-
Crabapple, Radiant	-
Crabapple, Robinson	-
Crabapple, Snowdrift	-
Dogwood, Flowering	Dogwood Borer
Dogwood, Pagoda	-
Ginkgo	-
Hackberry, Sugar	-
Hawthorn, Washington	Lacebug (LAC); Mealybugs
Hawthorn, Winter King	Lacebug (LAC); Mealybugs
Honeylocust	Honeylocust Mite; Honeylocust Leafhopper
Linden, Greenspire	Japanese Beetle
Magnolia, Saucer	Magnolia Scale (MGS)
Magnolia, Sweetbay	Magnolia Scale (MGS)
Maple, Red	Cottony Camellia/Maple Scale
Maple, Sugar	Cottony Camellia/Maple Scale

Oak, Bur	-
Oak, Red	Bacterial Leaf Scorch (BLS); Oak Wilt; Obscure Scale
Oak, Swamp White	-
Pagodatree, Japanese	-
Pear, Bradford	-
Pear, Redspire	-
Pine, Japanese Black	Pine Needle Scale (PNS); Pine Sawflies (SAW); Sphaeropsis Tip Blight (DIP); Bark Beetles; Bark Adelgid; Pine Spittlebug; Pine Tortoise Scale; Pine Webworm; European Pine Shoot Moth
Pine, Red	Pine Needle Scale (PNS); Pine Sawflies (SAW); Sphaeropsis Tip Blight (DIP); Bark Beetles; Bark Adelgid; Pine Spittlebug; Pine Tortoise Scale; Pine Webworm; European Pine Shoot Moth
Redbud, Eastern	-
Sweetgum	-
Zelkova	-

Other common pests and diseases typically affecting woody plants in the region include, but are not limited to, the following:

- Aphids (APHID)
- Bark Beetle
- Borer (BOR)
- Fall Webworm Caterpillar (WEB)
- Gypsy Moth Caterpillar (GMA)
- Japanese Beetle (JAP)
- Lace Bugs
- Lecanium Scale
- Oystershell Scale
- Spider Mite (MIT)

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2. TABLE A: FEATURES AND CONDITIONS

Table A: Features and Conditions

Vegetation

CLR Feature Name	*Component*	*Contributing Status*	*Key characteristics and notes about historic character*	*Condition summary*
Baldcypress Circles	North and south baldcypress circles	Contributing	Each of these two densely-planted conifer circles has an opening which frames views of Gateway Arch across the ponds. Both are elements of the original Kiley planting plan; the current trees were planted in 1980.	In general, the trees in the circles are in good condition. Branches extend out into the Arch view. There is some damage to tree bark on the trunks and knees by mowers and visitors. (CLR, May 2010)
Street edge plantings	Baldcypress street tree planting along Leonor K. Sullivan Boulevard	Non-contributing	Compatible. Not the same as Kiley's intended planting. Added later, but are in keeping with Kiley's overall concept.	These trees are in good condition generally; some bark damage from vehicular collisions. These trees are well suited to the flood area by the levee. (CLR, May 2010)
Street edge plantings	Plantings along Memorial Drive	Non-contributing	Compatible. Not the same as Kiley's intended planting. Added later. The trees along the Memorial's northwestern edge consist of clumps of hawthorn, river birch, magnolia, and eastern redbud. To the southwest, Rosehill ash trees line the Memorial's perimeter. The plantings around the Old Cathedral parking lot were modified in 1994, and did not retain the same number of trees or replace any of the Japanese black pine from the original planting. Several trees were removed from this area in 1997 and again circa 2003 with the installation of security cameras and bollards. (CLR, May 2010)	These trees are generally in good condition.
Street edge plantings	Tree and shrub planting along Washington Avenue	Non-contributing	Incompatible. The tree and shrub plantings along Washington Avenue were installed in 2009 by Metro and Laclede's Landing. These plantings include London planetree, English oak, European hornbeam, doublefile viburnum, and are dissimilar to those present in the Memorial landscape.	Newly established plantings, appeared to be in good condition in October 2009. The existing plantings do not reflect the design intention for Washington Avenue. (CLR, May 2010)
Street edge plantings	Tree plantings along Poplar Street	Non-contributing	Compatible. Not specified in Kiley's planting plan. Added later. In 2009, several species of trees that were new to the Memorial were planted along Poplar Street in order to test their hardiness. These include varieties of Norway Maple (*Acer platanoides* 'Emerald Queen') and hackberry (*Celtis occidentalis* 'Prairie Pride') along with two new species, Homestead elm (*Ulmus* 'Homestead') and Arnold tulip poplar (Liriodendron tulipifera 'Arnold').	Newly established plantings.
Single-species allées	Single-species allées	Contributing	The allées reflect Saarinen/Kiley design concept of uniform planting with precise alignment and close spacing along the walks. Curving formal walks enclosed by uniform, regularly spaced massing of trees are character-defining. The allées shape the views along the system of walks, especially views to the Gateway Arch. The uniform height of the allées creates an undulating line in the landscape that is apparent from the entrances to the Memorial. They are planted partly within the edges of the walks, 30 feet apart, and along the outside of the walks in a third row, as well as an additional row within the rest areas. The rows are alternating, with trees 16 to 20 feet on center.	The allée plantings of Rosehill ash trees are in fair condition. By 2009, 150 missing ash trees had not been replaced due to concerns about their susceptibility to the emerald ash borer. Gaps in the planting change the feeling of continuity. The trees' conditions are also affected by the grates which surround them. Some trees have been girdled by the grates. (CLR, May 2010)
Pond area plantings	Trees	Non-contributing	Compatible. The plant composition around the ponds does not reflect Kiley's design concept of a limited plant palette, forming distinct areas of abstracted forest and meadow, but are scattered as individual and small groupings of trees across the landscape. However, the existing trees and lawn are not intrusive. The pond area character is defined by the sinuous curved edge of ponds, undulating topography, the reflected image of Gateway Arch in water, and enclosure by trees. (CLR, May 2010)	Good condition.
Pond area plantings	Baldcypress groves	Non-contributing	Compatible. These small groves set into the curvilinear edge of each pond along its western edge are similar to what is shown on the Kiley planting plan for the pond edges.	These groves are in good condition; however, mulch rings beneath the trees are not in keeping with historic appearance/intent. (CLR, May 2010)
Pond area plantings	Small tree groups in lawn areas	Non-contributing	Compatible. While the plant composition around the ponds does not reflect Kiley's design concept of a limited plant palette, forming distinct areas of abstracted forest and meadow, the small groups of 3 to 7 trees in lawn are not intrusive. They include numerous species: bur oak, swamp white oak, sugar maple, red maple, linden, hawthorn, Kentucky coffeetree, river birch, honeylocust, Bradford pear, Japanese pagodatree, saucer magnolia, eastern redbud, and several varieties of crabapple.	Good condition.

CLR Feature Name	*Component*	*Contributing Status*	*Key characteristics and notes about historic character*	*Condition summary*
Pond area plantings	Ground cover - mulch rings	Non-contributing	Incompatible. Kiley's design drawings and concept do not show crisp circular mulch rings and manicured lawn in this area.	Each tree in the lawn areas around the ponds is generally encircled with a mulch ring - these appear to be in fair to poor condition and require a high level of maintenance. (CLR, May 2010; field observation, April 2010)
Pond area plantings	Lawns in pond areas	Non-contributing	Compatible. Manicured lawn is park-like. The Kiley concept drawings show a texture of taller meadow-like grass mown lower around the pond edge, which was never implemented. The lawn grasses in these areas are less intensively manicured than those in the main axis and adjacent to walks. Allows open views to and across ponds, and to the Gateway Arch.	Some erosion due to low grass cover on steep slopes and runoff. Slopes make mowing challenging. (CLR, May 2010; field observation, April 2010)
Railroad open cut and tunnel plantings	General	Non-contributing	Compatible. A few of the original trees have been retained, but most of these areas have been substantially altered. Existing vegetation (primarily open lawn with scattered individual trees and groups of small trees) does not reflect the character of the Saarinen/Kiley concept planting plan, which called for dense evergreen screening with a few flowering trees for contrast. (CLR, May 2010) The plantings on both the south and north RR cuts have not been maintained due to pending repair work.	Fair to poor condition.
Railroad open cut and tunnel plantings	Tree plantings on slopes of southern-most railroad cut (east of Grounds Maintenance Building)	Non-contributing	Compatible. Plantings do not closely represent Kiley plan for dense screening; while they were planted densely, tree mortality has resulted in transition to open lawn with scattered trees. The western slopes of the southern railroad open cut are planted with lindens and Japanese pagoda trees.	Fair condition.
Railroad open cut and tunnel plantings	Groundcovers above tunnel entrances	Non-contributing	Compatible. Character and plantings were not specifically identified by Kiley. Groundcovers over the railroad tunnels include pyracantha, Bulgarian ivy, and daylilies.	These plantings are in fair condition. The ivy is growing over some of the tunnel entrances, as well as climbing trees. (CLR, May 2010) Lack of shade in some areas has caused difficulty for shade-loving species.
Railroad open cut and tunnel plantings	Lawn plantings along slopes of open railroad cuts	Non-contributing	Compatible. Lawn was not specifically identified here by Kiley, as trees were intended to be planted more densely than their current condition. The lawn grasses in these areas are less intensively manicured than in the main axis and adjacent to walks.	Fair condition. Some erosion due to low grass cover on steep slopes, runoff. Slopes make mowing challenging.
Plantings along east side slopes	General	Non-contributing	Compatible. Not densely screened by trees as in Saarinen/Kiley plan. Kiley proposed massed tree plantings along the eastern slopes of the railroad open cuts, which line Leonor K. Sullivan between the overlooks. These slopes were planted between 1978 and 1979 with flowering dogwood, star magnolia, Arnold crabapple, black pine, and Bulgarian ivy. The planting followed the Kiley proposal closely.	Fair condition.
Service area plantings	General	Non-contributing	Compatible. Plantings generally reflect Saarinen/Kiley concept of screening the facilities from view. Current plantings are too sparse at Maintenance facility; many of the plants have also been replaced with different species. The maintenance facility is edged by scattered small trees in turf along the slope. The planting around the south service area is denser and more mature than those around the north service area. (CLR, May 2010)	Good condition.
Lawn areas	General	Non-contributing	Compatible. There is more lawn today than was called for in Saarinen/Kiley plan.	The lawn areas are resodded periodically and are in good condition throughout the Memorial. In some shaded, steep areas, erosion is occurring, and grass does not establish well. (CLR, May 2010)
Lawn areas	Lawn on primary axis of Memorial	Non-contributing	Compatible. The open axial view between Old Courthouse and the Arch is part of the Saarinen/Kiley plan and the presence of the manicured lawn allows for open view to be maintained.	This lawn is highly maintained and is in good condition.
Lawn areas	Lawn in north and south triangle and teardrop areas	Non-contributing	Compatible. There is more lawn today than was called for in Saarinen/Kiley plan. However, these areas were envisioned as open and the low, manicured lawn allows for open views to be maintained.	This lawn is highly maintained and is in good condition.

Structures

CLR Feature Name	*Component*	*Contributing Status*	*Key characteristics and notes about historic character*	*Condition summary*
North and south overlooks	North overlook	Contributing	Character-defining structures reflect “catenary curve” in the curved floodwall and staircase, monolithic appearance, and open views of river. Formal plazas and plinths intended to serve as open viewpoints situated above river and create finials of “pedestal” for Memorial as seen from the east; monolithic concrete structure designed with catenary curve segments.	Fair to poor condition. Spalling, cracking, and pieces of concrete falling from the floodwalls have been recurrent problems. The concrete along the walls is effloresing and crumbling in places. Nearly all the caulk in the expansion joints at the base of the wall and the mortar joints under the cap are failing. The joints where past repairs meet the original concrete are not all flush. A polymer-modified, cement mortar (Sika Top) applied to the surface of the viewing platforms is now cracking and peeling off the platform at the north overlook. Two small drains in the corners of the north viewing platform appear not to function. (CLR, May 2010)
North and south overlooks	South overlook	Contributing	Character-defining structures reflect “catenary curve” in the curved floodwall and staircase, monolithic appearance, and open views of river. Formal plazas and plinths intended to serve as open viewpoints situated above river and create finials of “pedestal” for Memorial as seen from the east; monolithic concrete structure designed with catenary curve segments.	Fair to poor condition. The paving appears to be separating from its foundation where the wall begins on the west side of the plaza. (CLR, May 2010)
North and south overlooks	North staircase	Contributing	Character-defining structures reflect “catenary curve.” The steps decrease in depth as the staircase rises.	Poor condition. The nearly one-inch-thick polymer-modified, cement mortar (Sika Top) used to repair the stairs is spalling and cracking, and has fallen off in places. (CLR, May 2010)
North and south overlooks	South staircase	Contributing	Character-defining structures reflect “catenary curve.” The steps decrease in depth as the staircase rises.	Poor condition. The nearly one-inch-thick polymer-modified, cement mortar (Sika Top) used to repair the stairs is spalling and cracking. The paving appears to be separating from its foundation where the wall begins on the west side of the plaza. (CLR, May 2010)
North and south overlooks	North floodwalls	Contributing	Character-defining structures reflect “catenary curve.”	Fair to poor condition. Vertical cracking was observed on the surface of the floodwalls. Approximately mid-way along the length of the wall, water seeping through vertical cracks was observed, some with unidentified residue and biological growth, indicating ongoing moisture problems. (CLR, May 2010)
North and south overlooks	South floodwalls	Contributing	Character-defining structures reflect “catenary curve.”	Fair to poor condition. Vertical cracking was observed on the surface of the floodwalls. Approximately mid-way along the length of the wall, water seeping through vertical cracks was observed, some with unidentified residue and biological growth, indicating ongoing moisture problems. (CLR, May 2010)
Railroad open cut walls and tunnels	North tunnel	Contributing	Walls and tunnel entrances conceal railroad line in the topography; geometry of concrete features reflects Saarinen’s catenary curve geometric form.	Good to fair condition. Some spalling and cracking of both the walls and the tunnels. Some staining and cracking on the concrete at the north entrance of the tunnel. (CLR, May 2010)
Railroad open cut walls and tunnels	South tunnel	Contributing	Walls and tunnel entrances conceal railroad line in the topography; geometry of concrete features reflects Saarinen’s catenary curve geometric form.	Good to fair condition. Some spalling and cracking of both the walls and the tunnels. (CLR, May 2010)
Railroad open cut walls and tunnels	North Open Cut Walls	Contributing	Walls and tunnel entrances conceal railroad line in the topography; geometry of concrete features reflects Saarinen’s catenary curve geometric form.	Good to fair condition. The metal drain pipes along the foot of the walls along the north railroad open cut appeared damaged, rusty, and degraded in many places. (CLR, May 2010)
Railroad open cut walls and tunnels	South Open Cut Walls	Contributing	Walls and tunnel entrances conceal railroad line in the topography; geometry of concrete features reflects Saarinen’s catenary curve geometric form.	Good to fair condition. Some spalling and cracking of both the walls and the tunnels. (CLR, May 2010)
Grand staircase	General	Contributing	Part of Saarinen/Kiley concept, though details such as tread-riser relationship were altered. Still supports the main axis and provides a monumental-scale access to riverfront. The central portion of the grand staircase was completed in 2003.	The grand staircase steps are in fair condition. The snow-melting mats installed in the 1980s function intermittently; typically every third step is active. The mat covers about six feet of stair adjacent to the north and south handrails. Some joints have failed on the stairs, and in some places there is evidence of shifting and cracking. The covered trench drains appear to be functioning. (CLR, May 2010)

Circulation

CLR Feature Name	*Component*	*Contributing Status*	*Key characteristics and notes about historic character*	*Condition summary*
System of Walks within the Memorial Grounds	Pedestrian walks	Contributing	Walk layout reflects Saarinen/Kiley design concept; their alignment is an important element of the overall site geometry. The aggregate surface material of the walks was not specified by Saarinen/Kiley, but its continuous surface is compatible with the design of the walks at the Memorial. Curving formal walks enclosed by uniform, regularly spaced massing of trees are character-defining.	Good to fair condition. The majority of the aggregate paving and the redwood in the expansion joints are in good condition. Some are in fair condition: areas of damage or deterioration are typically where larger trees are present in or adjacent to the walks, or at locations where drainage is poor, as well as at irregular expansion joints and junctures of paving. In some places the redwood spacers in the expansion joints have loosened or deteriorated, and in others the wood spacers have been replaced with thick bands of white caulk, which is also beginning to deteriorate. (CLR, May 2010)
Arch Entrance Ramps and Steps	Arch Entrance Ramps and Steps	Contributing	The entrance ramps leading to the visitor center were designed by Eero Saarinen & Associates and constructed in the 1960s. The concept of entering the Gateway Arch at the base was important because it dramatically affected the visitor experience.	Ramps are in good condition. They do not meet the Architectural Barriers Act Accessibility Standards (ABAAS). Safety problems associated with drainage and slipping have occurred at the ramps. The regrouted joints between the granite pavers are in fair condition. Some are leaching with visible layers of patching, and repairs have been made with bright white caulk. (CLR, May 2010)

Small-scale Features

CLR Feature Name	*Component*	*Contributing Status*	*Key characteristics and notes about historic character*	*Condition summary*
Tree grates	Tree grates	Non-contributing	Incompatible. Not in keeping with Saarinen/Kiley concept of levee block or cobbles around base of trees (shown in construction detail drawing, but never constructed). Maintenance problems, intrusive appearance.	The cast-iron tree grates are in fair to poor condition. The grates are difficult to maintain level due to improper installation (each rests on multiple slabs of concrete and/or on soil). The centers of the grates are routinely cut to accommodate tree growth. The grates not only require intensive maintenance, but their condition creates a tripping hazard for pedestrians. In some places the grates have become filled in with sediment, which has then spread across adjacent paving. The grates in many cases rest directly on top of the soil and root flares, causing compaction and poor drainage around the root system. Siltation and erosion exist in places where the tree grates meet the grass. (CLR, May 2010)

3. TABLE B: WORK REQUIREMENTS

Table B: Work Requirements

Baldcypress Circles

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	**To Be Updated by NPS For Recordation of Future Maintenance**					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Baldcypress Circles	View to Arch may be infringed on by growth of side branches at opening to circle.	Prune horizontal branches.	Seasonal, low urgency - as needed.	Prune horizontal branches.	Future inspections: check to ensure views of Arch are not infringed upon (every 6 months, spring and fall).	Views to Arch are important; framed by dense baldcypress trees, which enclose rest of the space.	Oct.-March.	ANSI A300 Part 1	20-Oct-10	SK, AF	***[to be added in future by Memorial staff]***	***[to be added in future by Memorial staff]***	***[to be added in future by Memorial staff]***	***[to be added in future by Memorial staff]***	***[to be added]***	***[to be added in future by NPS]***
Baldcypress Circles	Trunks are damaged by mowers and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees; feather edges into lawn to evoke forest-floor appearance, rather than sharp-edged mulch circles. Mow adjacent lawn with a walk-behind mower or a string trimmer.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Baldcypress Circles	"Knees" restrict ability to mow.	Protect knees with mulch.	Low urgency - as needed.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees; feather edges into lawn to evoke forest-floor appearance, rather than sharp-edged mulch circles. Mow adjacent lawn with a walk-behind mower or a string trimmer.	Annually in the fall; refresh as needed.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						

Street Tree Plantings

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	**To Be Updated by NPS For Recordation of Future Maintenance**					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Baldcypress street tree planting along Leonor K. Sullivan Boulevard	Trunks are damaged by vehicles and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Baldcypress street tree planting along Leonor K. Sullivan Boulevard	Trees are suceptible to seasonal flooding.	Clear sediment and debris from roots and tree wells after flood events.	As needed.	Remove mud and or debris from tree wells after flood events.	Inspect after flood events.		After flood events.	NA	20-Oct-10	SK, AF						
Plantings along Memorial Drive	Trunks are damaged by vehicles and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Tree and shrub planting along Washington Avenue	Trunks are damaged by vehicles and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Tree plantings along Poplar Street	Trunks are damaged by vehicles and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						

Single-Species Allées

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	**To Be Updated by NPS For Recordation of Future Maintenance**					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Single-Species Allées	Trunks of trees in lawn are damaged by vehicles and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Single-Species Allées	Trunks of trees in grates are damaged by vehicles, visitors, and grates.	Protect and monitor condition of trunks.	Critical, year-round.	Keep grates cut to maintain adequate clearance at trunk flare.	Check grates on trees within sidewalks to minimize trunk damage.	Grates are non-historic.	As needed.	NA	20-Oct-10	SK, AF						
Single-Species Allées	Low limbs interfere with pedestrian and vehicle movement and restrict visibility of Arch.	Maintain adequate clearance for pedestrians, service vehicles, and to maintain appropriate views of Arch.	Seasonal. Prioritize removal of low or hazardous limbs over walks.	Prune to maintain clearance and appropriate views of Arch.	Future inspections: check to ensure views of Arch are not infringed upon (once per year).	Maintain uniform clearance height and adequate clearance for views of memorial.	Oct.-March.	ANSI A300 Part 1	20-Oct-10	SK, AF						
Single-Species Allées	Bacterial Leaf Scorch (BLS) causing tree decline and death.	Monitor presence and consider removal as needed.	Critical, seasonal.	Remove declining trees that pose a hazard to visitors.	Continue to monitor seasonally.	Replace trees with acceptable species pending outcome of EAB EA.	March-Oct.	Bacterial Leaf Scorch - National Arboretum; Bacterial Leaf Scorch - University of Kentucky	20-Oct-10	SK, AF						
Single-Species Allées	Emerald Ash Borer (EAB) threatens survival of entire ash population.	Monitor presence of EAB and consider removal as needed. Coordinate response to EAB with other park planning efforts and processes that are addressing this issue.	Critical, seasonal.	Consider preventive measures such as soil injections or large scale removal of infected ash. Coordinate response to EAB with other park planning efforts and processes that are addressing this issue.	Cooperate with Missouri Department of Agriculture to provide trap sites, monitor traps and other ash trees.	Coordinate response to EAB with other park planning efforts and processes that are addressing this issue.	April-September.	USDA APHIS EAB Manual; EAB Treatment Guide	20-Oct-10	SK, AF						

Pond Area Plantings

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
											To Be Updated by NPS For Recordation of Future Maintenance					
General	Limb die-back occurs as trees age.	Prune horizontal branches.	Low urgency, annual.	Prune dead limbs, hazard limbs, and those blocking views to the Arch.	Future inspections: check for dead limbs, good tree form and adequate views to Arch annually.	Views to Arch are important and should be maintained in appropriate areas.	Fall.	ANSI A300 Part 1	20-Oct-10	SK, AF						
General	Trunks are damaged by mowers and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
General	Bacterial Leaf Scorch (BLS) causing tree decline and death on oaks.	Monitor presence and consider removal as needed.	Critical, seasonal.	Remove declining trees that no longer provide benefits	Continue to seasonally monitor every three months.	Replace trees with acceptable species.	March-Oct.	Bacterial Leaf Scorch - National Arboretum; Bacterial Leaf Scorch - University of Kentucky	20-Oct-10	SK, AF						
Baldcypress groves	Generally in very good condition.	Prune horizontal branches.	Low urgency, annual.	Prune horizontal branches.	Future inspections: check for dead limbs, good tree form and adequate views to Arch annually.	Views to Arch are important and should be maintained in appropriate areas.	Spring and Fall.	ANSI A300 Part 1	20-Oct-10	SK, AF						
Baldcypress groves	Trunks are damaged by mowers and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Baldcypress groves	"Knees" restrict ability to mow.	Protect knees with mulch.	Low urgency, annually or as needed.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees; feather edges into lawn to evoke forest-floor appearance, rather than sharp-edged mulch circles. Mow adjacent lawn with a walk-behind mower or a string trimmer.	Annually in the fall; refresh as needed.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Small tree groups in lawn areas	Generally in good condition.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees. Mow adjacent lawn with a walk-behind mower or a string trimmer.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Ground cover	Good condition.	Maintain adequate numbers of plants in each bed.	Replant annually.	Replant new groundcovers to maintain bed coverage.	Inspect beds annually and after events.	Maintain plant coverage	Early spring	NA	20-Oct-10	SK, AF						
Ground cover	Good condition.	Cover exposed soil with layer of mulch to help maintain plant health.	Critical, year-round.	Maintain 3" mulch.	Inspect beds annually and after events.	Apply mulch as a continuous cover within beds. Mow adjacent lawn with a walk-behind mower or a string trimmer.	Annually in the fall; refresh as needed	NA	20-Oct-10	SK, AF						
Ground cover	Good condition.	Monitor for competition from weeds.	Critical, year-round.	Apply pre-emergent herbicides in late February-early April, pull weeds as needed.	Assess and note areas where weedy growth has been problematic.	Maintain plant vitality by reducing weedy competition	Early spring	NA	20-Oct-10	SK, AF						
Ground cover	Good condition.	Monitor for insect/disease problems.	Seasonal, low urgency - as needed.	Apply pesticide to control rapidly spreading insect/disease issues.	Inspect beds annually.	Maintain plant coverage	Spring	NA	20-Oct-10	SK, AF						

Railroad Open Cut and Tunnel Plantings

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
											To Be Updated by NPS For Recordation of Future Maintenance					
General	Generally in fair condition.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees. Mow adjacent lawn with a walk-behind mower or a string trimmer.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Tree plantings on slopes of southern railroad cut	Generally in good condition.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Apply mulch as a continuous surface under the trees. Mow adjacent lawn with a walk-behind mower or a string trimmer.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Groundcovers above tunnel entrances	Ground cover is growing over railroad tunnels.	Prune groundcover.	Critical, seasonal.	Prune ground cover to contained area away from historic concrete, remove all cuttings.	Check for overgrowth on concrete every three months. Check for dead or dying plants in spring and fall.	Ground covers are not a prominent part of the design, so should be kept unobtrusive and low.	Prune in early spring, or as needed to remove overgrowth.	NA	20-Oct-10	LB, AF						
Ground cover	Ground cover is growing on trees.	Prune groundcover and remove climbing vines.	Critical, seasonal.	Prune ground cover and remove from tree trunks.	Check for growth on tree trunks every three months. Check for dead or dying plants in spring and fall.	Ground covers are not a prominent part of the design, so should be kept unobtrusive and low.	Prune in early spring, or as needed to remove overgrowth.	NA	20-Oct-10	LB, AF						
Ground cover	Poor condition.	Maintain adequate numbers of plants in each bed.	Replant annually.	Replant new groundcovers to maintain bed coverage.	Inspect beds annually and after events.	Maintain plant coverage	Spring.	NA	20-Oct-10	SK, AF						
Ground cover	Poor condition.	Cover exposed soil with layer of mulch to help maintain plant health.	Critical, year-round.	Maintain 3" mulch.	Inspect beds annually and after events.	Apply mulch as a continuous cover within beds	Annually in the fall; refresh as needed.	NA	20-Oct-10	SK, AF						
Ground cover	Poor condition.	Monitor for competition from weeds.	Critical, year-round.	Apply pre-emergent herbicides in late February-early April, pull weeds as needed.	Assess and note areas where weedy growth has been problematic.	Maintain plant vitality by reducing weedy competition.	Early spring.	NA	20-Oct-10	SK, AF						
Ground cover	Poor condition.	Monitor for insect/disease problems.	Seasonal, low urgency - as needed.	Apply pesticide to control rapidly spreading insect/disease issues.	Inspect beds annually and after events.	Maintain plant coverage.	Spring.	NA	20-Oct-10	SK, AF						

Plantings Along East Side Slopes

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar links*	*Technical and Standards Links*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
											To Be Updated by NPS For Recordation of Future Maintenance					
General	Limb dieback occurs as trees age.	Prune horizontal branches.	Seasonal, low urgency - as needed. Prioritize removal of limbs over walks.	Prune horizontal branches.	Future inspections: check for dead limbs, good tree form and adequate views to Arch annually.	Views to Arch are important and should be maintained in appropriate areas.	Oct.-March.	ANSI A300 Part 1	20-Oct-10	SK, AF						
General	Trunks are damaged by mowers and visitors	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	March-Oct.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						
Groundcover	Groundcover is growing up trees and signs.	Prune groundcover and remove climbing vines.	Critical, seasonal.	Prune ground cover and remove from tree trunks and signs.	Check for growth on tree trunks and signs every three months. Check for dead or dying plants in spring and fall.	Maintain plant coverage.	Prune in early spring, or as needed to remove overgrowth.	NA	20-Oct-10	LB, AF						

Groundcover	Good condition.	Maintain adequate numbers of plants in each bed.	Replant annually	Replant new groundcovers to maintain bed coverage.	Inspect beds annually and after events.	Maintain plant coverage.	Spring.	NA	20-Oct-10	SK, AF							
Groundcover	Good condition.	Cover exposed soil with layer of mulch to help maintain plant health.	Critical, year-round.	Maintain 3" mulch.	Inspect beds annually and after major events.	Apply mulch as a continuous cover within beds.	Annually in the fall; refresh as needed.	NA	20-Oct-10	SK, AF							
Groundcover	Good condition.	Monitor for competition from weed growth.	Critical, year-round.	Apply pre-emergent herbicides in late February-early April, pull weeds as needed.	Assess and note areas where weedy growth has been problematic.	Maintain plant vitality by reducing weedy competition.	Early spring.	NA	20-Oct-10	SK, AF							
Groundcover	Good condition.	Monitor for insect/disease problems.	Seasonal, low urgency - as needed.	Apply pesticide to control rapidly spreading insect/disease issues.	Inspect beds annually.	Maintain plant coverage.	Spring.	NA	20-Oct-10	SK, AF							

Service Area Plantings

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	**To Be Updated by NPS For Recordation of Future Maintenance**					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
General	Limb die-back occurs as trees age.	Prune horizontal branches.	Seasonal, low urgency - as needed. Prioritize removal of limbs over walks.	Prune horizontal branches.	Future inspections: check for dead limbs, good tree form, adequate screening from walkways annually.	Screening of service areas from walkways and other visitor areas was intended by the designers and should be maintained.	Oct.-March.	ANSI A300 Part 1	20-Oct-10	SK, AF						
General	Trunks are damaged by mowers and visitors.	Protect and monitor condition of trunks.	Critical, year-round.	Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.	Check bark and roots every three months during mowing season for damage from mowers or other equipment.	Mulch applications need to be minimal in order to be consistent with original design intent. Refer to mulch definition.	Annually in the fall; refresh as needed.	ANSI A300 Part 6 MU Mulch info MDC Mulch info	20-Oct-10	SK, AF						

Railroad Open Cut Walls and Tunnels

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	**To Be Updated by NPS For Recordation of Future Maintenance**					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
North Open Cut Walls	Cracking concrete.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
North Open Cut Walls	Spalling concrete.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable spalling occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
South Open Cut Walls	Cracking concrete.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
South Open Cut Walls	Spalling concrete.	Inspect and repair spalling.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable spalling occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.)	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
North Tunnel	Stained concrete at north entrance of the tunnel.	Inspect and clean surface staining.	Examine concrete surface on annual basis for staining. Be mindful that staining can indicate serious underlying problems such as rebar corrosion, improper previous surface treatment, or efflorescence. See historic character recommendations for concrete for more detailed information.	Clean with low-pressure water (less than 200 psi) or steam clean to remove surface stains from sound concrete, care is needed on fragile or deteriorated surfaces. If staining is more severe and more extensive cleaning is required, detergent cleaners or mild organic acids, such as acetic or citric acid, should be used. Aggressive inorganic acids such as muriatic (hydrochloric) or hydrofluoric acid should be avoided. See historic character recommendations for concrete for more detailed information.	Record annually where staining is occurring to identify chronic stained areas to assess probability of underlying problem. Repeated staining in the same location may require professional consultation.	Area where stain is removed should match surrounding concrete as closely as possible to maintain monolithic appearance.	Inspect annually; conduct any cleaning activities during times of low visitation and moderate weather (spring and fall).	Preservation Brief 15, *The Preservation of Historic Architecture*, U.S. General Services Administration Historic Preservation Technical Procedures 03710-16	20-Oct-10	LB, AF						
North Open Cut Walls	Metal drain pipes at base of wall are damaged, rusty and degraded.	Repair to ensure drainage is functional.	Check for blocked and damaged downspouts in spring and fall. Undertake basic maintenance to keep drain spouts clear of debris and open. If the metal pipe material is damaged, replacement should be undertaken, which is outside of normal day-to-day maintenance.	Clear drain spout of debris, ensure that pipe outlet is open.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas. If problem is recurrent, this could indicate underlying drainage and/or structural problems, in which case professional consultation may be necessary.		Inspect annually; conduct repairs as needed.	NA	20-Oct-10	LB, AF						
North Tunnel	Cracked concrete at north entrance of the tunnel.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
South Tunnel	Cracking concrete.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						
South Tunnel	Spalling concrete.	Inspect and repair spalling.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable spalling occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of spalling during frost-free months (Generally Mar-Oct.).	Preservation Brief 15, *The Preservation of Historic Architecture*	20-Oct-10	LB, AF						

North and South Overlooks

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***To Be Updated by NPS For Recordation of Future Maintenance***					
											Updated Date	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
North Overlook	Cracking concrete.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15	20-Oct-10	LB, AF						
North Overlook	Spalling concrete.	Inspect and repair spalling.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable spalling occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15	20-Oct-10	LB, AF						
North Overlook	Exposed rebar in wall along viewing platform	Inspect and patch.	Inspect walls and stairs annually for exposed rebar. Evaluate rebar to determine if it requirements removal or replacement. If it is determined that the exposed rebar is structurally significant, consult with a professional to determine best method of replacement.	Remove any loose concrete, and saw cut area around exposed rebar to prepare for repair. Lightly hand chip edge of repair to conceal patch. Clean, prime, and paint exposed reinforcement bar with corrosion-inhibiting coating. See historic character recommendations for concrete for further direction on patching concrete once rebar is repaired.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic exposed rebar and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where rebar is exposed.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15	20-Oct-10	LB, AF						
North Overlook	Concrete along the walls is efflorescing and crumbling in places.	Inspect and repair crumbling surface; clean efflorescence.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.).	Preservation Brief 15	20-Oct-10	LB, AF						
North Overlook	Drains at corners of viewing platform are covered in sediment and vegetation	Inspect drains and clear vegetation and sediment.	Inspect drains quarterly, when sediment build up is present remove using most gentle method possible.	Clear areas of collected sediment and remove vegetation by hand, exercising care with historic concrete. Cleaning methods should not aggravate underlying drainage problem by excessive water collection on surface. Consider cleaning with air pressure.	Record inspections to determine if the problem is chronic, if so, consult with a structural engineer, as this may indicate drainage failure which could cause structural damage, and is outside the realm of day-to-day maintenance.		Inspect annually; repair as needed, focusing on spring months leading up to high visitation periods (March-April).	NA	20-Oct-10	LB, AF						
North Overlook	Caulk in expansion joints at the base of the wall are failing.	Inspect and repair expansion joints.	When 50 percent of caulk along a segment of the wall is visibly failing, completely replace with a new expansion joint filler.	Replace caulk with redwood spacers or alternate expansion joint material in a brown color, taking care to ensure that it will not damage the concrete.	Record inspections to determine if the problem is recurring, if so, consult with a structural engineer, as this may indicate drainage failure which could cause structural damage, and is outside the realm of day-to-day maintenance.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch.	Inspect annually; repair as needed, focusing on spring months leading up to high visitation periods (March-April).	NA	20-Oct-10	LB, AF						
North Overlook	Mortar joints under the cap are failing.	Inspect and repair mortar joints.	When 50 percent of mortar joint under a segment of cap is visibly degraded, or the cap becomes loose, remove all mortar in this section and completely replace with appropriate mortar.	Replace caulk with redwood spacers or alternate expansion joint material in a brown color, taking care to ensure that it will not damage the concrete.	Record inspections to determine if the problem is recurring, if so, consult with a structural engineer, as this may indicate drainage failure which could cause structural damage, and is outside the realm of day-to-day maintenance.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; repair as needed, focusing on spring months leading up to high visitation periods (March-April).	Preservation Brief 15	20-Oct-10	LB, AF						
North Overlook	Sika Top coating applied to the surface of the viewing platforms and their stairs is now cracking and peeling off the platform at the north overlook	Regularly inspect for damage, remove areas of debris, remove cracking material that is in danger of falling off.	Inspect the surface of the viewing platform and the stairs on a bi-monthly basis, to determine if areas of SikaTop coating failure present a safety hazard. Look for areas of cracking and spalling as well as for pieces falling off. Loose pieces larger than two square inches should be removed immediately. Areas where two-inch or larger chunks have fallen from surface of stair treads should be closed to visitors pending a comprehesive repair effort.	Additional patching is not recommended, as the repair is clearly failing, and may be causing damage to underlying historic concrete structure. Short term measures include the removal of larger pieces of failing coating, installation of safety cones or hazard tape around the area, until long-term repairs can be undertaken. If additional patching proves necessary before larger repairs can be made, consult a professional structural engineer.	Record inspections to determine rate of deterioration and consult with a structural engineer about appropriate repairs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish. Repairs should not compromise the monolithic appearance of the concrete surface.	Inspect bi-monthly; repair as needed.	Preservation Brief 15	20-Oct-10	LB, AF						
North Staircase	Sika Top coating used to repair the stairs is spalling and cracking, and has fallen off in places.	Regularly inspect for damage, remove areas of debris, remove cracking material that is in danger of falling off.	Inspect the surface of the stairs on a bi-monthly basis, as areas of SikaTop failure present safety hazard. Look for areas of cracking and spalling. Loose pieces larger than two square inches should be removed immediately. Areas where two-inch or larger chunks have fallen from surface of stair treads should be closed to visitors pending a comprehesive repair effort.	Additional patching is not recommended, as the repair is clearly failing, and may be causing damage to underlying historic concrete structure. Short term measures include the removal of larger pieces of failing coating, installation of safety cones or hazard tape around the area, until long-term repairs can be undertaken. If additional patching proves necessary before larger repairs can be made, consult a professional structural engineer.	Record inspections to determine rate of deterioration and consult with a structural engineer about appropriate repairs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish. Repairs should not compromise the monolithic appearance of the concrete surface, or the catenary curve of the stairs.	Inspect bi-monthly; repair as needed.	Preservation Brief 15	20-Oct-10	LB, AF						
South Staircase	Sika Top coating used to repair the stairs is spalling and cracking, and has fallen off in places.	Remove areas of debris, remove cracking material that is in danger of falling off.	Inspect the surface of the viewing platform and the stairs on a bi-monthly basis, to determine if areas of SikaTop failure present safety hazard. Look for areas of cracking and spalling. Loose pieces larger than two square inches should be removed immediately. Areas where two-inch or larger chunks have fallen from surface of stair treads should be closed to visitors pending a comprehesive repair effort.	Additional patching is not recommended, as the repair is clearly failing, and may be causing damage to underlying historic concrete structure. Short term measures include the removal of larger pieces of failing coating, installation of safety cones or hazard tape around the area, until long-term repairs can be undertaken. If additional patching proves necessary before larger repairs can be made, consult a professional structural engineer.	Record inspections to determine rate of deterioration and consult with a structural engineer about appropriate repairs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish. Repairs should not compromise the monolithic appearance of the concrete surface, or the catenary curve of the stairs.	Inspect bi-monthly; repair as needed.	Preservation Brief 15	20-Oct-10	LB, AF						

North and South Floodwalls

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
North Floodwalls	Vertical cracking on the surface.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.)	Preservation Brief 15	20-Oct-10	LB, AF						
South Floodwalls	Vertical cracking on the surface.	Inspect and repair cracks.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	Inspect annually; conduct any repair of cracking during frost-free months (Generally Mar-Oct.)	Preservation Brief 15	20-Oct-10	LB, AF						

Grand Staircase

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Grand Staircase	Joint failure.	Inspect and determine cause of joint failure (likely related to settling/shifting and other visible problems).	Inspect staircase quarterly for failing joints.	Replace failing expansion joint material with a more durable joint filler material that matches grey of concrete stair, taking care to ensure that it will not damage the concrete.	Track locations of joint repairs to determine if problem is increasing or has stabilized. Consider in coordination with tracking of shifting and cracking on stairs to provide a record to help diagnose and address underlying problems.	Noticeable different color patching or replacement should be avoided. Expansion joint materials should have a similar color or tone to the existing concrete.	*[to be added]*	*[to be added]*	20-Oct-10	LB, AF						
Grand Staircase	Shifting.	Inspect and determine hazard potential of shifting stairs.	Inspect staircase quarterly, particularly the area where the newer central portion meets the north and south portions of the stairs.	Cordon off areas that represent tripping hazard in advance of repair work.	Check annually for shifting stairs, measure amount of shift to determine if problem is increasing or has stabilized. If shifting is increasing or presents a tripping hazard, consult with a professional to determine repair strategy.	Noticeable different color patching or replacement should be avoided.	*[to be added]*	*[to be added]*	20-Oct-10	LB, AF						
Grand Staircase	Cracking.	Inspect and repair cracks.	See historic character recommendations for concrete.	See historic character recommendations for concrete.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing mortar; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch or finish.	*[to be added]*	Preservation Brief 15	20-Oct-10	LB, AF						

System of Walks within the Memorial Grounds

Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Walks	Poor drainage.	Temporarily repair drainage problems in advance of larger projects.	Assess and record areas of poor drainage every other month. Examine surface of walks for puddling after rains, and edges of walks for areas of recurrently mud. Puddling which creates a safety hazard requires immediate maintenance.	Clear areas of collected sediment, exercising care with historic concrete. Cleaning methods should not aggravate underlying drainage problem by excessive water collection on surface. Consider cleaning with air pressure.	Record inspections in advance of larger repair project.	When clearing sediment, care should be taken with the surface of the historic concrete.	Every other month from January onward, and after rains.	NA	20-Oct-10	LB, AF						
Walks	Soil erosion along edges and footing of walks.	Temporarily repair drainage problems in advance of larger projects.	Assess and record areas of erosion every other month. Examine edges of walks for areas of recurrent mud. Puddling which creates a safety hazard requires immediate maintenance.	Minor grading of areas with hand tools to create positive drainage. Re-seeding areas where soil and grass cover has eroded.	Record inspections in advance of larger repair project.	When clearing sediment, care should be taken with the surface of the historic concrete.	Every other month from January onward.	NA	20-Oct-10	LB, AF						
Walks	Damage or deterioration.	Remove and repair damaged or deteriorated concrete.	See historic character recommendations for concrete for detailed actions.	See historic character recommendations for concrete for detailed actions.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	Match patching material to existing concrete; avoid patching large areas of aggregate concrete surfacing, creating a noticeable different-color patch	April.	NA	20-Oct-10	LB, AF						
Walks	Deteriorating redwood spacers in expansion joints.	Remove deteriorating spacers and replace with new ones.	Examine for areas of rot and splintering. Replace individual spacers when more than 80% of spacer is deteriorated.	Replace with new redwood spacers.	Inspect bi-anually, examine for areas of rot and splintering. Document areas where rot occurs so locations of recurrent damage can be tracked to inform future repairs. Replace when more than 80% of spacer is deteriorated.	Match color and texture of spacers as closely as possible to existing spacers.	Replace during times of lowest annual visitation.	NA	20-Oct-10	LB, AF						
Walks	Deteriorating white caulk in expansion joints.	Remove deteriorating caulk and replace with redwood spacers.	Examine for areas of flaking and gouging. Completely remove white caulk when more than 30% of caulk is deteriorated. Replace with redwood spacer.	Remove remaining caulk and replace with new redwood spacers.	Inspect bi-anually, examine for areas of flaking and gouging. Replace when more than 30% of caulk is deteriorated.	Spacers should match color of adjacent spacers as closely as possible. Spacers should be unobtrusive.	Inspect bi-annually; replace as neded, focusing most work during times of lowest annual visitation.	NA	20-Oct-10	LB, AF						
Gateway Arch Entrance Ramps and Steps	Leaching joints causing staining on adjacent granite pavers.	Clean granite.	Clean the granite pavers every 6 months or less frequently if not needed. If the problem persists, first try using a different cleaning product. In the long term consider replacing the expansion joint material with a non-leaching material.	Clean granite pavers with a solution with maximum 4% acid acid concentration.	If staining continues, consider replacement of mortar with a different material. Test new mortar materials in an inconspicuous area before undertaing replacement.	When cleaning, the goal should be to achieve an 85% clean paver. Most damage occurs when trying to clean the remaining 15%.	April and October.	GSA Historic Preservation Technical Procedures 0446506R "General Cleaning of Granite"	20-Oct-10	LB, AF						
Gateway Arch Entrance Ramps and Steps	Patchwork repairs are visible on stairs and wall alongside ramp.	Match new patching to existing historic concrete.	See historic character recommendations for concrete.	See historic character recommendations for concrete.	Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only tend to aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.	When new repairs are needed, use care to match the mortar and aggregate materials to the existing to avoid obvious patching.	NA	NA	20-Oct-10	LB, AF						
Gateway Arch Entrance Ramps and Steps	White caulk in expansion joints is visually intrusive.	Remove white caulk.	Inspect and identify areas of flaking and gouging. Replace expansion joint when more than 30% of caulk is deteriorated.	Replace with new redwood spacers.	*[to be added]*	When new repairs are needed, consider visual impact of color choices for expansion joints, to maintain the monolithic appearance of the materials.	October.	NA	20-Oct-10	LB, AF						
Gateway Arch Entrance Ramps and Steps	Ice forms in winter where warmers end on ramps.	Clear ice from ramps for visitor safety.	In the winter, address ice removal as needed. Use non-chloride products to melt ice as necessary. (Chloride salt products can result in spalling of masonry and metal corrosion.) This is a life safety issue that, for long term solution, should be addressed through extension of warmers in a future project.	[sustainable ice removal - add guidance here]	*[to be added]*		Winter months as needed.	NA	20-Oct-10	LB, AF						

Tree Grates										**To Be Updated by NPS For Recordation of Future Maintenance**					
Component	*Condition*	*Work requirements*	*Threshold/Level of work required*	*Recommended Actions*	*Criteria for future inspections; Further Diagnosis or Assessments recommended; frequency*	*Special considerations for historic appearance*	*Calendar summary*	*Technical and Standards References*	*Updated Date*	*Updated By*	***Updated Date***	***Updated By***	***Action performed date***	***Progress (cumulative assessment)***	***Next Update Due***	***FMSS reference number (TBD)***
Tree Grates	Heaving creates tripping hazard.	Level or remove heaving grates.	Inspect grates, document problems, and adjust as needed.	Level or remove heaving grates. Avoid damaging tree trunk and roots or adjacent paving in the process.	Inspect grates after Labor Day through early winter and from late winter through just prior to Memorial Day to locate and mark heaving grates for correction.	Tree grates are an incompatible non-contributing feature. They are not part of the intended design for the Memorial landscape. Focus of maintenance is on ensuring they remain functional and do not cause tree damage or visitor hazards.	Sept.-Nov. and Mar.-May	NA	20-Oct-10	LB, AF						
Tree Grates	Grates have filled with sediment, which is spreading to adjacent paving.	Clear sediment from grates and adjacent paving.	Inspect grates, document problems, and adjust as needed.	Using hand tools gently remove sediment from around roots, top of grates, and adjacent paving. Avoid damaging tree trunk and roots or paving in the process.	Inspect grates after Labor Day through early winter and from late winter through just prior to Memorial Day to identify areas where soil and sediment in tree pits is above the level of the grate or is spreading across the paving.	Tree grates are an incompatible non-contributing feature. They are not part of the intended design for the Memorial landscape. Focus of maintenance is on ensuring they remain functional and do not cause tree damage or visitor hazards.	Sept.-Nov. and Mar.-May	NA	20-Oct-10	LB, AF						
Tree Grates	Grates rest directly on soil and root flares.	Cut grates to eliminate pressure on root flares.	Inspect grates, document problems, and adjust as needed.	Cut grates to allow ample space for root flares where needed. Avoid damaging tree trunk and roots or adjacent paving in the process.	Inspect grates after Labor Day through early winter and from late winter through just prior to Memorial Day to identify areas where root flares are being damaged by grates resting on them.	Tree grates are an incompatible non-contributing feature. They are not part of the intended design for the Memorial landscape. Focus of maintenance is on ensuring they remain functional and do not cause tree damage or visitor hazards.	Sept.-Nov. and Mar.-May	NA	20-Oct-10	LB, AF						
Tree Grates	Siltation and erosion where grates meet grass.	Clear sediment from grates.	Inspect grates, document problems, and adjust as needed.	Using hand tools gently remove sediment from around roots and top of grates. Avoid damaging tree trunk and roots or paving edges in the process.	Inspect grates after Labor Day through early winter and from late winter through just prior to Memorial Day to identify areas where soil and sediment in tree pits is above the level of the grate or is spreading across the paving.	Tree grates are an incompatible non-contributing feature. They are not part of the intended design for the Memorial landscape. Focus of maintenance is on ensuring they remain functional and do not cause tree damage or visitor hazards.	Sept.-Nov. and Mar.-May	NA	20-Oct-10	LB, AF						

4. Tree Inventory Summary

SUMMARY OF TREE DATA - 2009 (listed alphabetically on the left; by quantity, most to least, on the right)

SPECIES (by name)	NUMBER OF TREES	PERCENT OF TOTAL
Ash, Marshall's Seedless (MA)	10	0.48%
Ash, 'Rosehill' (RH)	956	46.21%
Baldcypress (BC)	160	7.73%
Birch, River (BN)	55	2.66%
Birch, River 'Heritage' (HB)	22	1.06%
Blackgum (BG)	6	0.29%
Coffeetree, Kentucky (KC)	12	0.58%
Corktree, Amur (AC)	3	0.14%
Crabapple, Profusion (PC)	13	0.63%
Crabapple, Radiant (RC)	57	2.75%
Crabapple, Robinson (CR)	43	2.08%
Crabapple, Snowdrift (SD)	51	2.46%
Dogwood, Flowering (FD)	2	0.10%
Dogwood, Pagoda (PD)	11	0.53%
Ginkgo (GB)	1	0.05%
Hackberry, Sugar (SH)	23	1.11%
Hawthorn, Washington (WH)	33	1.59%
Hawthorn, Winter King (WK)	3	0.14%
Honeylocust (HL)	23	1.11%
Honeylocust, Shademaster (HL)	31	1.50%
Linden, Greenspire (GL)	59	2.85%
Magnolia, Saucer (MS)	29	1.40%
Magnolia, Sweetbay (MV)	7	0.34%
Maple, Red (RM)	60	2.90%
Maple, Sugar (SM)	27	1.30%
Oak, Bur (BO)	44	2.13%
Oak, Red (RO)	18	0.87%
Oak, Swamp White (SW)	50	2.42%
Pagodatree, Japanese (JP)	20	0.97%
Pear, Bradford (BP)	52	2.51%
Pear, Redspire (RS)	13	0.63%
Pine, Japanese Black (JB)	23	1.11%
Pine, Red (RP)	4	0.19%
Redbud, Eastern (RB)	130	6.28%
Serviceberry, Downy	1	0.05%
Sweetgum (SG)	13	0.63%
Zelkova (ZS)	4	0.19%

SPECIES (by occurrence)	NUMBER OF TREES	PERCENT OF TOTAL
Ash, 'Rosehill' (RH)	956	46.21%
Baldcypress (BC)	160	7.73%
Redbud, Eastern (RB)	130	6.28%
Maple, Red (RM)	60	2.90%
Linden, Greenspire (GL)	59	2.85%
Crabapple, Radiant (RC)	57	2.75%
Birch, River (BN)	55	2.66%
Pear, Bradford (BP)	52	2.51%
Crabapple, Snowdrift (SD)	51	2.46%
Oak, Swamp White (SW)	50	2.42%
Oak, Bur (BO)	44	2.13%
Crabapple, Robinson (CR)	43	2.08%
Hawthorn, Washington (WH)	33	1.59%
Honeylocust, Shademaster (HL)	31	1.50%
Magnolia, Saucer (MS)	29	1.40%
Maple, Sugar (SM)	27	1.30%
Hackberry, Sugar (SH)	23	1.11%
Honeylocust (HL)	23	1.11%
Pine, Japanese Black (JB)	23	1.11%
Birch, River 'Heritage' (HB)	22	1.06%
Pagodatree, Japanese (JP)	20	0.97%
Oak, Red (RO)	18	0.87%
Crabapple, Profusion (PC)	13	0.63%
Pear, Redspire (RS)	13	0.63%
Sweetgum (SG)	13	0.63%
Coffeetree, Kentucky (KC)	12	0.58%
Dogwood, Pagoda (PD)	11	0.53%
Ash, Marshall's Seedless (MA)	10	0.48%
Magnolia, Sweetbay (MV)	7	0.34%
Blackgum (BG)	6	0.29%
Pine, Red (RP)	4	0.19%
Zelkova (ZS)	4	0.19%
Corktree, Amur (AC)	3	0.14%
Hawthorn, Winter King (WK)	3	0.14%
Dogwood, Flowering (FD)	2	0.10%
Ginkgo (GB)	1	0.05%
Serviceberry, Downy	1	0.05%

5. Seasonal Tree Care and Maintenance Calendars

SEASONAL TREE CARE CALENDAR

Shaded cells indicate months where tasks can be completed operationally, while shaded and "X" boxes indicate optimal biological time.

ACTIVITY	Annual (A) or As Needed (N)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
REMOVALS													
High Priority	A	X	X	X							X	X	X
Moderate Priority	A	X	X	X							X	X	X
Stumps	A	X	X	X							X	X	X
PRUNING													
High Priority	A	X	X	X							X	X	X
Moderate Priority	A	X	X	X							X	X	X
Routine Pruning (Five Year Cycle)	A	X	X	X							X	X	X
Training Pruning (Three-Year Cycle)	A	X	X	X							X	X	X
FERTILIZATION													
Macronutrient (N-P-K;)	A			X	X						X	X	
Micronutrient (Fe/Mn)	N												
PEST MANAGEMENT													
Scouting	A			X	X	X	X	X	X	X	X		
Pesticide Treatments	N			X	X	X	X	X	X	X			
Pest Pruning	N												
OTHER CULTURAL ACTIVITIES													
Watering (Older Trees)	A							X	X	X	X	X	
Cabling and Bracing	N	X	X	X								X	X
Mulching	A												
Weed Control	A			X	X	X							
TREE PLANTING													
Site Assessment	N												
Ball & Burlap Container	N			X	X	X				X	X	X	
Bare Root	N			X	X	X							
Watering (New Trees)	N			X	X	X	X	X	X	X	X	X	
Mulching	N												
INVENTORY													
Update Field Inventory and Software	A												

MONTHLY TASK CALENDAR

This list of cyclic maintenance tasks by month may be updated and revised as needed.

JANUARY

VEGETATION:

- Rent aerial lift for pruning.
- Single Species Allées
  - Check grates within sidewalks to identify and minimize trunk damage.
- Baldcypress Circles
  - No scheduled activity on this feature.
- Street Tree Plantings
  - No scheduled activity on this feature.
- Pond Area Plantings
  - No scheduled activity on this feature.
- Railroad Open Cut and Tunnel Plantings
  - No scheduled activity on this feature.
- Plantings Along East Side Slopes
  - No scheduled activity on this feature.
- Service Area Plantings
  - No scheduled activity on this feature.

STRUCTURES

- Railroad Open Cut Walls and Tunnels
  - No scheduled activity on this feature.
- North and South Overlooks
  - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a tripping hazard to visitors.
- Grand Staircase
  - No scheduled activity on this feature.
- System of Walks within the Memorial Grounds
  - Assess and record areas of poor drainage and erosion every other month. Examine surface of walks for puddling, and edges of walks for areas of recurrently wet soil. Puddling that creates a safety hazard requires immediate maintenance.
  - Clear areas of collected sediment, exercising care with historic concrete. Do not use cleaning methods which aggravate underlying drainage problem by leaving excessive water on the surface. Consider cleaning with air pressure.
- Gateway Arch Entrance Ramps and Steps
  - Clear ice from ramps as needed.

FEBRUARY

VEGETATION

- Rent aerial lift for pruning.
- Single Species Allées
  - Check grates within sidewalks to identify and minimize trunk damage.

STRUCTURES

- Gateway Arch Entrance Ramps and Steps
  - Clear ice from ramps as needed.

MARCH

VEGETATION

- Begin reseeding areas that were not reseeded in fall.
- Apply crabgrass preventer to lawn areas on south side of Eads Bridge.
- Single Species Allées
  - Check grates within sidewalks to identify and minimize trunk damage.
  - Prune lower limbs to maintain clearance and appropriate views of Arch.
  - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
  - Remove soil from areas where it is spreading across the pavement.
  - Level or remove heaving grates.
- Baldcypress Circles
  - Check bark and roots for damage.
  - Check for dead or hazard limbs and for horizontal branches encroaching on Arch views; prune as needed.
- Street Tree Plantings
  - Check for dead or hazard limbs and for horizontal branches encroaching on Arch views; prune as needed.
- Pond Area Plantings
  - Identify and remove declining/dying trees.
  - Monitor oaks for signs of BLS (Bacterial Leaf Scorch) and determine whether removal is needed.
  - Monitor small groups of trees in lawn areas for condition of trunks.
- Railroad Open Cut and Tunnel Plantings
  - Check for ground cover overgrowth on concrete; prune as needed.
  - Check for ground cover growing up tree trunks; prune as needed.
  - Prune ground cover for shape.
- Plantings Along East Side Slopes

  - No scheduled activity on this feature.
- Service Area Plantings
  - No scheduled activity on this feature.

STRUCTURES

- North and South Overlooks
  - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a potential tripping hazard to visitors.
- Gateway Arch Entrance Ramps and Steps
  - Clear ice from ramps as needed.

APRIL

VEGETATION

- Single Species Allées
  - Check bark and roots for damage from mowers or other equipment.
  - Prune lower limbs to maintain clearance and appropriate views of Arch.
  - Identify and remove declining/dying trees.
  - Check grates on trees within sidewalks to identify and minimize trunk damage.
  - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
  - Level or remove heaving grates.

- Baldcypress Circles
  - Check bark and roots for damage from mowers or other equipment.
  - Check for dead or hazard limbs and for horizontal branches encroaching on Arch views; prune as needed.
- Street Tree Plantings
  - Check bark and roots for damage from mowers or other equipment.
- Pond Area Plantings
  - Check bark and roots for damage from mowers or other equipment.
  - Replant ground cover to maintain coverage.
  - Monitor ground cover for weed growth, apply organic herbicide as needed.
- Railroad Open Cut and Tunnel Plantings
  - Check bark and roots for damage from mowers or other equipment.
  - Replant ground cover to maintain coverage.
  - Monitor ground cover for weed growth.

- Plantings Along East Side Slopes
    - Check bark and roots for damage from mowers or other equipment.
    - Replant ground cover to maintain coverage.
    - Monitor ground cover for weed growth, apply organic pesticide as needed.
- Service Area Plantings
    - Check bark and roots for damage from mowers or other equipment.

STRUCTURES

- Railroad Open Cut Walls and Tunnels
    - Inspect metal drain pipes at base of North Open Cut walls. Check for blocked and damaged downspouts. Undertake basic maintenance to keep drain spouts clear of debris.
- System of Walks within Memorial Grounds
    - Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching.
    - Remove and repair damaged or deteriorated concrete as needed.

MAY

VEGETATION

- Single Species Allées
    - Identify and remove declining/dying trees.
    - Monitor for EAB; consider removal as needed.
    - Check grates within sidewalks to identify and minimize trunk damage.
    - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
    - Level or remove heaving grates.
- Pond Area Plantings
    - Monitor ground cover for disease or insect problems; apply organic pesticide as needed.
    - Monitor ground cover for weed growth; hand pull or apply organic herbicide as needed.
- Railroad Open Cut and Tunnel Plantings
    - Monitor ground cover for disease or insect problems; apply organic pesticide as needed.
    - Monitor ground cover for weed growth; hand pull, or apply organic herbicide as needed.
- Plantings Along East Side Slopes
    - Check bark and roots for damage from mowers or other equipment.
    - Monitor ground cover for weed growth; hand pull, or apply organic herbicide as needed.
    - Monitor ground cover for disease or insect problems; apply organic pesticide as needed.

STRUCTURES

- North and South Overlooks
    - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a potential tripping hazard to visitors.

JUNE

VEGETATION

- Single Species Allées
    - Identify and remove declining/dying trees.
    - Monitor for EAB, consider removal as needed.
- Pond Area Plantings
    - Monitor oaks for signs of BLS (Bacterial Leaf Scorch) and determine whether removal is needed.
    - Monitor small groups of trees in lawn areas for condition of trunks.

JULY

VEGETATION

- Single Species Allées
    - Check bark and roots for damage from mowers or other equipment.
    - Check grates on trees within sidewalks to identify and minimize trunk damage.
    - Identify and remove declining/dying trees.
    - Monitor for EAB, consider removal as needed.
- Baldcypress Circles
    - Check bark and roots for damage from mowers or other equipment.
- Street Tree Plantings
    - Check bark and roots for damage from mowers or other equipment.
- Pond Area Plantings
    - Check bark and roots for damage from mowers or other equipment.
- Railroad Open Cut and Tunnel Plantings
    - Check bark and roots for damage from mowers or other equipment.
- Plantings Along East Side Slopes
    - Check bark and roots for damage from mowers or other equipment.
- Service Area Plantings
    - Check bark and roots for damage from mowers or other equipment.

STRUCTURES

- North and South Overlooks
    - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a potential tripping hazard to visitors.

AUGUST

VEGETATION

- Single Species Allées
    - Identify and remove declining/dying trees.
    - Monitor for EAB; consider removal as needed.

SEPTEMBER

VEGETATION

- Single Species Allées
    - Identify and remove declining/dying trees.
    - Monitor for EAB; consider removal as needed.
    - Check grates on trees within sidewalks to identify and minimize trunk damage.
    - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
    - Level or remove heaving grates.
- Pond Area Plantings
    - Monitor oaks for signs of BLS (Bacterial Leaf Scorch) and determine whether removal is needed.
    - Add 3" of mulch to ground cover beds.
- Railroad Open Cut and Tunnel Plantings
    - Add 3" of mulch to ground cover beds.
- Service Area Plantings
    - Add 3" of mulch to ground cover beds.

STRUCTURES

- North and South Overlooks
    - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a tripping hazard to visitors.

OCTOBER

VEGETATION

- Single Species Allées
    - Check bark and roots for damage from mowers or other equipment.
    - Prune lower limbs to maintain clearance and appropriate views of the Arch.
    - Identify and remove declining/dying trees.
    - Check grates within sidewalks to identify and minimize trunk damage.
    - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
    - Level or remove heaving grates.

- Baldcypress Circles
    - Check bark and roots for damage from mowers or other equipment.
    - Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible. Be sure to protect “knees.”
    - Check for dead or hazard limbs and for horizontal branches encroaching on Arch views; prune as needed.
- Street Tree Plantings
    - Check bark and roots for damage from mowers or other equipment.
- Pond Area Plantings
    - Prune dead limbs, hazard limbs, and those blocking views to the Arch.
    - Monitor small groups of trees in lawn areas for condition of trunks.
    - Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.
    - Check bark and roots for damage from mowers or other equipment.
- Railroad Open Cut and Tunnel Plantings
    - Check bark and roots for damage from mowers or other equipment.
- Plantings Along East Side Slopes
    - Check bark and roots for damage from mowers or other equipment.
- Service Area Plantings
    - Check bark and roots for damage from mowers or other equipment.

STRUCTURES

- System of walks within the Memorial Grounds
    - Inspect for rot and splintering of redwood spacers in expansion joints. Document areas where rot occurs to track locations of recurrent damage to inform future repairs. Replace when more than 80% of spacer is deteriorated.
    - Examine white caulk in expansion joints for areas of flaking and gouging. Completely remove white caulk when more than 30% of caulk is deteriorated. Replace with redwood spacer.

- Gateway Arch Entrance Ramp and Steps
    - Clean granite pavers as needed. If leaching joints persists, try a different cleaning product in advance of mortar replacement.
    - Examine white caulk in expansion joints at top of ramp for flaking and gouging. Completely remove white caulk when more than 30% of caulk is deteriorated. Replace with new redwood spacer.

NOVEMBER

VEGETATION

- Single Species Allées
    - Check grates within sidewalks to identify and minimize trunk damage.
    - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
    - Level or remove heaving grates.
- Plantings Along East Side Slopes
    - Inspect trees for limb dieback; prune as needed.
    - Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.
- Railroad Open Cut and Tunnel Plantings
    - Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.
- Service Area Plantings
    - Inspect trees for limb dieback; prune as needed.
    - Add mulch around trunks 3" deep with reducing depth towards trunk, varying widths to drip line where possible.

STRUCTURES

- Railroad Open Cut Walls and Tunnels
    - Record spalling, cracking, and staining of concrete. Note where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of past repair attempts. Document areas of substantial spalling. Compile a report of this documentation for management to determine whether professional consultation is required for repair.
    - Inspect metal drain pipes at base of North Open Cut walls. Check for blocked and damaged downspouts. Undertake basic maintenance to keep drain spouts clear of debris and open. Record annually where damage, deterioration, and undesirable conditions are occurring to identify chronic damaged areas. Recurrent problems could indicate underlying drainage and/or structural problems, in which case compile a report of this documentation for park management to determine whether professional consultation is required for repair.

- North and South Overlooks
    - Inspect the north and south overlook viewing platforms and north and south staircases where Sika Top coating was applied. Remove debris and unstable areas of cracking material that create a tripping hazard to visitors.
    - Record spalling, cracking, and staining of concrete on all areas of the structures (floodwalls, overlook areas, staircases, viewing platforms). Note where damage, deterioration, and undesirable conditions are occurring to identify recurrent damage and success of past repair attempts. Note areas where there is exposed rebar efflorescence, or poor drainage. Note expansion joint and mortar failures. Document areas of substantial spalling. Compile a report of this documentation for park management to determine whether professional consultation is required for repair.
- Grand Staircase
    - Inspect for shifting stairs. Measure amount of shift each year to determine if problem is increasing or has stabilized. If shifting is increasing or presents a tripping hazard, consult with a structural engineer to determine repair strategy.
    - Record where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching. Since superficial repairs that do not eliminate underlying causes will only aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs.
    - Check for failing mortar and expansion joints and repair using materials that have a similar tone or color to the existing concrete.
- System of Walks within the Memorial Grounds
- Gateway Arch Entrance Ramp and Steps
    - Record annually where damage, deterioration, and undesirable conditions are occurring to identify recurrent damaged areas and success of patching on concrete stairs and wall alongside ramp. Since superficial repairs that do not eliminate underlying causes will only aggravate problems, professional consultation is recommended in almost every instance where noticeable cracking occurs. When new repairs are needed, use care to match the mortar and aggregate materials to the existing to avoid obvious patching.

DECEMBER

VEGETATION

- Single Species Allées
    - Check grates within sidewalks to identify and minimize trunk damage.
    - Identify areas where soil in tree pits is above the level of the tree grate; remove excess soil.
    - Level or remove heaving grates.

STRUCTURES

- Gateway Arch Entrance Ramps and Steps
    - Clear ice from ramps as needed.

6. Historic Character Recommendations for Woody Plants

HISTORIC CHARACTER RECOMMENDATIONS FOR WOODY PLANTS



The following section of this Landscape Preservation Maintenance Plan (LPMP) provides guidance for retaining and maintaining the historic form and health of tree plantings on the Memorial grounds. This includes information on maintaining trees for health, as well as pruning to retain designed form, and appropriate replacement and substitution guidance.

At the Memorial, as described in the CLR, selection of trees for form was critical to the design. Based on Kiley's intended plant palette, the CLR treatment guidelines recommend limiting the trees to 16 species in the pond planting areas; consult these guidelines when determining new plantings. The chief consideration in selecting replacements should be to match the form of the tree as closely as possible with the form of the tree originally suggested on either the Kiley or NPS final plant lists. The only areas where Kiley specified single-species groupings were in the allées and the baldcypress circles. In other areas of the Memorial, different tree species can and should be interplanted to reflect the forest of canopy and understory trees that Kiley intended.

Many of the tree plantings were not planted exactly to Kiley's design or the NPS final planting plan. Over the decades, the spacing has been altered from Kiley's original plan, many individual trees were replaced, new tree plantings were sited without relationship to a larger plan, and new tree species were introduced. Some of these new species were introduced because trees from Kiley's planting list failed to thrive in the Memorial's challenging conditions. Much of the time these decisions were driven by forces unrelated to the designed intent of the Memorial grounds: plant availability, budget concerns, and changing ideas about tree planting, for example. Many of the Memorial's planted areas bear some resemblance to Kiley's design concept but are dissimilar enough to be considered non-contributing to the landscape's historic character. The realization of the historic design intent for these plantings can be achieved through the implementation of a major redesign of the planting plans to better align to the Kiley planting plan; this lies outside the realm of day-to-day maintenance.

The maintenance goal for plantings that are non-contributing but compatible is to enhance their compatibility by maintaining the trees in the appropriate form and incrementally replacing any inappropriate species with historically appropriate ones. In certain plantings or for certain species, each noted in the sections that follow, removed trees should not be replaced. Detailed recommendations for the goals and intentions of the preservation the historic character of the trees are found in Chapter 5 of the CLR. Consult a historical landscape architect for guidance on specific tree replacement and planting to ensure compatibility with the historic landscape character.

There are some trees that have been planted as potential replacement species throughout the site. Certain species will continue to be used as the replacement species while others will not be replanted. If trees are considered invasive, they should be removed. If instead these trees are not invasive only incompatible to Kiley's design, they should be left in place and maintained but no extraordinary measures should take place to retain the tree.

This section is organized by tree species.

'ROSEHILL' WHITE ASH;

Fraxinus americana 'Rosehill'

GENERAL





The Rosehill ash seedling selection originated from Missouri. It is known for red-purple fall color. Young trees are prone to storm damage and require frequent pruning (Gerhold, Wandell, Lacasse, & Schein, 1989).

More than 900 ash (46 percent of all trees) grow on the Memorial grounds. Among these, most are part of the most distinctive and significant planting at the Memorial: the single-species allée of trees lining the system of walks and framing the Arch on the north and south. Some ash are also planted on the east side slopes near the Grand Staircase and along Memorial Drive.

Ash trees throughout the Midwest are battling the Emerald Ash Borer (EAB). While not identified in St. Louis or the surrounding region in 2010, it was confirmed in southeast Missouri and is considered to pose a serious threat to the entire ash population. Details about treatment protocols that may offer some protection are found in the General Guidelines and Appendices.

Height: 50' to 65'

Width: 35' to 45'

Common uses: Street or canopy tree.

Natural form: Uniform branching forms a narrow, open crown.

CHARACTERISTIC USE: SINGLE SPECIES ALLÉES

DESIGN PURPOSE

Kiley originally specified the tulip poplar for the allées; the NPS substituted the Rosehill ash.

The use of trees closely spaced along the walks in an allée created a deliberate edge and sense of enclosure. The trees, spaced 30 feet on center, formed a dense overhead canopy providing enclosure for the visitor while affording carefully controlled glimpses towards the soaring Gateway Arch. Kiley said in a 1993 interview that he intended the trees to be cathedral-like, to create an 'elevated, spiritual feeling.' The use of the same tree throughout the pedestrian path system strengthened the edge and provided visual continuity and fluidity. (CLR, 2010)

The dense, uniform mass of upright, straight-trunked trees planted along the walks was the strongest single feature of the Kiley planting plan. The uniform, tall trees would define the

pedestrian space and conceptually strengthen the simplicity of the Gateway Arch and the surrounding site design. (CLR, 2010)

MAINTENANCE:

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: De-compaction is recommended in areas along sidewalk.

Mulch: Consider removing tree grates; mulch every spring.

Pruning:

Design Driven Pruning

Pruning objectives: To preserve and enhance the vertical character of the allées. Along the north-south walkways, selectively thin crowns and raise to preserve designed views of the Gateway Arch, while ensuring that the overall natural branching structure of the trees is sufficiently maintained. The intention is to preserve views, but not to create a sheared wall of branches along the walks. Trees along or within walkways should be raised to 15 feet.

Pruning types: Raise uniformly over and along the walks.

Young Trees

Pruning objective: Maintain health and structure, preserve views to the Gateway Arch along the north-south axis, and maintain historic character.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, preserve views to the Gateway Arch along the north-south axis, and maintain historic character.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% canopy crown not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Habit: The designer's idealized form for the allée trees was tall, straight, single-trunked, columnar to pyramidal, with horizontal branching and a highly regular shape. The ash has a more spreading form, but limbing up trees along the walks has maintained the designed views to the Arch and uniform appearance of the trees. Pruning practices should maintain this character to the extent possible, without compromising the health and structural stability of the tree.

Tree Condition Monitoring Inspection: Monitoring for EAB should be given high priority and performed during the entire growing season. Monitor BLS-associated decline and remove trees as needed.

Insect and Disease: Emerald ash borer (EAB); ash-lilac borer; blackheaded ash sawfly; ash decline or dieback; bacterial leaf scorch (BLS).

Tree Removals: Refer to general guidelines in chapter one of this plan. With the onset of BLS and the threat of EAB, there is a good chance that large numbers of removals will be required. Do not replace Rosehill ash trees that are not part of the allée planting along the walks. See the EAB

Strategy (2009) for guidance on replacement of ash in the single-species allées, or refer to the most recent Memorial management planning on this topic.

Newly Planted: Few new trees have been planted in the allées because of the threat of EAB. In the short term, continue to replace in kind per the EAB Strategy (2009).

Reference: \Cut Sheet fs-FRAPENB-ash marshall seedless.pdf

Notes:

CHARACTERISTIC USE: CANOPY TREES

DESIGN PURPOSE

Along the eastern side of Memorial Drive, Kiley intended groves of canopy and flowering trees to extend approximately 350 feet along the sidewalk from each entrance. Interspersed between these groves, unrealized meadows extended roughly 600 feet on the north and 350 feet on the south. (CLR, 2010) The east side of Memorial Drive was depicted in Kiley's plan as partially open to the street, and he did not specify any trees for this area. Numerous Rosehill ash were added later along the street edge, where they serve to screen views to and noise from Memorial Drive. These plantings are compatible with the Memorial grounds, but are not part of Kiley's plan and do not contribute to its significance. Rosehill ash are also planted in two groves on either side of the grand staircase; again, these are not contributing plantings to the Memorial's design significance.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: De-compaction is recommended in areas adjacent to the sidewalk.

Mulch: Mulch every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Trees in this area should be maintained in their natural habit.

Young Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% canopy crown not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Monitoring for EAB should be given high priority and performed during the entire growing season. Monitor BLS associated decline and remove trees as needed.

Insect and Disease: EAB; ash-lilac borer; blackheaded ash sawfly; ash decline or dieback; BLS.

Tree Removals: Remove these trees when necessary, and do not replace in-kind. With the onset of BLS and the threat of EAB, there is a good chance that large numbers of ash tree removals will be required.

Newly Planted: NPS is reluctant to plant more ash trees because of the threat of EAB. Until further NPS management decisions are made, do not replace any Ash trees that are removed in the area along Memorial Drive between the baldcypress circle and the Old Cathedral parking lot, because there was not a tree planting here historically or in Kiley's design. Likewise, do not replace ash on the east side slopes near the Grand Staircase. (In contrast, the trees in the single-species planting along the walks within the Memorial grounds should be treated per the EAB Strategy (2009) as noted in the previous section.) Where ash exist on other areas of the Memorial grounds, replace with a canopy tree such as ginkgo, or white, red or bur oak. If these trees are unavailable or unsuitable, replace ash with another canopy tree from the limited species palette.

Reference:

Notes:

BALDCYPRESS

Taxodium distichum

GENERAL



There are 160 baldcypress located on the Memorial grounds, primarily in the circles near the north and south ponds. Others are located along Leonor K. Sullivan Boulevard and near the maintenance facility. These include several distinct plantings, and different pruning is required to maintain the form of each.

Baldcypress are native to North America and are found in swamps and wetlands. A unique characteristic of baldcypress are the cypress "knees" that project from the ground as far away as a few feet from the trunk. Typically, these are formed only on wet sites, but the trees at the Memorial exhibit some knees. Knees should be protected during mowing/site maintenance. Baldcypress is one of the few deciduous conifers, which means they lose their needles in the fall. Baldcypress become chlorotic when soil pH is above 7.5. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Height: 60' to 80'

Width: 20' to 45'

Common uses: Screening trees, street tree.

Natural form: Conical to columnar.

CHARACTERISTIC USE: BALDCYPRESS CIRCLES

DESIGN PURPOSE:

The intent of the baldcypress circles was to create enclosed spaces with vistas of the Gateway Arch. The genesis of these spaces lay in the original design competition requirement that the Memorial have circular "council ring" or "campfire" areas, like those typically found in other national parks.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Be aware of and protect the cypress knees during mowing. Mow or trim by hand near the knees and trunk.

Mulch: Mulch (per recommended specifications) every spring. Position mulch around and between the cypress knees, and spread evenly, feathering the edge of the mulched area out into surrounding grass to evoke a more naturalistic edge rather than a sharply circular mulch ring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the trees ina relatively tightly-spaced, circular planting at the south circle. Maintain the north circle as a tightly-spaced, irregular circle. Prune as needed to maintain the natural habit of the trees. At the north circle, selectively prune to ensure that the view to the Gateway Arch is maintained, as needed.

Young Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Structural prune, prune to clean.

Mature Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Prune to clean.

Tree Condition Monitoring Inspection:

Insect and Disease: No major insects or diseases typically affect these trees.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. Do not plant new trees in the opening that provides a view to the Gateway Arch from each circle. Newly planted trees need to be heavily watered until stable.

Reference: \cut sheet fs_tadi2-bald cypress.pdf

CHARACTERISTIC USE: STREET TREES

DESIGN PURPOSE:

Kiley intended single rows of trees to be planted on both sides of Leonor K. Sullivan Boulevard, spaced approximately 40 feet on center. Currently, there are baldcypress planted only on the west side of the street.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Be aware of the baldcypress knees during maintenance. Remove knees cleanly at ground level if they create tripping hazards.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain a row of evenly-spaced trees along the street and sidewalk between the grand staircase and the overlook stairs on either side. Raise to 12' above the ground to provide even vertical clearance for pedestrian and vehicular traffic on adjacent sidewalk and street.

Young Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Structural prune, prune to clean.

Mature Trees

Pruning objective: Maintain health and structure and improve aesthetics.

Pruning types: Prune to clean.

Tree Condition Monitoring Inspection:

Insect and Disease:

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. New trees must be heavily watered until stable.

Reference: \cut sheet fs_tadi2-bald cypress.pdf and \TAXDISA.pdf

EASTERN REDBUD

Cercis canadensis

GENERAL



There are more than 100 eastern redbuds scattered across the Memorial grounds, including at the maintenance facility, east side slopes, pond planting areas, and service areas.

Native to eastern North America, the eastern redbud is a common understory tree that offers bright spring color. The fruit is a flat reddish-brown pod.

Height: 20' to 35'

Width: 25' to 35'

Common uses: understory tree.

Natural form: low-branching flowering tree, often multi-stemmed.

CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

Kiley's design concept for the pond areas included eastern redbud as a flowering understory tree that was part of the pond area plantings. It was an element of texture and color within a massing that was to be reminiscent of a forest with open meadow areas. The concept for planting included a few tall canopy tree species planted in groves; and several species of flowering trees (including redbud) planted as an understory fringe around the canopy tree groves. (CLR, 2010)

Along the east side slopes, eastern redbud (along with other flowering trees such as dogwood) was intended to be interplanted at the edges of dense pine plantings screening the railroad cuts in order to provide color and textural contrast.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed. Adaptable to acid or high pH.

Roots:

Mulch: Mulch groupings instead of individual rings where possible in order to enhance the intended forest-like planting appearance around the pond areas. Feather mulch at the edges into the grass, rather than creating a sharp circle or line.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree. In the Memorial's plantings, these are intended to look like understory forest trees and should not be heavily pruned or maintained as specimens. Maintain optimal conditions for seasonal flowering.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Verticillium wilt and canker.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. Redbud is not easily transplanted, and should be balled and burlapped during the dormant season or spring. Look for single-stem, well-branched nursery stock.

Reference: \Cut Sheet cs_ceca4-eastern redbud.pdf

RED MAPLE

Acer rubrum

GENERAL



There are 60 red maples at the Memorial grounds, located primarily around the north and south ponds, as well as forming a grove near the Old Cathedral; there are also a few in the screen planting around the south service area.

Red maples are native throughout the northeastern and central United States, and many varieties are available. They are popular for their fall color of yellow-red to fire red.

Red maples have a shallow root system and surface roots may cause sidewalk damage. They can become chlorotic in certain soils. (Gerhold, Wandell, Lacasse, & Schein, 1989)



Height: 50' to 75'

Width: 30' to 70'

Common uses: Canopy tree, street tree.

Natural form: Young trees are pyramidal and grow into a rounded oval.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Kiley's plan did not include red maples. The NPS, in interpreting Kiley's plan, added red maples. The grove of maples near the Old Cathedral is non-contributing, having been added later. The trees in the screen plantings around the south service area include a mixture of species, and were never detailed by Kiley. The maples contribute to the screening function of these plantings.

Kiley's design concept for the pond planting included a few tall canopy tree species planted in groves; and smaller flowering trees planted as an understory fringe around the canopy tree groves to provide color and texture. (CLR, 2010) Red maples were not included in this plan, and their moderate stature means they do not fulfill the canopy concept as well as other trees would.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Typically very shallow.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form in all planting areas.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% canopy crown not to exceed 25%), prune to raise, prune to shape (not to include limbs over 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4")

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Cottony camellia/maple scale, verticillium wilt, leafhoppers.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: In the pond area, if using red maple as an understory tree among larger canopy trees, they may be retained and replanted. Consider replacing red maples with another species more suited to the canopy-scale concept for the pond areas, such as hackberry, red or white oak, or another tree from the Kiley or NPS planting lists.

Reference: \Cut Sheet fs_acru-maple red.pdf and \Cut Sheet pg_acru-maple red.pdf

GREENSPIRE LINDEN

Tilia cordata 'Greenspire'

GENERAL



There are 59 Greenspire lindens at the Memorial. These are located in the north and south pond area plantings, the service area, and near the maintenance facility.

Greenspire linden, originally from Europe, has a strong central leader and upright growth habit. While it is broadly adaptable to soil pH levels, soil compaction and sun conditions, Greenspire is sensitive to drought and salt. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Height: 50' to 70'

Width: 35' to 50'

Common uses: Canopy tree, street tree.

Natural form: Pyramidal in youth growing into a rounded pyramidal shape with dense branching as it matures.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Kiley's design concept for the pond areas relied on a limited number of species and a large number of trees, providing massing that was to be reminiscent of a forest with a few open meadow areas. The concept for planting included a few tall canopy tree species planted in groves; and several species of flowering trees planted as an understory fringe around the canopy tree groves to provide color and texture. (CLR, 2010) Lindens were not among Kiley's planned trees in this area, but were added later.

Kiley intended dense plantings along Poplar Street in order to screen the maintenance area from view. Although linden was not specified, NPS chose to include it in their interpretation of Kiley's planting plan in this area.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots:

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain health and structure and retain the tree's natural form. In pond areas, trees should be maintained as canopy layer trees to fulfill Kiley's design concept for these areas. Prune to maintain screening function at maintenance area.

This species may require pruning of basal sprouts.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, maintain screening function at maintenance area.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats identified.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Lindens may be replaced in kind; consider a native substitute (American linden). Other trees that may be considered for replacing lindens in the pond areas are the canopy trees on Kiley's original planting list and the NPS list, such as hackberry, white oak, bur oak, red oak, tulip poplar, or Kentucky coffeetree. American beech and sycamore or London planetree are other potential alternatives.

Reference: \Cut Sheet fs-TILCORC-linden greenspire.pdf

RADIANT CRABAPPLE, ROBINSON CRABAPPLE, SNOWDRIFT CRABAPPLE, PROFUSION CRABAPPLE

Malus 'Radiant,' *Malus* 'Robinson,' *Malus* 'Snowdrift,' *Malus* 'Profusion'





GENERAL

There are 57 Radiant, 51 Snowdrift, and 43 Robinson crabapples located on the Memorial grounds. Most are planted around the ponds. Others are at the east side slope plantings, maintenance facility, Luther Ely Smith Square, parking garage and service area screen plantings. Radiant crabapple trees are being replaced with *Malus* 'Robinson.' Luther Ely Smith Square only has Profusion planted.

Crabapples are popular due to their ornamental qualities. They offer a variety of spring color and high wildlife value. While they are adaptable to many soil types, crabapples prefer full sun in well drained, acidic soil. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Height: 10' to 35'

Width: 10' to 25'

Common uses: Understory tree, street tree, groves, flowering tree.

Natural form: 'Radiant' has a rounded form; 'Snowdrift' and 'Profusion' are upright and spreading.

CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

The crabapple, as a small flowering tree, contributes to the historic character of the pond planting areas and the east side slope plantings.

Kiley chose crabapples to form part of the flowering understory at the pond areas. The concept for planting included a few tall canopy tree species planted in groves; and several species of flowering trees planted as an understory fringe around the canopy tree groves to provide color and texture. (CLR, 2010)

Plants proposed around the service areas and east side slopes were to visually screen these operational functions and discourage visitors from approaching. Canopy and flowering trees were to be planted along the slopes. (CLR, 2010)

The plantings of crabapple around the maintenance facility, at Luther Ely Smith Square, and near the parking garage and service areas are compatible with, but do not contribute to the historic character.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Mulch: Mulch (per recommended specifications) every spring.

Pond Area Mulch: Mulch groupings instead of creating individual tree rings where possible in order to support a forest-and-meadow appearance in the pond areas.

Design Driven Pruning

Pruning objectives: Maintain the natural form of this tree. Flowering trees should not be pruned or maintained as specimen trees.

Young Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats identified.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: The crabapples may be replaced in kind. Replacing the Radiant crabapple with Robinson is acceptable. Consider substitutions of any of the flowering trees from Kiley's plant list in the pond areas, including eastern redbud, Washington hawthorn, or flowering Oriental cherry.

Snowdrift crabapples were used to replace flowering dogwood, which performed poorly at the memorial. Other possible substitutions for flowering dogwood include Stellar Series dogwood (*Cornus* 'Rutgers Hybrids'), Kousa dogwood (*Cornus kousa*), or Japanese tree lilac (*Syringa reticulata*).

Reference: \Cut Sheet fs-MALXD-crabapple snowdrift.pdf

HONEYLOCUST

Gleditsia triacanthos 'inermis'





GENERAL

There are 51 honeylocusts on the Memorial grounds. They are scattered throughout the landscape, and are found near the ponds, service areas, and maintenance facility, both as individual tree plantings and as part of multi-species screen plantings.

Honeylocust is commonly used in urban plantings because of its ability to withstand many harsh urban conditions such as salt, heat, drought, and compaction. They have a broadly ovate, spreading shape with fine, feather-like texture. Filtered sunlight allows grass to grow under the canopy. (Gerhold, Wandell, Lacasse, & Schein, 1989) The species has thorns; a thornless variety is what has been used on the Memorial grounds, and is recommended for any future use.

Height: 40' to 80'

Width: 40' to 70'

Common uses: Canopy tree, street tree.

Natural form: Broadly oval spreading canopy.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Honeylocust was not included in Dan Kiley's final planting plan, although he did suggest it in 1996 as a possible species for the allées, which would later be planted in Rosehill Ash instead (CLR, 2010, 5-32). The NPS included honeylocust in their interpretation of Kiley's plan, but did not use it for the allées. None of the existing honeylocust trees contribute to the significance of the Memorial, although they are compatible with its character.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots:

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree. In the pond areas, maintain as canopy layer trees to fulfill Kiley's planting concept.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Honeylocust mite, honeylocust leafhopper, thyronectria.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. It has been noted that ironwood have been tested as a potential replacement species for the honeylocust on site and while Ironwoods generally perform well in the Midwest the tree form is different of the honeylocust. Recommend planting Kentucky coffeetree as a replacement. (See page 6-37 for more information on Kentucky coffeetree.)

Reference: \Cut Sheet fs_gltr-honeylocust.pdf and \Cut Sheet pg_gltr-honeylocust.pdf

BRADFORD PEAR

Pyrus calleryana 'Bradford'



GENERAL

There are 52 Bradford pears on the Memorial grounds, mostly in a grove on the east side of the parking garage. A few others are planted at the north and south ponds.

Although popular for their tolerance of urban conditions and uniform appearance, Bradford pears present numerous problems. These include a shallow root system, weak interior branching structure, suckers, and tree splitting. Bradford pears are now considered an invasive species and should not be planted.

Height: 40' to 50'

Width: 35' to 45'

Common uses: street tree, flowering tree.

Natural form: Broadly conical in youth and maturity.

CHARACTERISTIC USE: FLOWERING TREE

DESIGN PURPOSE:

This tree was not in Kiley's final planting list. Bradford pears were introduced by the NPS as a flowering tree in their 1978 final planting plan. The majority are in the vicinity of the Gateway Arch Parking Garage, an area where Kiley did not specify any plantings, thus the plantings here do not contribute to the historic character of the Memorial.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Shallow roots – protect with mulch.

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: These trees are non-contributing and do not have design driven Pruning objective; consider retaining their natural form.

Young Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threat other than weak branch structure.

Tree Removals: Refer to general guidelines in chapter one of this plan. Bradford pears are considered invasive and should be removed.

Newly Planted: Bradford pears should not be replanted. If replacement trees are desired, select for appropriate landscape value (for example, when replanting trees at the parking garage, select for effective screening). From a preservation maintenance perspective, the plantings in the parking garage do not necessarily need to be replaced at all. There was no planting identified in this area by Kiley and they are in a low-visibility location.

Consider using a tree from the Kiley or NPS original planting list or another tree already in use on the grounds to maintain a consistent palette of plants within a limited number of species. Consider eastern redbud, crabapple, and magnolia, for example.

Reference: \Cut Sheet fs-PYRCALB-pear bradford.pdf and \Cut Sheet fs-PYRCALC-pear redspire.pdf

WASHINGTON HAWTHORN AND WINTER KING HAWTHORN

Crataegus phaenopyrum and Crataegus viridis 'Winter King'



GENERAL

There are currently 33 Washington and 3 Winter King hawthorns on the Memorial grounds. Most are planted in small groups in the pond areas. Others can be found near the service areas and maintenance facility.

This wide-spreading flowering tree develops a main stem with ascending branches. Hawthorns are known to hybridize naturally. Sometimes suckering will occur on grafted trees. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Height: 25' to 30'

Width: 25' to 30'

Common uses: flowering tree, ornamental tree.

Natural form: Hawthorn species are typically low-branching with a broadly ovate form. Winter King is broadly vase-shaped.



CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

Kiley specified Washington hawthorn for planting as a flowering understory tree as part of the massing in the pond area that was to be reminiscent of forest and meadow. These flowering trees were to be planted as part of the understory fringe around groves of a few tall canopy tree species. (CLR, 2010)

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Suckering with commonly occur on *C. phaenopryrum*, the common rootstock.

Pond Area Mulch: Mulch groupings instead of creating mulch rings around individual trees where possible in order to create a forest and meadow feel rather than groomed, manicured park.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree. Flowering trees should not be maintained as specimens.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs over 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% canopy crown not to exceed 25%), prune to shape (not to include limbs greater than 4")

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Lacebug (LAC); mealybugs; cedar-hawthorn rust.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind (give preference to Winter King).

Reference: \Cut Sheet fs-CRAPHAA-hawthorn washington.pdf and \Cut Sheet fs-CRAVIRA-Hawthorn winter king.pdf

Notes: Kiley only specified Washington Hawthorn.

SAUCER MAGNOLIA AND SWEETBAY MAGNOLIA

Magnolia x soulangeana and Magnolia virginiana





GENERAL

There are 29 saucer and 7 sweetbay magnolias on the Memorial grounds. These are located around the north and south pond, east side slopes, and at the north overlook.

Saucer and sweetbay magnolias are low, spreading, ornamental flowering trees.

SAUCER MAGNOLIA

Height: 20' to 30'

Width: Widely varies

Common uses: Large flowering tree.

Natural form: Low branched upward arching rounded canopy.

SWEETBAY MAGNOLIA

Height: 10' to 20'

Width: 10' to 20'

Common uses: Understory tree.

Natural form: Single-stem tree or multi-stem shrub form.

CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

Kiley specified saucer magnolias and star magnolias (*Magnolia stellata*) in his final planting plan, to be used as canopy trees. Their seasonal flowering was to provide color and texture. In the NPS interpretation of the Kiley plan the saucer magnolia was retained, but its category was changed to an understory tree due to the lack of height these typically have in the St. Louis area. Rather than being intermixed with the canopy trees, it would form part of the edge to the symbolic forest areas by the ponds. The star magnolia was replaced in the NPS planting plan. Sweetbay magnolias were introduced to the Memorial grounds after the 1978 final NPS planting plan.

Kiley identified magnolias as potential canopy trees, while NPS considered them akin to redbud and dogwood as flowering understory due to their smaller stature. The may be considered or interpreted as part of what was intended to be the understory fringe in the pond areas. (CLR, 2010)

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Pond Area Mulch: Mulch groups of trees instead of creating individual rings wherever possible in order to create forest and meadow feel. Feather the mulch edges out into surrounding grass rather than leaving a crisp edge.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree. Flowering trees were not intended to be pruned as specimens.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape, prune for clearance.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Magnolia scale (MGS).

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace magnolias in kind. Before replacing saucer magnolias with another species, first try different varieties such as: 'Alexandrina', 'Brozonii', 'Lennei', 'Verbanica'. Try to determine the cause of decline among the saucer magnolias and possibly find a remedy. If a replacement species is necessary, it should match the form and size of the saucer magnolia.

Reference: \Cut Sheet fs-MAGSOUA-magnolia saucer.pdf and \Cut Sheet fs-MAGVIRAmagnolia sweetbay.pdf

Note: Saucer magnolia and star magnolia were listed under canopy trees in Kiley's plan. The NPS listed the saucer magnolia as an understory tree.

JAPANESE BLACK PINE

Pinus thunbergii



GENERAL

There are currently 23 Japanese black pines on the Memorial grounds. The majority can be found on the east side plantings while others are near the maintenance facility.

This evergreen tree was commonly used until the 1990s, when it declined in popularity because it suffered from many insects and diseases.



Height: 20’ to 100’

Width: 20’ to 50’

Common uses: screening tree.

Natural Form: shrubby, wide spreading.

CHARACTERISTIC USE: SCREENING TREE

DESIGN PURPOSE

Japanese black pine was not specified by Kiley in his final planting plan. The NPS used it as a substitution for Canadian hemlock in areas where plantings were intended to screen views, such as along the railroad cuts and around the service areas. However, it reportedly did not grow well and a number of these trees have since been removed.

The plantings proposed around the service areas are intended to visually screen these operational functions and discourage visitors from approaching. (CLR, 2010) Proposed massed tree plantings along the railroad cuts and east side slopes in the final NPS plant list included Japanese black pine. (CLR, 2010)

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Salt tolerant.

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain the natural form of tree and fulfill its screening function.

Young Trees

Pruning objective: Maintain health and structure, retain screening function.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape, prune for clearance.

Medium Aged Trees

Pruning objective: Maintain health and structure, retain screening function.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs over 4").

Mature Trees

Pruning objective: Maintain health and structure, retain screening function.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs over 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Pine needle scale (PNS); pine sawflies (SAW); sphaeropsis tip blight (DIP); bark beetles; bark adelgid; pine spittlebug; pine tortoise scale; pine webworm; and European pine shoot moth.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. If a different species is desired, consider Vanderwolf limber pine, (*Pinus flexilis* 'Vanderwolf's Pyramid').

Reference: \Cut Sheet fs_pith2-pine japanese black.pdf

SUGAR HACKBERRY

Celtis laevigata





GENERAL

There are 23 sugar hackberries on the Memorial grounds, located in the north and south pond planting areas. Sugar hackberries are tolerant of urban conditions, and are replacing sugar maples designated in NPS's planting plan.

Height: 40' to 50'

Width: 30' to 40'

Common uses: Street or canopy tree.

Natural form: Upright, spreading habit.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

The common hackberry (*C. occidentalis*) was specified by Kiley to be part of the abstracted forest's canopy layer around the north and south ponds. The hackberry was later removed from the NPS interpretation of Kiley's plan. Sugar hackberry was introduced between 1986 and 1995 to replace other species that failed to thrive on the Memorial grounds.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed. Hackberries can become chlorotic in alkaline soils.

Roots: Wide spreading.

Mulch: Mulch (per recommended specifications) every spring.

Pond Area Mulch: Mulch groups of trees instead of creating individual rings wherever possible in order to create forest and meadow feel. Feather the mulch edges out into surrounding grass rather than leaving a crisp edge.

Design Driven Pruning

Pruning objectives: Maintain the tree's natural form as part of the canopy tree layer in the pond area plantings.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape, prune for clearance.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to exceed limbs over 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), Prune to shape (not to include limbs over 4")

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threat.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replant in kind. Consider using hackberry for other canopy tree replacements in the pond areas and east side plantings (such as for replacing Rosehill ash and sugar maple). Transplant only in the spring; they tend to be slow to recover from transplant.

Reference: \Cut Sheet fs-CELLAEA-hackberry sugar.pdf

Notes: Slow growth in reaching maturity.

River Birch and River Birch 'Heritage'

Betula nigra and Betula nigra 'Heritage'



General

There are 55 river birches and 22 'Heritage' river birches on the Memorial grounds. The majority of these trees are located around the north and south pond plantings. In the wild, river birch are found in moist lowlands and along waterways.

Height: 40' to 70'

Width: 40' to 60'

Common uses: Canopy tree.

Natural form: Youth habit is pyramidal to oval and typically rounded at maturity. Can be single- or multi-stemmed.

Characteristic Use: Canopy Tree

Design Purpose:

This tree was not specified by Dan Kiley nor the NPS plant list. It was a later addition that is not in keeping with the intended designed forms and limited number of species indicated for the pond area plantings.

Kiley's design concept for the pond areas relied on a limited number of species and a large number of trees, providing massing that was to be reminiscent of a forest with a few open meadow areas. The concept for planting included a few tall canopy tree species planted in groves; and several species of flowering trees planted as an understory fringe around the canopy tree groves to provide color and texture. (CLR, 2010) The river birch are planted in small groups and singly, and are neither a canopy tree nor a flowering understory tree; they do not fit into the planting concept. The continued use of this tree is incompatible with the historic character of the Memorial.

Maintenance

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Prefer moist and acidic soils; high pH – chlorosis can be serious.

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Bronze birch borer (BBS); birch leaf miner (BLM); dusky birch sawfly.

Tree Removals: Do not replant river birch once they are removed. Consider replacing these trees in the pond areas with some of the flowering understory trees identified in Kiley's planting list, such as eastern redbud, hawthorn, crabapple, or magnolia. Also consider canopy trees such as sugar hackberry, Kentucky coffeetree, or American beech.

Reference: \Cut Sheet fs-BETNIGB-birch river heritage.pdf and \Cut Sheet pg_beni-birch river.pdf

Notes: Some research excludes river birch from bronze birch borer threat.

JAPANESE PAGODATREE OR SCHOLARTREE

Styphnolobium japonicum



GENERAL

There are 5 Japanese pagodatrees on the Memorial grounds, located in the north pond area. Pagodatree is native to China and tolerant of urban conditions. The late-blooming flowers usually occur on trees after 10 years.

Height: 40' to 70'

Width: 40' to 70'

Common uses: Street tree, canopy tree.

Natural form: Broadly ovate with upward spreading branches.



CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Japanese pagodatrees were listed in both the final Kiley and NPS plant lists as canopy trees. It appears that they were intended to be intermixed with the "forest" groves. They are planted in loose clusters within the pond areas.

The Saarinen/Kiley plan proposed a dense planting of Japanese pagodatrees at the main parking area on the north end of the Memorial. The intent of this planting was presumably to shade and screen views of the proposed parking area. (CLR 2010) These were never planted due to the construction of a parking garage rather than a surface lot.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Tolerates urban conditions.

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree as part of the intended pond area forest canopy layer.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape, prune for clearance.

Note: Can be difficult to properly train upright.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Twig blight; canker; nectria canker; mildew; leaf hoppers

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Consider replacing in-kind, or consider a similarly-scaled but native tree species, preferably from the Kiley or NPS planting lists, such as white or red oak, tulip poplar, red maple, Kentucky coffeetree. Transplant balled and burlap only in the spring. Yellow buckeye, (*Aesculus octandra*) is another option as a replacement tree. It has a upright-oval habit, and grows 60' high and a 35'wide. The yellow buckeye has large yellow flowers that bloom in May and June. Golden rain tree (*Koelreuteria paniculata*) is another option for a replacement tree. It is not native to Missouri but the 30-40' high and spread, vase/globe shape, and bright yellow flower in May to July resemble Japanese padgodatrees.

Reference: \Cut Sheet fs-SOPJAPA-pagodatree japanese.pdf

Notes: Leaves, flowers, and fruit can stain sidewalk.

SWAMP WHITE OAK, BUR OAK AND RED OAK

Quercus bicolor, Quercus macrocarpa, and Quercus rubra

GENERAL

There are 50 swamp white oaks, 44 bur oaks, and 18 red oaks on the Memorial grounds. Most of the swamp white oaks and red oaks, and a few bur oaks, are around the north pond. Bur oaks are mostly around the south pond, along with a few swamp white and red oaks. A few swamp white oaks are on the east side slopes. Some oaks are also located around the maintenance facility and service areas.

Oaks are hardy native forest canopy trees. In urban conditions they are typically used as street trees and in parks.

SWAMP WHITE	BUR OAK	RED OAK
Height: 60’ to 80’	Height: 70’ to 90’	Height: 60’ to 80’
Width: 50’ to 80’	Width: 60’ to 90’	Width: 45’ to 65’

Common uses: Canopy tree, street tree.

Natural form: Swamp white oak: pyramidal at youth and rounded at maturity; bur oak: broadly globular form; red oak: rounded growth habit.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

White oaks and red oaks were intended by Kiley, the 1978 NPS interpretation substituted bur oak. The swamp white oak (similar to white oak) was added after 1978. Kiley’s design concept for the pond areas included a few tall canopy tree species, such as oaks, planted in groves meant to evoke forests. (CLR, 2010)

Plants proposed around the service areas were to visually screen these operational functions and discourage visitors from approaching. Canopy and flowering trees were to be planted along the slopes. (CLR, 2010)

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

- Swamp white oak: Chlorosis may occur in alkaline soils. Prefers acidic soil.
- Bur oak: Acclimated to a wide range of soils.

- Red oak: Chlorosis may occur in soils with a pH greater than 7.5. Prefers well drained, acidic soil.

Mulch: Mulch (per recommended specifications) every spring.

Pond Area Mulch: Mulch groupings instead of individual rings where possible in order to create forest and meadow feel rather than groomed, manicured park. Create paths (could be grass clippings or mulch) in and between trees from sidewalk to the pond in order to create an invitation to the pond.

Design Driven Pruning

Pruning objectives: Maintain the natural form of the trees, as the intended canopy layer in the pond areas.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape, prune for clearance.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Anthracnose; bacterial leaf scorch (BLS); oak wilt; obscure scale; oak blotch leafminer.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: All swamp white oaks should be replaced with bur oaks; All others should be replaced in kind. Transplant balled and burlapped in the spring.

Reference: \Cut Sheet cs_qubi-oak, swamp white.pdf ; \Cut Sheet cs_quma2-oak, bur.pdf ; \Cut Sheet cs_quru-oak, northern red.pdf

Notes: Bur oaks may show transplant shock. Red oaks are easily transplanted.

SWEETGUM

Liquidambar styraciflua



GENERAL

There are currently 13 sweetgum trees on the Memorial grounds. All are located at Luther Ely Smith Square.

Sweetgum is commonly planted for its fall color and symmetrical crown, frequently in lawns, parks, and along streets (Gerhold, Wandell, Lacasse, & Schein, 1989). However, the species has large fruiting bodies that are a nuisance on walks.

Height: 50' to 75'

Width: 40' to 65'

Common uses: canopy tree, street tree,

Natural form: symmetrical crown when young maturing into a ovate form.



CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Kiley's originally conceived planting of tulip poplars was intended to visually connect Luther Ely Smith Square to the main portion of the Memorial grounds. This extension of the allées was never implemented. (CLR, 2010) Instead of tulip poplar (intended) or ash (implemented in remainder of grounds), there are two alternating rows of sweetgum along the north and south sides of the square. This planting is considered non-contributing.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed. Iron chlorosis occurs with high pH. Prefers acid soil.

Roots: Shallow and wide spreading.

Mulch: Mulch (per recommended specifications) every spring.

Pruning objectives: Maintain the natural form of tree; raise to 7 feet above ground surface to enable pedestrian clearance on adjacent sidewalk.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Bleeding necrosis of bark; leaf spots; webworm; caterpillars; scale

Tree Removals: Recommended specifications apply.

Newly Planted: Do not replace in kind. If replacement is necessary, consider a species that matches the trees lining the walks in the eastern part of the Memorial (currently Rosehill ash).

Reference: \Cut Sheet cs_list2-sweetgum.pdf and \Cut Sheet fs_list2-sweetgum.pdf

Notes:

KENTUCKY COFFEETREE

Gymnocladus dioicus



GENERAL

There are currently 12 Kentucky coffeetrees on the Memorial grounds, located in the north and south pond planting areas.

A somewhat uncommon tree in landscapes, the Kentucky coffeetree is tolerant of urban conditions and a range of soil conditions. Its double compound leaflets do not block sun and allow grass to grow underneath.

Height: 55' to 75'

Width: 45' to 65'

Common uses: Canopy tree.

Natural form: Young habit is irregular; mature habit is obovate with rugged branch structure.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

This tree was not specified by Kiley, but was chosen as a canopy species in the 1978 NPS interpretation of Kiley's plan and was installed in the pond areas, where it functions as a canopy tree, contributing to the intended massing that was to be reminiscent of a forest.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Will sucker if roots are disturbed.

Mulch: Mulch (per recommended specifications) every spring.

Design Driven Pruning

Pruning objectives: Maintain the natural form of tree as one of the canopy tree layer in the pond areas.

Young Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. Transplant balled and burlapped in the spring; may show transplant shock.

Reference: \Cut Sheet fs_gydi-coffeetree kentucky.pdf

Notes: Pods and leaves can cause litter issues. Intolerant of shade.

PAGODA DOGWOOD AND FLOWERING DOGWOOD

Cornus alternifolia and Cornus florida





GENERAL

There are currently 2 flowering dogwoods and 8 pagoda dogwoods on the Memorial grounds. The majority are around the north pond, with fewer at the south pond. Others are located near the parking garage and north overlook.

Flowering dogwoods are popular understory trees have strong horizontal branching patterns and are often multi-stemmed. The large flowers appear in April–May and ornamental red fruit ripens in late September.

Height: 20' to 30'

Width: 20' to 30'

Common uses: flowering tree, understory tree.

Natural form: Strong horizontal branching patterns with rounded to flat topped crown.

CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

Pond Planting Area: Kiley specified flowering dogwood (*C. florida*) among other flowering understory trees for plantings in this area as part of a massing that was to be reminiscent of forest and meadow. The concept for planting included groves of canopy trees with flowering trees, including dogwood, planted as an understory fringe around the canopy tree groves to provide color and texture. (CLR, 2010) Though dogwoods were planted in this area, they are scattered in small groups and individual plantings rather than grouped around groves of canopy trees.

Kiley proposed densely massed plantings of evergreens and other screening vegetation intermixed with flowering dogwood and redbud to add color and texture at the railroad open cuts, service areas, and east side slopes, although none are evident in this area today. (CLR, 2010)

The flowering dogwood has not performed well on the Memorial grounds, and pagoda dogwood was planted in some places as a replacement, although its performance at the Memorial grounds is reported to also not be good.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Mulch: Mulch (per recommended specifications) every spring.

Pond Area Mulch: Mulch groupings instead of individual rings where possible in order to create forest and meadow feel rather than groomed, manicured park. Create paths (could be grass clippings or mulch) in and between trees from sidewalk to the pond.

Design Driven Pruning

Pruning objectives: Maintain the natural form as an understory forest tree. Flowering trees should not be maintained as specimens. Prune to maintain optimal conditions for seasonal flowering.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Discula anthracnose (DIS); dogwood borer.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in kind. If disease or other problems becomes too significant to warrant in-kind replacement and other varieties have been tried, replace with another flowering tree with similar size, habit, texture, and color, such as Korean dogwood (*Cornus kousa*), Stellar Series Dogwood (*Cornus* 'Rutgers Hybrids'), or Japanese tree lilac (*Syringa reticulata*). Also consider flowering trees on Kiley's original plant list, such as eastern redbud, hawthorn, crabapple, or magnolia.

Transplant balled and burlapped in the spring; may show transplant shock.

Reference: \Cut Sheet fs_cofl2-flowering dogwood.pdf

BLACKGUM

Nyssa sylvatica



GENERAL

There are 6 blackgum trees on the Memorial grounds, located in the east side slope plantings and south pond plantings.

Blackgum is a native understory tree typical of North American forests; the trunk is typically straight with a horizontal branching habit. Blackgum has a bright red fall color.

Height: 40’ to 50’

Width: 30’ to 45’

Common uses: Understory tree.

Natural form: Trunks are typically straight with a horizontal branching habit.

CHARACTERISTIC USE: UNDERSTORY TREE

DESIGN PURPOSE:

Blackgum was not specified by Kiley or included in the NPS interpretation of Kiley’s plan. The existing blackgum trees were planted later, but fulfill the concept of understory trees providing color and texture in both the evergreen plantings of the east side slopes and the forest-meadow planting of the pond areas.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed. Growth is depressed with soil pH greater than 6. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Roots: Sensitive to compacted soils.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of tree.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure, improve view, and improve aesthetics.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats are identified.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Replace in-kind, or consider replacing with another similar understory tree with fall color. Transplant balled and burlapped in the spring; may show transplant shock. Watering is recommended for the first year.

Reference: \Cut Sheet fs_nysy-blackgum.pdf and \Cut Sheet pg_nysy-blackgum.pdf

RED PINE

Pinus resinosa

GENERAL



There are currently 4 red pines on the Memorial grounds, scattered among other trees on the east side slopes.

Red pines are native trees that naturally occur in poor sandy soils with rock outcrops. The wood is commonly used for commercial timber. The red pine was planted at the Memorial as a potential replacement for Japanese black pine.

Height: 60' to 100'

Width: 30' to 60'

Common uses: screening trees.

Natural form: Dense and conical in youth, symmetrically oval at maturity.

CHARACTERISTIC USE: SCREENING TREE

DESIGN PURPOSE:

Kiley proposed dense plantings screening the railroad cuts and along the east side slopes. Evergreens were intended to be the primary tree in these plantings, with flowering trees intermixed for color and texture. (CLR, 2010) Red pines were planted in these areas sometime after 1978.

The conifers Kiley originally specified were Canadian hemlock and baldcypress; the NPS revised planting plan retained the baldcypress and substituted Japanese black pine for hemlock. Red pine is a later addition to the Memorial grounds and is non-contributing, and its regular symmetrical form is different from the irregular shape of the conifers in the original tree lists.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Red pines are particularly sensitive to compacted soils.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree and retain its screening function.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure and prolong screening function.

Pruning types: Prune to clean, prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Pine needle scale (PNS), pine sawflies (SAW), sphaeropsis tip blight (DIP), bark beetles, bark adelgid, pine spittlebug, pine tortoise scale, pine webworm, and european pine shoot moth.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: If replacement is necessary, replant with 'Vanderwolf' limber pine, which is the current replacement species for Japanese black pine.

ZELKOVA

Zelkova serrata





GENERAL

There are currently 4 zelkovas on the Memorial grounds. These are located in the north and south pond planting areas.

Native to Japan, Korea, and China, this tree was popularized in North America as a substitute for the American elm due to its similar canopy structure.

Height: 50’ to 60’

Width: 50’ to 60’

Common uses: Street tree.

Natural form: Vase–shaped.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Zelkova was not specified by Kiley or included in the NPS interpretation of Kiley’s plan. It was a later addition that is not in keeping with the limited number of species indicated in Kiley’s design; its vase-shaped form is not like any of the other species on the Kiley or NPS plant lists.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed. Growth is depressed with soil pH greater than 6. (Gerhold, Wandell, Lacasse, & Schein, 1989)

Mulch: Mulch (per recommended specifications) every spring.

Pruning: Will split at crotch because of the narrow branching habit. It is important to prune to thin and structural prune when young.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree and fulfill the design form of the canopy layer trees in the pond areas.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: Canker, elm leaf beetle.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Do not replant zelkovas in kind. This tree is not associated with design significance, as it is not one of the trees specified originally and its distinctive vase shape is not similar in form to any of the canopy trees intended for the pond areas.

When replacement is necessary, replant with sugar hackberry, or red, bur, or white oak.

Reference: ..\ut Sheet fs-ZELSERA-zelkova.pdf

Notes: Zelkovas were planted at Jefferson as a potential replacement for sugar maples.

AMUR CORKTREE

Phellodendron amurense



GENERAL

There are currently 3 Amur corktrees on the Memorial grounds. These are located in the north and south pond area plantings.

Native to Japan and China, corktrees thrive in urban conditions.

Height: 35' to 45'

Width: 30' to 40'

Common uses: canopy tree.

Natural form: Broad-spreading canopy.



CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Amur corktree was not specified by Kiley or included in the NPS interpretation of Kiley's plan. It was a later addition that is not in keeping with the limited number of species indicated in Kiley's design. It is currently in the pond areas, which were intended to be populated with canopy trees and flowering understory trees.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Wide spreading. Consider this when construction or excavation projects occur in the vicinity.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs over 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: Do not replant Amur corktree. This tree is not associated with design significance, as it is not one of the trees specified originally and its distinctive form is not similar to any of the canopy trees intended for the pond areas. Replant with sugar hackberry.

Reference: \Cut Sheet fs-PHEAMUA-corktree amur.pdf

Notes: Low maintenance once desired branch structure is established.

- Amur corktrees were planted at the Memorial as a potential replacement for greenspire linden or sugar maple.

GINKGO

Ginkgo biloba





GENERAL

There is currently one ginkgo on the Memorial grounds, located near the maintenance facility.

Ginkgo is one of the best known examples of a living fossil and is classified in its own division, the Ginkgophyta. The tree is dioecious (separate male and female trees) and the female tree's fruits are considered a nuisance. Many male cultivars are available and are widely used in urban plantings.

Height: 50' to 80'

Width: 40' to 80'

Common uses: Canopy tree, street tree.

Natural form: upright form and horizontal branching.

CHARACTERISTIC USE: CANOPY TREE

DESIGN PURPOSE:

Ginkgo was included among the canopy trees in Kiley's planting list. He also suggested it as a potential tree to replace the ash as the single-species allée planting when consulted in 1996. The NPS removed this species from their final interpretation of Kiley's planting plan. The exsiting ginkgo was planted as a test near the maintenance facility.

MAINTENANCE

Soil Care: Follow recommendations based on initial soil test. Repeat test every 3 years. Apply soil amendments as needed.

Roots: Wide spreading.

Mulch: Mulch (per recommended specifications) every spring.

Pruning:

Design Driven Pruning

Pruning objectives: Maintain the natural form of the tree.

Young Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to raise, prune to shape.

Medium Aged Trees

Pruning objective: Maintain health and structure.

Pruning types: Structural prune, prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to raise, prune to shape, (not to include limbs greater than 4").

Mature Trees

Pruning objective: Maintain health and structure.

Pruning types: Prune to clean, prune to thin (prune 10-15% of canopy crown, not to exceed 25%), prune to shape (not to include limbs greater than 4").

Tree Condition Monitoring Inspection: Tree inspections should be conducted every 5 years.

Insect and Disease: No serious threats.

Tree Removals: Refer to general guidelines in chapter one of this plan.

Newly Planted: The fruit of the female tree has a strong and offensive odor. If new ginkgos are planted on the grounds, plant only males.

Reference: \Cut Sheet pg_ginkg-ginkgo.pdf

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7. Historic Character Recommendations for Concrete

HISTORIC CHARACTER RECOMMENDATIONS FOR CONCRETE

INTRODUCTION

The structures at the Memorial this plan addresses include the concrete walkways, the Overlooks, and the Grand Staircase. The historic character recommendations in this section are concerned with the visual appearance of the concrete surfaces at the Memorial grounds. These features in some cases are composed entirely of concrete slabs – such as walkways – and in other cases, the concrete is part of a larger, more complex structure, such as the overlooks and railroad tunnels. This LPMP does not address structural repairs, which lie outside the realm of day-to-day maintenance. Such repairs must be undertaken after investigation and planning by qualified structural engineers or historical architects, preferably those with extensive experience with Modern concrete structures.

Whenever repairs are needed on a historic feature, it is essential to identify and consider its desired historic character as part of the repair process. The historic character of the Memorial's concrete features is described in the CLR, and is discussed as relevant in the sections that follow.

This section provides basic technical information related to identification of typical concrete problems, and outlines the general scope of work to be undertaken. Historic concrete repair is a specialized skill, which should be undertaken by—or under the guidance of— qualified professionals, technicians, and/or tradespersons depending on the scope of the maintenance work, preferably those with extensive experience.

INSPECTION AND REPAIR OF CRACKS AND SPALLING IN CONCRETE

Historic concrete maintenance requires regular inspection of concrete features to establish baseline conditions, identify needed repairs, and monitor deterioration and the success of repairs.

Modern buildings and landscapes present unique challenges for preservation maintenance, because preservation of the monumental forms is equally important as (and in some cases, more important than) conservation of the original materials. Modern architectural historian Theodore Prudon notes, "It is not just how much remains of the original material that is important, but also how much of the original design is recognizable and visually cohesive." (Prudon, *Preservation of Modern Architecture* (2008), 158.) Saarinen and Kiley's design intent at the Memorial was to create a "unified form-world," in which the catenary curve is present in built forms throughout the grounds, reflecting the distinctive geometry of the Gateway Arch. The simple monumentality of this curve is enhanced through the repeated use of a few materials on a grand scale. Therefore, special care is needed in the maintenance and repair of concrete to ensure the integrity of the uniform surface.

The recommendations included in this maintenance plan are intended to slow deterioration and prevent damage to historic concrete, as well as address potential health and safety concerns. Major repairs and assessment of structural problems are beyond the scope of this maintenance plan (refer to the CLR for implementation projects). The guidelines presented here are interim measures to be taken in advance of any major repair work that may be necessary. These short-term measures should be completed in a manner that is technically correct and unobtrusive.

GUIDELINES FOR HISTORIC CONCRETE REPAIR

Cracking and spalling of historic concrete can indicate structural damage that requires assessment and repair by a trained professional structural engineer. Thresholds for treatment of concrete damage are identified below. In some cases, cracks allow moisture to penetrate the structure, resulting in structural damage. Elastomeric sealants can be used to seal cracks and joints to impede moisture. When these are used to repair cracks on historic concrete, the appearance of the sealant can be visually intrusive. Other sealant materials include urethane, polyurethane, and high-performance silicone. If sealants are used, test first on an inconspicuous area before applying it to the crack. Visual intrusion can be mitigated by matching as closely as possible to the surface color. In some cases, sand can also be broadcast onto the surface of the sealant to conceal the repair.



Figure 1. Highly visible patching of a crack with light-colored materials.

"In most cases, a mix design for durable replacement concrete should use materials similar to those of the original concrete mix. Prepackaged materials are often not appropriate for repair of historic concrete." (Preservation Brief 15: Preservation of Historic Concrete, (2007), 11)

Matching the color and texture of the patching materials is of paramount importance for a historic concrete feature. The use of an unobtrusive patching mix is recommended. Testing prior to repair includes determining the composition of the historic concrete (its aggregate, mortar, color, and finish). Develop a mix for patching that is matched as closely as possible to the historic concrete. "In general, repair material should match the composition of the original material (as revealed by laboratory analysis) as closely as possible so that the properties of the two materials, such as coefficient of thermal expansion and strength, are compatible." (*The Preservation of Historic Architecture* (2004), 152.) Avoid bright- or light-colored materials, such as white caulk, which, while inexpensive and easily available, has a very short life cycle for repairs, rendering it relatively ineffective, and is visually intrusive whether new or worn.

Information about historic concrete repair and maintenance is often updated as new techniques and materials are developed. It is recommended that maintenance staff consult with qualified professionals, or consider hiring or training a staff member who specializes in the repair and maintenance of the Memorial's extensive areas of historic concrete.

Before undertaking repairs, consult NPS Preservation Brief 15: Preservation of Historic Concrete, and relevant sections on concrete in the Department of the Interior's *The Preservation of Historic Architecture: The U.S. Government's Official Guidelines for Preserving*

Historic Homes (2004). See also the American Concrete Institute's how-to guides on visual condition assessments, available online at www.concrete.org.

CHARACTERISTIC USE: MONOLITHIC, UNIFIED SURFACE

The monolithic, uniform appearance of structures, often with an unbroken surface of smooth material such as concrete, is characteristic of Modern architecture. The monolithic appearance emphasizes the form and geometry of the structure as a whole. Such large expanses of concrete are found at the Memorial's overlooks, railroad open cut walls and tunnels, floodwalls, and along the pedestrian walks. Most of these features were constructed during Saarinen's lifetime, and they are important because they embody the original design of the Memorial grounds as a Modern masterpiece.

DESIGN INTENT

The design intent for the concrete structures at the Memorial was to create unified, monolithic surfaces using the catenary curve geometry found in the Gateway Arch and reflecting Saarinen's goal of a "unified form-world."

Inspection

"Inspection tasks involve monitoring protection systems, including sealant joints, expansion joints, and protective coatings; reviewing existing conditions for development of distress such as cracking and delaminations; documenting conditions observed; and developing and implementing a cyclical repair program. Conduct a visual conditions survey to identify and evaluate the extent, types, and patterns of distress and deterioration." (Preservation Brief 15: Preservation of Historic Concrete, (2007), 8.)

Superficial repairs that do not address underlying causes can aggravate issues such as interior drainage problems. Professional consultation is recommended for any instance where noticeable, chronic cracking or spalling occurs on large concrete structures (e.g. multiple patches and repairs have been undertaken over time on the same area of concrete, and cracking and spalling continues to occur). Inspections should be conducted on repairs that appear sound, in order to gauge their future performance or whether they may accelerate the deterioration of the original concrete. It is best to undertake concrete repair during frost-free months.

Concrete repair projects require a phased approach:

- Phase 1: Development of procedure for trial development;
- Phase 2: Trial repairs (including mock-ups);
- Phase 3: Evaluation of trial repairs; and
- Phase 4: Repair work.

Repair

CRACKING

There are different types of cracks found in concrete structures:

- **Structural cracks** can result from temporary or continued overloads, uneven foundation settling, or original design inadequacies.
- **Thermally-induced cracks** frequently occur at the ends or corners of older concrete structures built without expansion joints capable of relieving stresses from exposure to seasonal temperature changes.
- **Random surface cracks** (or "map" cracks), which deepen over time and exude a white gel which hardens on the concrete surface, are caused by an adverse reaction between the alkalis in cement and some aggregates.



Figure 2. Cracking in concrete pavement

"Cracks larger than hairline cracks, but less than approximately one-sixteenth of an inch, can be repaired with a mix of cement and water. If the crack is wider than one-sixteenth of an inch, fine sand should be added to the mix to allow for greater compatibility, and to reduce shrinkage during drying. Conduct field trials to determine whether the crack should be routed (widened and deepened) minimally before patching to allow sufficient penetration of the patching material…. When it is desirable to reestablish the structural integrity of a concrete structure involving dormant cracks, epoxy injection repair should be considered. An epoxy injection repair is made by sealing the crack on both sides of a wall or a structural member with an epoxy mortar, leaving small holes, or "ports" to receive the epoxy resin. After the surface mortar has hardened, epoxy is pumped into the ports. Once the epoxy in the crack has hardened, the surface mortar can be ground off, but the repair may be visually noticeable." (*The Preservation of Historic Architecture* (2004), 152) Because of this, epoxy injection is generally not recommended.

Cracks should not be repaired with white caulk, which is visually intrusive and detracts from the design intent of a monolithic surface.

SPALLING

"Spalling is the loss of surface material in patches of varying size." (*The Preservation of Historic Architecture* (2004), 148.) There are several causes of spalling.

- The corrosion of reinforcing bars creates stress in the concrete; this stress causes blocks of concrete to fall off the surface.
- Similar stressful conditions are created when porous aggregates absorb water, which then freezes.
- Vapor-proof paints or sealants can trap moisture and lead to spalling.
- Cement can rise to the surface if concrete was improperly consolidated during construction, which



Figure 3. Spalling concrete on overlook wall

can lead to spalling in thin layers, known as scaling.

Surface preparation is key to the successful repair of spalling concrete. "In order to prevent future crack development after the spall has been patched, and to ensure that the patch matches the historic concrete, great attention must be paid to the treatment of rebars, the preparation of the existing concrete substrate, the selection of compatible patch material, the development of good contact between patch and substrate, and the curing of the patch." (*The Preservation of Historic Architecture* (2004), 152)

To repair spalling concrete:

1. Remove the area of deteriorated concrete.
2. Assess and treat the rebar.
    a. Enlist a qualified design or engineering professional to assess the rebar and determine if the corrosion is so severe that the rebar needs to be replaced. If the rebar is not important to maintain the strength of the concrete, it can be cut away.
    b. If rebar is to be retained, remove rust on any exposed rebar with a wire brush or by sandblasting. Coat cleaned rebar with epoxy to minimize the risk of further corrosion.
3. Prepare the substrate to ensure a strong bond between the patch and existing concrete.
    a. If a clean cut or smooth area is to be patched, roughen the surface with a hammer and chisel.
    b. Before placing the patch, moisten the substrate with wet cloths, sponges, or running water for at least one hour.
    c. Scrub the substrate with cement paste to encourage bonding; this can also be accomplished by using a liquid bonding agent to the substrate surface.
    d. Note that the application of admixtures to the patch to increase bonding (epoxy resins, latexes, and acrylics) can create problems with color matching.
4. Install the patch to fit tightly within the existing, sound concrete.
    a. Anchors can be used to enhance contact (stainless-steel hooked pins are preferable); these should be placed into holes drilled into the structure and held in position with epoxy.
5. Compact the patch material thoroughly to ensure a strong contact between the patch and the existing concrete.
    a. If using a trowel, build up thin layers of concrete to achieve compaction.
    b. For large patches, board forms are needed.
        i. Care must be taken with board forms not to damage the surface of the existing concrete finish. Use rodding or vibration to consolidate the patch in the form.
        ii. Remove forms before the patch has completely set, to avoid a sheen that does not match the historic concrete. When forms are removed, bolt holds must be patched and finished to match the existing concrete.
6. Finish the patch surface with a brush or wet sponge to match the texture of the historic concrete.

Note that patches which have a cement binder will likely shrink as they dry. Cure the patch by keeping it wet for several days with wet burlap. While increased amounts of sand will prevent much shrinkage, note that patches with high sand content will not bond easily.

CLEANING STAINED AND EFFLORESCING CONCRETE

Staining can be caused by pollutants in the atmosphere, accumulated dirt, or organic matter growing on the surface. Stains can indicate a more serious underlying problem, such as corroded rebar, problems with prior surface treatments, alkali-aggregate reaction, or efflorescence. Efflorescence occurs when water migrates from the interior of the concrete or the soil and deposits soluble salts on the surface of the concrete as the water evaporates.

Cleaning

STAINING

When the original concrete is to be cleaned of dirt, stains, paint, or graffiti, the preferred methods to use are those that are effective yet gentle. Low-pressure water (less than 200 psi) or steam cleaning can remove surface stains if the concrete is sound. Care must be exercised on fragile or deteriorated surfaces. If staining is more severe and more extensive cleaning is required, detergent cleaners or mild organic acids, such as acetic or citric acid, should be used. More aggressive inorganic acids such as muriatic (hydrochloric) or hydrofluoric acid should be avoided. (Preservation Brief 15: Preservation of Historic Concrete, (2007), 9.)



Figure 4. Staining on concrete railroad tunnel

EFFLORESCENCE

Usually efflorescence "is soluble and may be removed by scrubbing with water alone or hosing with water [avoid high pressure washing, which may loosen aggregate and damage mortar on the concrete's surface]. Surface deposits composed mainly of calcium acid carbonate and magnesium acid carbonate from the soil or calcium hydroxide should be washed off as soon as possible using water alone. These deposits are water-soluble for only a brief period of time after reaching the atmosphere, when carbon dioxide converts them to water-insoluble calcium carbonate and magnesium carbonate, which are impossible to remove without the use of acids." (U.S. General Services Administration *Historic Preservation Technical Procedures 03710-16.*)



Figure 5. Efflorescing concrete on the overlook walls

Solvents recommended for the cleaning of efflorescence include acetic acid (C2H4O2), also called vinegar acid, mixed in water. More aggressive acids, such as hydrochloric acid, are not recommended as they may damage the concrete. Consult the U.S. General Services Administration *Historic Preservation Technical Procedures 03710-16* for safety precautions when using acid.

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National Park Service
U.S. Department of the Interior

Jefferson National Expansion Memorial

Appendices to Landscape Preservation Maintenance Plan / November 2010



APPENDICES TO LANDSCAPE PRESERVATION MAINTENANCE PLAN

JEFFERSON NATIONAL EXPANSION MEMORIAL

ST. LOUIS, MISSOURI

NOVEMBER 2010

NATIONAL PARK SERVICE

MIDWEST REGIONAL OFFICE

OMAHA, NEBRASKA

TABLE OF CONTENTS

- **Tree Appraisal**: This article details how and why tree value is determined.

- **USDA Information Sheets**: These sheets provide information on individual tree species planted throughout the Memorial, including uses, culture, and potential pests and problems.

- **Soil Test Results**: Details collection and analysis procedures used on soil samples gathered at the Memorial in November 2009, includes a map of the sample locations, and results of soil tests.

- "**Comparison of ability to modify site conditions before and after planting"** in *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines* (2004): This table details the ability to modify soil conditions – including texture, structure, moisture, and chemical characteristics - pre and post planting.

- **"Comparison of treatments tested for improving soil structure and tree growth in compacted soil"** in *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines* (2004):This table compares soil treatments and results for a variety of methods, including mulch, vertical mulching, soil removal and replacement, compressed air, and disruption.

- **Comparison of Tree Inventory Software**: This includes two articles comparing several urban forestry tree inventory and management software programs, and includes a brief description of each.

- **Bacterial Leaf Scorch (BLS) Information**: A pair of articles on the causes, symptoms, spread and treatment of BLS.

- **Emerald Ash Borer (EAB) Treatment Guide**: Recommendations from the University of Minnesota on treatment strategies for EAB.

- **Tree Inventory Table**: This inventory of existing trees was updated in 2009. The update of the 2006 inventory was performed utilizing data provided by Memorial staff and site visit observations. It also includes charts showing distribution of trees in different areas of the grounds. The data is provided in a spreadsheet to be updated as needed by Memorial staff.

- **Tree Planting Details:** Detail drawings of proper tree planting techniques.

- **Mulch Recommendations and Information**: Articles from the University of Missouri Extension and the Missouri Department of Conservation on the uses, types, and benefits of mulching, along with proper mulching techniques. Due to copyright restrictions, these articles have been submitted as separate electronic files, and are not integrated into the electronic version of this document.

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TREE APPRAISAL

Agricultural Extension Service
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SP614



What Are Those Plants Worth?

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This publication is intended to provide information relating to methods used by professionals to appraise the value of trees and shrubs in landscapes. Individuals are encouraged to evaluate plants in their landscapes using the information presented; however, for many purposes, especially casualty losses, insurance claims and other "legal" situations, individuals are strongly encouraged to use the services of a professional plant appraiser to receive an independent, reasonable and defensible appraisal of landscape plants.

Plants are a diverse group of living things upon which all non-photosynthetic organisms ultimately depend. The inherent dignity and beauty of plants and their interactions with other organisms are profoundly valuable. In addition, the spiritual and mystical contributions of vegetation are important to humans. However, these inherent properties are very difficult to measure. Trees and landscape plants also contribute basic architectural, engineering and environmental functions such as shelter, climatic modification and animal habitat. Most human interest in plants is a function of these inherent and applied characteristics.

Landscapes and individual plants appear to enhance property values and represent tangible assets. Recent studies have measured the contributions of vegetation to property values. One study revealed that shade trees contributed 19 percent of the total appraised value of commercial and residential properties (Peters, 1971). A U. S. Forest Service study showed that real estate appraisers estimated that trees contributed as much as 27 percent of the price of the land (Payne, 1973). A survey completed by a mortgage company revealed that 84 percent of real estate agents believed that selling prices for homes on lots with trees were as much as 20 percent higher than comparable homes on lots without trees (Arbor National Mortgage, 1993).

It is recognized that plants have monetary value beyond their aesthetic contributions to the landscape and that such value can be determined. Plant appraisal is a process that is applicable to many different situations, from appraisal of a single landscape tree to appraisal of a large commercial landscape including trees, shrubs and herbaceous plants. The practice of plant appraisal is essentially concerned with the application of a set of procedures to estimate the monetary value of trees and landscape plants.

Plant appraisals are used for a variety of purposes, such as general interest, tree inventories, real estate transactions, income tax purposes (both basis and casualty loss), insurance purposes, damage assessment, plant condemnation and establishment of vegetation values at construction sites. Appraisals are also used by landscape designers to communicate budget requests for maintenance and removal of vegetation.

Appraisal in the Legal Sense

An appraisal is an unbiased estimate of the nature, quality, value or utility of the item or interest under consideration. The purpose of a plant appraisal is to assess the monetary value of plants in relation to the specific interests of the client. The valuation process begins with clear communication of the client's needs to the appraiser. The process concludes with delivery of a concise message that contains the relevant findings of the appraisal process. Each appraisal is a unique situation in which many types of value can be estimated. The most common appraisal assignment is the estimation of current market value.

Methods of Plant Appraisal

Appraisers estimate value using specific procedures that reflect three distinct methods for compiling and analyzing information. The three accepted methods used in valuation of assets are the **COST**, the **INCOME** and the **MARKET** approaches. Some situations dictate that a decision must be made between plant valuation and the timber income potential. The following discussion relates to non-timber appraisal.

The cost approach is based on the idea that the total value of property can be calculated by summing the cost of the individual components. A common analogy would be going to a store, purchasing individual components and reassembling the property. The estimated value is assumed to be the current cost of constructing or replacing the improvements and fixed features on the land. Depreciation is subtracted from the sum of land and improvements, to pro-

duce an estimate of value for the property as a whole. Use of the cost approach in plant appraisal is quite common. This approach assumes that the cost to repair or replace plants and landscape features to comparable condition can be added to the value of the land in order to arrive at the total property value.

The **cost approach** is perhaps the most widely used method of plant appraisal and has direct applicability to many situations. Cost approaches are particularly useful when landscapes are damaged and can easily be repaired or replaced. In most cases, landscape professionals are the most qualified persons to provide an accurate monetary estimate to repair or replace trees and landscape features.

The choice of a particular method of appraisal depends primarily on what you intend to do with the estimate. Data to be collected will depend on the method chosen and will include a number of factors such as species, size of the largest commonly available transplantable tree, cost of installation and cost of removal or cleanup. The value of a plant of replaceable size is typically determined by the **replacement cost method**. The value of a tree considered to be irreplaceable (too large to buy a transplantable substitute) is determined by the **trunk formula method**. The **cost of repair method** is appropriate for damaged plants that can be returned to their pre-damaged condition with proper treatment. When vegetation suffers extensive damage, including loss of plants and destruction of landscape features, the appraisal of necessary treatments required to return the property to some reasonable level of the original condition is known as the **cost of cure method**. In general, each of these are considered variations on the cost method.

The **income approach** to appraisal determines value based on the income-producing potential of the plants being appraised. This approach is standard where trees have market value as forest products. Periodic income is "discounted" using compound interest calculations. This approach is of limited use in many instances unless the material being appraised is part of a property that generates cash flow, such as nursery materials or situations where the landscape/trees contributed to the overall value of a commercial enterprise. Consider, for example, an apartment complex with a landscape of old, majestic trees. These trees allow the owner of the complex to charge a premium of $50/month more in rent than comparable apartments without such trees. The additional income due to these trees should be considered during an appraisal.

The **market approach** relies on prices paid for property in the market and is derived by comparing sales of properties with landscapes to sales of properties without landscapes. This process is sometimes referred to as the **sales comparison approach**. Plant appraisers require some knowledge of and experience with the market approach, because it is widely used in real estate appraisal and is preferred by the IRS and most courts. The contribution of plants and landscapes to the market value of real estate can be extracted from data obtained from sales of properties. In general, the appraised value by the cost and/or the income approach should be not significantly different from the total value based on comparable sales. The market approach often serves as a test of "reasonableness" for the other methods.

Variations of the market approach have direct applications for the plant appraiser, especially in appraisal of large landscapes where other methods may overestimate contributions of plants. Plant appraisers can benefit from collaboration with real estate professionals when the market approach is used. Application of the market approach to plant appraisal involves extracting information on the contribution provided by plants and landscape to the overall value of property. The contribution is calculated by comparing the property sales with plants and landscaping vs. sales of property in the same marketplace with few or no plants in the landscape. The arithmetic difference between the values of such sales indicates the contribution made by plants and landscapes.

Appraised Values of Plants Must Be Reasonable and Defensible

The tools of the plant appraisal professional are used to place monetary value on plants in the landscape for a variety of purposes. It is important that the values of plants and landscape fixtures be reasonable in terms of the total property value. If litigation is expected, the assessed value of plants must be defensible. Therefore, plant appraisers must have information on current market values of properties in the local area when making appraisals of plants. Knowledge of values of the various components of the property, including the value of the land improvements, vegetation and other landscape features, will assist the professional in making reasonable estimates of the average contributory value of trees and shrubs. Fortunately, there are historical data, published research and professional standards that support some general conclusions. Research indicates that well-maintained landscapes can contribute up to 20 percent of the value of residential property and that mature, well-placed trees can increase property values when compared to undeveloped properties. It seems appropriate to check the reasonableness of a plant appraisal by comparing the estimated value of vegetation on the site with the overall appraised value of the property. If the plant appraisal falls within 20 to 25 percent of the total value of the real property, then appraisal may be deemed reasonable.

Who Should Contact a Plant Appraiser?

Plant appraisals require the skills and expertise of an experienced, qualified professional. It is recommended that appraisals be conducted by experienced and qualified professionals. Professional firms employing experts with current memberships in and/or certifications from professional organizations such as the American Society of Consulting Arborists, the American Society of Landscape Architects and the International Society of Arboriculture should be able to supply a quality service with the capability to defend the reasonableness of the appraisal should the situation call for such evidence.

Factors Influencing Plant Value

When appraising the value of landscape plants, a few common factors must be considered that influence monetary value. These factors are:

- How large is it (size)?
- What kind is it (species)?
- What condition is it in?
- Where is it (location)?

Determining the relative contributions of each of these factors is essential when determining the value of plants.

Determination of Size

Landscape plants are typically described by the dimensions of the above-ground parts. Size of trees is most commonly expressed in terms of height, trunk diameter, canopy size and spread. The height, branch spread or trunk diameter of a tree can be measured, but no one measurement completely describes the three-dimensional size of trees. An accepted representation of tree size is the cross-sectional area of the stem or trunk. Cross-sectional area of the trunk is determined by measuring the tree's diameter and calculating the cross-sectional area.

The height at which the trunk diameter of a tree is measured depends upon size of the plant. The American Standard for Nursery Stock (ANSI Z60.1) suggests that measurement should be taken 6 inches above the ground for trunk diameters up to 4 inches. Larger, transplantable trees are measured 12 inches above the soil. Trees considered to be too large to transplant are measured at "standard height" or 4.5 feet (54 inches) above the soil. Trees with branches below 4.5 feet should be measured at a height between the ground and 4.5 ft that most effectively represents the size of the tree. When a tree or shrub has multiple stems, the diameter of each of the individual stems is measured and total diameter is calculated as the sum of all stems. Cross-sectional area (Table 1) is calculated using the formula:

$(d^2 \times 0.785)$ = cross section area in square inches, where d is the diameter in inches.

Location Factor

The location factor accounts for the placement and contribution of the tree to the functional and aesthetic qualities of the site. Table 2 provides examples. A tree in a group of similar trees will almost always have less value than a single landscape tree. Trees in a rural woodland or roadside situation will be less valuable than trees lining a boulevard in a busy urban setting. Plants that provide additional functions, such as screening or noise reduction, and vegetation that has historical or cultural significance should be assigned higher location values than those without such attributes. Generally, trees in arboreta, cemeteries, university campuses and urban residential landscapes receive higher location ratings than trees on rights-of-way (roads, powerlines, etc.) and wooded and forest lands.

Table 1. Cross sectional areas of trees and their base value based on $48 per square inch.

Diameter	Cross Section Square Inches	Base Value $48/Sq. In.[1/]
6	28.3	$1,358
8	50.3	2,414
10	78.5	3,768
12	113.1	5,429
14	153.9	7,387
16	201.1	9,653
18	254.5	12,216
20	314.2	15,082
22	380.1	18,245
24	452.4	21,715
26	530.9	25,483
28	615.8	29,558
30	706.9	33,931
32	804.3	38,606
34	907.9	43,579
36	1017.9	48,859
38	1134.1	54,437
40	1256.6	60,336

[1/] Southeastern United States Tree Species Guide, March, 2001 International Society of Arboriculture-Southern. Reliable tree/plant appraisals require oversight and guidance by a committee of qualified local arborists and horticulturists who compile species lists and ratings, determine the size of commonly available transplantable nursery material and costs associated with material, transportation, installation and maintenance. This information is compiled by the Southern Region of the International Society of Arboriculture.

Table 2. Location values for landscape trees.

Site Location	Percent Value
Specimen, arboretum or historical	100
Average residential landscape	80
Malls and public areas	80
Park and recreation	60
Golf course	60
City street	60
Environmental screen	60
Industrial area	40
Out-of-city highway	40
Native, open woods	20

Species Classification or Species Rating Factor

Tremendous numbers of tree species and cultivars are grown in our landscapes. Within a single species, individuals and cultivars exhibit wide ranges of growth characteristics, adaptability to the environment and tolerances of physical and biotic stresses. To account for the characteristics of different species, a rating scale is developed for each geographic region. Members of the local chapter of the International Society of Arboriculture (ISA) compile the species rating for a particular region. Species are rated by nursery professionals, landscape contractors, urban foresters, arborists and landscape architects. Factors taken into consideration when developing the species rating include: *climatic adaptability*, such as drought tolerance, heat/cold tolerance, resistance to storms, wind, ice etc; *adaptability to soil conditions*, particularly drainage, structure and texture, pH and presence or absence of nutrients; *growth characteristics* such as strength of wood, life expectancy, training and pruning requirements; and the *resistance or tolerance to pest and diseases.* Species that tend to be low-rated often have undesirable characteristics such as rapid growth rate, low transplant survival, poor drought tolerance and susceptibility to diseases and insect infestations. Species ratings often vary geographically, depending on the species' relationship with its environment. Certain characteristics of a species may be an asset under a certain set of conditions and may be a liability in a different set of conditions prevalent in another part of the same region. Plants that grow poorly in one area due to soil conditions may grow very well in an adjacent area with different soil conditions. There may be situations in which only a few species will survive and flourish in a particular environment. In such cases, the species rating may be much higher than that generally applied for the region. Table 3 shows general species ratings for some common Tennessee trees.

Table 3. Species classification rating for common trees in Tennessee.

Class 1 – 100%	
Red Maple	Dogwood
Ginkgo	American Holly
Tulip Poplar	Scarlet Oak
White Oak	Willow Oak
Class 2 – 80%	
Pecan	Bald Cypress
White Pine	Hemlock
Linden	Disease-resistant Crabapples
Magnolia species	Washington Hawthorn
Bradford Pear	Beech
Red Oak	Southern Red Oak
Class 3 – 60%	
Buckeye	Hickory species
Hackberry	White Ash
Yellowwood	River Birch
Honey Locust	Black Cherry
Sassafras	Kentucky Coffee Tree
Hophornbeam	
Class 4 – 40%	
Sycamore	Osage Orange
Persimmon	Redbud
Virginia Pine	Disease- susceptible Crabapples
Green Ash	Eastern Redcedar
Norway Maple	Post Oak
Class 5 – 20%	
Tree-of-Heaven	Siberian Elm
Boxelder	Black Locust
Catalpa	Silver Maple
Mulberry	Cottonwood & Black Willow

Condition Rating

The condition of a tree is determined by evaluating its structure and state of health. Assessing plants to ascribe a condition rating takes skill and experience and should only be undertaken by a trained professional plant appraiser. When the condition of plants must be assessed after major damage has occurred, it is important to get an estimate, if possible, of the condition of plants prior to the damage. Problems typical of the species, such as brittle wood and weak branch attachments, should be excluded from the evaluation of condition, since these factors are included in the species rating.

When assessing plant health, the appraiser must be familiar with the characteristics of the species or clone, such as size, leaf and bud color, shoot form, growth and general structure. Careful observation of all parts of the plant allows the trained appraiser to obtain a measure of the general health. The vigor of the plant can be evaluated by close observation of annual shoot growth from current and preceding years. Symptoms of plants in poor condition are leaf discoloration, abnormal leaf shape or size, lack of growth, presence of decay or die back and the presence of pests and diseases. Damage from chemicals in the environment can also be apparent and is included in the condition rating.

Table 4 shows how a tree's condition is converted to a rating. Potential hazards may be identified when examining the tree's condition. These may be indicated by observation of such symptoms as broken or dead roots, presence of decay fungi, loss of foliage in the crown, split branches and loss of bark. Removal is recommended when the health of a tree is seriously compromised and the problems cannot be efficiently corrected. University of Tennessee Extension factsheet SP575 discusses hazard tree rating in greater detail. A tree recommended for removal may have little, no or negative value if the timber or firewood value is less than the removal and cleanup costs.

Table 4. Tree condition rating table.	
	Sound trunk with no rot, healthy bark, good limb structure and balance, no corrective pruning or maintenance needed, good foliage color, no insects or diseases, twigs showing excellent growth.
80%	Similar to above except tree may have minor insect or disease problems and/or need minor corrective maintenance.
60%	Sound trunk and healthy bark, fair limb structure with broken branch stubs, moderate maintenance needed, insect or disease problem present, fair twig growth and leaf color.
40%	Similar to above plus evidence of trunk scars and early stages of decay present.
20%	Advanced stage of decline with major problems in roots, trunk, branches and foliage.

Table 5. Sample worksheet for determining tree value with 3 examples.

Diameter measured at 4½' or 1' above ground	
Base value	
Species factor %	x
Subtotal	
Condition factor %	x
Subtotal	
Location factor %	x
Final value	$

EXAMPLES

#1 20" diameter Ginkgo, excellent health, well-placed in a residential yard.

$15,082 x 1.00(spp.) x 1.00(cond.) x 0 .80(loc.) = $12,066

#2 26" Hackberry, moderate health, crowding a tennis court in the park.

$25,483 x 0 .60(spp.) x 0.60(cond.) x 0 .40(loc.) = $3,670

#3 8" Boxelder in poor condition, growing along a highway (measure at 1 ft. above ground).

$2,414 x 0.20(spp.) x 0.20(cond.) x 0.40(loc.) = $39

Steps in Plant Appraisal

The appraisal process starts with clear communication of objectives from the client to the appraiser, followed by a site visit to identify the plant species, size and condition. Notes taken by the appraiser at this time should include an overall sketch plan of the property showing locations of plants and landscape features. Using skill and experience, the appraiser must evaluate and record the condition rating for plants in the landscape.

Trunk Formula Method

Appraisal of trees that are too large to transplant is commonly done by estimating the cost to buy and install the largest available transplantable tree and adding an estimate of the increased value of large size. A regional committee of The International Society for Arboriculture, composed of arborists, urban foresters, landscape architects and nursery producers, periodically publishes the regional base tree value expressed in dollars per square inch of trunk area. This value is used to establish the **Basic Tree Cost** after measuring the cross sectional area of the trunk at the appropriate place on the plant. The estimate of **Basic Tree Cost** is adjusted by multiplying by species, condition and location ratings according to the following formula:

Tree value = basic tree cost x species rating x condition rating x location factor.

When the trunk formula method is used in appraisals, it has been observed that values of trees less than 10 inches in diameter are often underestimated and values of trees over 30 inches in diameter are often overestimated, since large trees increase in size faster than they increase in value. An adjusted trunk area is used to calculate the monetary value. Value of adjusted trunk areas for large trees are published by ISA (2000) in Chapter 4 of the ninth edition of the **"Guide for Plant Appraisal."** A sample worksheet for calculating tree value with several examples is given in Table 5.

Conclusion

Woody plants in the landscape are often regarded as permanent and priceless, since frequently personal associations with plants relate to specific places and people that have significantly influenced our lives. Words often cannot express the value of our landscapes and trees; however, in certain situations, there is a need to have an independent, reliable estimate of the dollar values of landscape plants. In these situations, there are qualified professionals who can provide realistic, unbiased appraisals of plant values using methods described herein, coupled with their knowledge and experience. We encourage you to investigate all the components of value that well-managed landscapes bring to the places in which we live.



This magnificent, mature dogwood tree is located in a botanical garden where it has assumed additional value due to local, artistic and cultural significance.

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A fine specimen sugar maple tree in a botanical garden display is usually appraised with the highest value compared to other individuals of the species in other locations.





This good-looking red maple tree is in a relatively poor location. The appraised value of this tree will be affected by the poor location.



A grove of bald cypress trees in good condition placed close to a busy road. The value of each individual tree is lowered by the presence of neighboring trees of the same species.



A fine Kousa dogwood tree in good condition and a great location will be very valuable.



Topped hackberry trees in a residential neighborhood will have very little positive effect on the value of the property.

Photos by Stephen Garton and Hugh Conlon

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USDA INFORMATION SHEETS

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

EASTERN REDBUD

Cercis canadensis L.

Plant Symbol = CECA4

Contributed By: USDA NRCS National Plant Data Center



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@ PLANTS

Alternate names
Redbud, Judas tree; this species has several varieties recognized in the U.S.: *Cercis canadensis* var. *canadensis*, *Cercis canadensis* var *mexicana*, and *Cercis canadensis* var. *texensis*.

Uses
Ethnobotanic: The Alabama, Cherokee, Delaware, Kiowa, and Oklahoma were among the Native American tribes that used eastern redbud for various purposes. The bark was made into a tea to treat whooping cough. Taking cold infusions of the roots and inner bark treated fevers and congestion. An infusion of the bark was used to treat vomiting and fever. During winters, the plants were used for firewood. Because it is one of the first plants to flower in the spring, the blossoming branches were brought into the homes to "drive winter out." Children were "fond of eating the blossoms" of eastern redbud.

Wildlife/Livestock: Many birds, including bobwhite quails, eat the seeds. White-tailed deer are among the animals that browse the foliage. Honeybees visit the blossoms. Livestock will browse on Eastern redbud.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
General: Legume Family (Fabaceae). Eastern redbud is a native, perennial, deciduous tree or shrub. The plants may vary in form from dense and round (to 6 m tall) when grown in sun, to an open, taller form (to 12 m tall) when grown in the shade. The trees produce hundreds of small pink pea flowers in the very early spring, even before other trees have leafed out. The bright magenta-pink to lilac flowers, appear in small clusters, primarily on older stems. The flowers are irregular, 9 to 12 cm long, with ten stamens. The unique, broadly heart-shaped leaves are nearly circular (5 to 10 cm), with a long, slender petiole. The leaves are alternate and have 5 to 9 prominent veins that radiate palmately from the base. New leaves are a light green that darken with age and finally turn yellow in the fall. The seeds are contained in a flat, thin pod (4 to 10 cm long), which turns from green to brown.

Distribution: Eastern redbud is native to the eastern and south-central United States, southward to Texas. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Eastern redbud occurs in the forest understory in moist rich woods, along the banks of streams, in ravines, on bluffs, in open rocky woods, and abandoned farmlands.

Establishment
Eastern redbud is widely cultivated as an ornamental because of the plants showy springtime flowers and beautiful heart-shaped leaves. The plants are graceful with arching branches that look lovely as a specimen tree, in groupings, and in shrub borders. The plants do well in soils of moderate to low fertility and are very drought resistant. The seeds have very hard seed coats that require both chilling and scarification for germination, unless planted in the fall. Cuttings are difficult to root. Mature plants do not transplant well so buy young plants that are balled-and-burlapped or container grown. Transplant the plants in the spring or fall, in well-drained soils in sun to part shade. Water the plants regularly until established.

Management
These plants require very little maintenance. The brown seedpods, which can cling to the branches until late in the year, can be somewhat unattractive.

Pests and Potential Problems
Eastern redbud has relatively few pests. Stem canker, leaf spots, and verticillium wilt may be a problem. The plants may experience some insect damage from leaf rollers, treehoppers, scales, leafhoppers, aphids, and spider mites, but damage is rarely severe.

Cultivars, Improved and Selected Materials (and area of origin)
These plant materials are readily available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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Plant Guide

SWEETGUM
Liquidambar styraciflua L.
Plant Symbol = LIST2

Contributed by: USDA NRCS National Plant Data Center



USDA, NRCS, National Plant Materials Center

Alternate names
Sweet gum, American sweet gum, red gum, bilsted, star-leaved gum, alligator-tree

Uses
Ethnobotanic: The sweetgum tree was used by the Cherokee, Choctaw, Koasati, Rappahannock and other Native American tribes for various purposes. The hardened gum, or rosin from the tree was used as chewing gum. A piece of the bark was knocked from the tree. After one week, the sap from the wound was hardened and could be collected and used for chewing gum. Tea was made from both the fruits and the bark. The hardened sap was rolled up and then placed in a dog's nose to treat distemper. A salve was made by mixing the plant with animal tallow for application to wounds, cuts, sores, bruises, and ulcers. The plant was boiled until a scum rose to the top. This scum was then mixed with the roots of *Obolaria virginica* and used as a dressing for cuts and bruises. The roots were boiled into a strong tea to treat skin sores that were possibly caused by small worms under the skin. A "drawing plaster" was made from the gum. Ten to a dozen drops of the sap were taken before meals to reduce fevers. The sap and inner bark were used to treat diarrhea and dysentery. The bark was used to make an infusion that was used as a sedative for nervous patients and for patients who were well in the day but sick during the night. The plant was used to treat colic, internal diseases and to "comfort the heart."

Wildlife: Goldfinches, purplefinches, mallard ducks, bobwhite quails, Carolina chickadees, yellow-bellied sapsuckers, white-throated sparrows, towhees, Carolina wrens, squirrels, and chipmunks eat the seeds of sweetgum trees. Beavers use the wood for constructing dams.

Other: Liquidambars are valued for their timber and for the aromatic sap, called styrax. The timber provides pulp, veneer and lumber. The wood is used in cabinetry, home interiors, boxes and utensils. The balsamic sap is used as an ingredient in both medicine and perfume.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
General: Sweetgum is a deciduous tree that is a member of the Hamamelidaceae, or witch-hazel family. It is named after the sweet balsamic sap which, when exposed, hardens into a fragrant gum. The trees can reach 30 to 40 meters in height and spread from 15 to 20 meters. The mature bark is rough, deeply furrowed and grayish brown. Young twigs are rusty red and frequently develop wings of corky bark. The star-shaped leaves, somewhat resemble maple leaves, except that they are arranged alternately instead of opposite. The leaves are 18 cm wide with long, thin petioles (6-15mm). Actively growing leaves are fragrant when crushed. They are palmate in shape with five to seven lobes and saw-toothed margins. Glossy-green in summer, the leaves turn bright yellow to deep red in the fall. The undersides of the leaves are pale green with a coating of fine white hairs. The small, greenish inconspicuous flowers have no true petals. The woody, ball-shaped, pendulous, burr-like fruits (3-4 cm) contain numerous, small seeds (1 cm) that are winged at one end. The seeds are contained in beak-like capsules to protrude from the surface (1 to 2 per capsule).

Distribution: Sweetgum is common in the Coastal Plain and Piedmont sections of the Southeastern United States. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Sweetgum trees occur in moist or wet woods, tidal swamps, along streambanks, in clearings and old fields, and in low swampy bottomlands where they often form pure stands.

Establishment
Sweetgum is a hardy, ornamental tree that is valued for its shade as well as its lumber. They make attractive specimen trees all year and especially in the fall when the leaves turn brilliant colors before dropping in the fall. Young trees transplant best in the spring into well-watered soils. The roots are slow to develop. The trees may be planted in sun or part shade in soils that are medium to well drained and of medium to high fertility. The trees need medium to high moisture availability and are not suitable for dry areas. New trees volunteer readily from the seeds, however they generally do not germinate until the second year. The seeds are ripe when the fruit begins to lose its green color. Spread the fruits out to dry. When dry, they will open and release the seeds. Germination can be considerably increased if the seeds are prechilled for 15 to 90 days.

Management
The trees are relatively trouble-free and generally do not require pruning. The fruits can look somewhat messy in fall and winter when they drop, especially onto a manicured lawn where they can also make mowing difficult. Avoid planting near a patio or sidewalk where the fruits can be painful when stepped on with bare feet.

Cultivars, Improved and Selected Materials (and area of origin)
These plant materials are readily available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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Plant Guide

SWAMP WHITE OAK

Quercus bicolor Willd.

Plant Symbol = QUBI

Contributed by: USDA NRCS National Plant Data Center and the Biota of North America Program



Robert H. Mohlenbrock
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Uses

Industry: The wood of swamp white oak is light brown, close-grained, heavy, and hard. It is similar to that of white oak (*Q. alba*) and usually is cut and sold under that name, but the amount of lumbered swamp white oak is a small fraction of the total for 'white oak.' Also, because the lateral branches of swamp white oak tend to persist (compared to white oak), the wood is knottier and less valuable. The wood is used for furniture, cabinets, veneers, interior finishing, and flooring, as well as for boxes, crates, fence posts, railroad ties, and beams and boards for general construction. As in white oak, the wood provides tight cooperage and was once widely used in making barrels and kegs.

Conservation: Swamp white oak is planted on highway rights-of-way and is frequently used as a shade tree for large lawns, golf courses, parks, and naturalized areas. The crown shape and bi-colored leaves (dark above, lighter beneath) are attractive features; fall color is yellow, with occasional red-purple. The trees can grow well in areas that are dry, poorly drained and wet, or even occasionally flooded, and they will tolerate significant soil compaction.

Wildlife: Trees of swamp white oak provide cover for birds and mammals. The acorns are sweet and are an important food for wildlife such as squirrels, mice, white-tailed deer, beaver, black bear, and a variety of birds, including ducks and turkey.

Ethnobotanic: Native Americans and pioneers have eaten the acorns raw or cooked. They have been ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. Roasted acorns have been ground and used as a coffee substitute. Bitterness of the tannins is removed by leaching in running water.

Oak galls, caused by the activity of the larvae of various insects, can be used as a source of tannin and dye. They also are strongly astringent and can be used in the treatment of hemorrhages, chronic diarrhea, and dysentery. Some Native Americans used swamp white oak to treat cholera, broken bones, and consumption. Mulch of the dead leaves is reported to repel slugs, grubs, and various insects.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as state noxious status and wetland indicator values.

Description

General: Beech Family (Fagaceae). Native trees commonly growing to 15–20 m, sometimes to 30 m, the lateral branches relatively persistent (slow in self-pruning), with an open, irregularly shaped crown; bark dark gray, scaly or flat-ridged, often peeling off in large, ragged, papery curls. Leaves are deciduous, alternate, obovate to narrowly elliptic or narrowly obovate, (8–)12–18(–21) cm long, (4–)7–11(–16) cm wide, usually with regularly spaced, shallow, rounded teeth, or toothed in distal half only, or moderately to deeply lobed, upper surfaces dark green and glossy, lower surfaces lighter green to whitish, softly hairy. Male and female flowers are borne in separate catkins on the same tree (the species monoecious) on the current year's branchlets. Acorns maturing the first year, ovoid-ellipsoid or oblong, mostly 1.5–3 cm long, single or clustered in groups of 2–4, on a stalk (peduncle) 3-8 cm long; cup enclosing 1/3–1/2 of the acorn, scales closely appressed, finely grayish tomentose, those near rim of cup often with a short, stout, irregularly recurved spinose tip. The common name is from its typical habitat and its membership in the white oak subgroup.

Swamp white oak is a member of the white oak subgroup (subgenus *Quercus*) and hybridizes with related species, including white oak (*Q. alba*), overcup oak (*Q. lyrata*), and bur oak (*Q. macrocarpa*). Swamp white oak is distinguished from all similar native species by its long-stalked acorns.

Variation within the species: Formal variants are not recognized.

Distribution
Swamp white oak occurs mainly in the Midwestern states from Iowa, Missouri, eastern Kentucky, and southern Wisconsin east to New York, Pennsylvania, Connecticut, and Massachusetts. Isolated populations occur northward in Minnesota, other New England states, and Quebec and Ontario, and southward to Tennessee, Virginia, and North Carolina. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Adaptation: Swamp white oak occurs in a variety of soils (from silty clay to silt and sandy loams) in swamp forests of river bottoms, streamsides, depressions, borders of ponds, lakes and swamps, and moist peaty flats. It also occurs on moist slopes and poorly drained uplands, at elevations of 0-1000 meters. Swamp white oak grows best in full sun in moist to wet, deep, acidic soils. Development of a 2-layer root system allows it to grow well in areas that are flooded in spring but markedly dry in summer.

Young trees of swamp white oak are tolerant of light shade but become more characteristic of full sun with maturity. Swamp white oak usually is a minor component of the forests in which it occurs, perhaps depending on local disturbance for release into the canopy. Stands of elm-ash-cottonwood will convert to oak-dominated stands that include swamp white oak. White oak forests (of which swamp white oak is a component) will progress towards hickory and beech forests if undisturbed.

Flowering occurs in May–June, during early development of the leaves, while fruiting occurs in August–October.
General: Seed production in swamp white oak begins at 20–30 years. The greatest production occurs between 75–100 years; good seed crops are produced every 3–5 years. The acorns have no dormancy and may germinate the same season as ripening and falling. The maximum age for trees of swamp white oak is 300–350 years.

Swamp white oak can sprout from the stump or root crown if damaged or top-killed.

Swamp white oak can be transplanted or propagated from seed. Young plants from containers and young trees in ball-and-burlap are best planted in early spring. Bare-root transplants also are best done in the spring, but these may be difficult because of the strong and rapid development of the taproot.

Acorns are capable of germination as soon as ripe and must be collected for storage shortly after falling from the tree. They retain viability in storage for only a few months, especially if allowed to dry, and should be stored over winter in a cool, moist place at 1–4° C. Germination frequency may be enhanced by stratifying 30–60 days at 1–5° C., but stratification is not required for germination. Acorns planted in the fall in permanent positions give the best results.

Management
Swamp white oak is susceptible to various insect pests, fungi, cankers, and wilts but none are serious. It is relatively resistant to oak wilt but may be affected by "oak decline;" anthracnose may sometimes be a problem. Growth in alkaline soils (with pH above 7.2) may cause iron chlorosis.

Because of the slow self-pruning habit of swamp white oak, lower branches may require pruning in areas where high clearance is necessary.

Severe fires can top-kill mature trees of swamp white oak. Fire-damaged survivors are susceptible to disease and insect attack. Moderate fires may kill seedlings and saplings, but young individuals can re-sprout following fire. Acorns are easily destroyed by fire because of high moisture content.

Cultivars, Improved and Selected Materials (and area of origin)
These plant materials are readily available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under ”United States Government.” The Natural Resources Conservation Service will be listed under the subheading “Department of Agriculture.”

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Plant Guide

BUR OAK

Quercus macrocarpa Michx.

Plant Symbol = QUMA2

Contributed by: USDA NRCS National Plant Data Center & the Biota of North America Program



Nobel Foundation Plant Image Gallery
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Alternate Names
Blue oak, mossycup oak, mossy-overcup oak

Uses
Industry: Bur oak wood is used for cabinetry, barrels, hardwood flooring, and fence posts. Main sources of trees for timber are Iowa and Illinois bottomlands. The wood is sometimes marketed as 'white oak.'

Ethnobotanic: Native Americans made a bark decoction with astringent properties used to treat diarrhea, wounds and sores, hemorrhoids, poison oak, and insect bites. The large, sweet acorns have been eaten boiled and raw.

Wildlife: The acorns are eaten by many birds and mammals, including squirrels, rabbits, ground squirrels, mice, deer, wood ducks, and blue jays. They are dispersed by rodents and blue jays, which frequently cache the acorns for later use. The foliage is eaten by deer and cattle. Red-tailed hawks, screech owls, fox squirrels, and flying squirrels nest in large trees of bur oak.

Conservation: Bur oak is tolerant of city smoke and other air pollutants and of soils that are compacted, sandy, and/or of high pH – it is commonly planted as a shade tree in many urban areas of the United States. The trees become large and are suited for lawns and other open areas, including golf courses, parks, large islands, and fields. They also are useful in rehabilitation of degraded sites and have been widely planted in shelterbelts because of their drought tolerance. A deep tap root system penetrates to lowered water tables during the dry periods.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as state noxious status and wetland indicator values.

Description
General: Beech Family (Fagaceae). Native trees growning to 25 m tall, with a broad, rounded crown, sometimes shrubby; branches and branchlets with corky-winged projections; bark light gray, thick, rough, furrowed into scaly plates and vertical flattened ridges. Leaves deciduous, alternate, obovate, shaped like a fiddle, tapering to a wedge-shaped base, 10–25 cm long and 6–12 cm wide, widest above the middle, with 2–3 rounded lobes on upper half of leaf and 5–7 deeper lobes on lower half of leaf, dark green above, gray-green below, turning yellow or brown in fall. Male and female flowers are borne in separate catkins on the same tree (the species monoecious) on the current year's branchlets. Acorns maturing in the first year, 2.5–5 cm long and wide, with a deep, thick, fringed cup covering 1/2 to 3/4 of the acorn, the scales knobby, long-pointed with narrow free tips. The common name (bur) is in reference to the cap-covered acorn.

Variation within the species: Three varieties are commonly recognized within the species.

Var. *depressa* (Nutt.) Engelm. (*Q. mandanensis* Rydb.) – mostly along the western margin of the Great Plains; small trees or shrubs with smaller and less fringed cups and corky twigs.

Var. *macrocarpa* – over most of the species range; trees with large thick cups.

Var. *oliviformis* (Michx. f.) A. Gray) – Iowa, Minnesota, South Dakota, and North Dakota; trees with thinner and smaller cups. This is sometimes considered within the typical variety.

Bur oak is a member of the white oak subgroup (subgenus *Lepidobalanus*) and hybridizes with various related species, including northern pin oak (*Q. ellipsoidalis*), white oak (*Q. alba*), swamp white oak (*Q. bicolor*), overcup oak (*Q. lyrata*), swamp chestnut oak (*Q. michauxii*), chinkapin oak (*Q. muehlenbergii*), post oak (*Q. stellata*), live oak (*Q. virginiana*), and Gambel's oak (*Q. gambelii*).

Distribution
Bur oak is grows natively throughout much of the north-central United States and the eastern Great Plains. It occurs from southern New Brunswick and New England westward to the Dakotas and southeastern Montana, and south to Tennessee, Arkansas, and the central prairies of Texas – with rare outliers in Louisiana, Mississippi, and Alabama. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
Bur oak grows in a range of habitats and moisture regimes – from prairies to valley floors and upland woods. It is a pioneer or early seral species at prairie margins, but bur oak savannas have declined due to grazing and fire suppression. It grows quickly on moist, rich bottomlands but is relatively intolerant of flooding during the growing season. At the north and west ends of its range, where bur oak occurs on rocky bluffs with thin soil and where repeated fire also may be common, it commonly grows as small trees or thickets of low shrubs. Young plants grow well in full sun to partial sun.

Flowering occurs from April through June, just after leaves develop, while fruiting occurs from August to November.

Establishment
Minimum seed-bearing age is 35, with optimum seed production occurring between 75–150 years, and trees are known to produce seed up to 400 years. Abundant acorns are produced every 2–3 years, with light crops in the intervals. Most natural seed germination occurs during the fall (directly after maturation) and unless germination is rapid, few seeds survive predation by insects, small birds, and mammals. Litter-covered acorns appear to be more vulnerable to rodents, insects, and fungus.

The taproot of young bur oaks rapidly penetrates into the soil, sometimes growing more than one meter deep in the first growing season. This early root development, along with high water-use efficiency, may explain why bur oak can pioneer on droughty sites and can successfully establish itself in competition with prairie shrubs and grasses. The trees are slow-growing but long-lived and may reach ages approaching 1000 years.

Management
Bur oak may be transplanted or it is easily propagated from seed. Seed should be stored over winter in a cool, moist place at 1–4° C. Germination frequency may be enhanced by stratifying 30–60 days at 1–5° C. but stratification is not required for germination, except for var. *oliviformis*, which typically germinates during the spring. Most natural seed germination occurs during the fall (directly after maturation) but seed may be planted in either the spring or fall. Seeds should be planted 1.2–2.5 centimeters deep, in groups of 2–3, spaced at roughly 2 meter intervals.

Although strong and rapid development of the taproot contribute to difficulty in transplanting, bur oak saplings can be obtained in ball-and-burlap and they may be transplanted as young plants from containers. Transplants are best made in spring.

Bur oak bark is thick and fire-resistant and larger trees often survive fire. Grass fires often kill only seedlings and young trees, but even seedlings may survive unless fires occur at short intervals or with enough intensity of heat. Top-killed smaller trees (or those mechanically damaged) sprout vigorously from the stump or root crown after fire. In areas of frequent fire and strong herbivore browsing, the underground portions may be much older and more extensive than the continually resprouting aerial portions. Where fire suppression is prevalent, bur oak communities may be replaced by more shade-tolerant maple-basswood forests.

Few insects or diseases cause serious damage to bur oak. Oak lacebug (*Corythucha arcuata*) may heavily defoliate bur oaks in shelterbelt plantings, especially during dry weather. Oak wilt (*Ceratocystis fagacearum*) is a less serious problem in bur oak than in species of red oak, but the disease sometimes spreads through root grafts of adjacent trees, and entire groves have been killed by the gradual expansion of the disease from one center of infection.

Cultivars, Improved and Selected Materials (and area of origin)
Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources

Conservation Service will be listed under the subheading “Department of Agriculture.”

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Edited: 19jun02 jsp; 29may03 ahv; 060809 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

NORTHERN RED OAK

Quercus rubra L.

Plant Symbol = QURU

Contributed by: USDA NRCS National Plant Data Center and the Biota of North America Program



© Mike Hogan
Trees of Alabama and the Southeast
Auburn University

Alternate Names
Red oak, common red oak, eastern red oak, mountain red oak, gray oak

Uses
Industry: Northern red oak is an important source of hardwood lumber. The wood is close-grained, heavy, and hard; it machines well and accepts a variety of finishes. It is used for furniture, veneer, interior finishing, cabinets, paneling, and flooring as well as for agricultural implements, posts, and railway ties.

Wildlife: Northern red oak provides good cover and nesting sites (including cavities) for a wide variety of birds and mammals. Deer, elk, moose, and rabbits commonly browse leaves and young seedlings and the acorns are eaten by a wide variety of large and small mammals and birds.

Ethnobotanic: The acorns of red oak (and other oak species) were an important food source for Native Americans. To remove bitter tannins, they were boiled, leached with ashes, soaked for days in water, or buried over winter. Some tribes used red oak bark as a medicine for heart troubles and bronchial infections or as an astringent, disinfectant, and cleanser.

Conservation: Northern red oak is commonly planted as a landscape tree in eastern North America and Europe -- used as a shade tree on lawns, parks, campuses, golf courses, etc, where space is sufficient. It is fast growing, easy to transplant, tolerant of urban conditions (including dry and acidic soil and air pollution), the abundant nuts attract wildlife, and the leaves develop a brick-red fall color. It has been used in various rehabilitation projects, including revegetation of coal mine spoils in states of the east central United States (Ohio, Indiana, Illinois, Kentucky, and Pennsylvania).

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
General: Beech Family (Fagaceae). Native trees often reaching 20–30 m tall, less commonly up to 50 m; bark dark gray or black, shallowly furrowed into broad hard scaly ridges, inner bark reddish to pink; generally developing a strong taproot and network of deep, spreading laterals. Leaves are deciduous, alternate, elliptic, 10–25 cm long and 8–15 cm wide, divided less than halfway to midvein into 7–11 shallow wavy lobes with a few irregular bristle-tipped teeth, sinuses usually extending less than 1/2 distance to midrib, glabrous and dull green above, light dull green below with tufts of hairs in vein angles. Male and female flowers are borne in separate catkins on the same tree (the species monoecious), the staminate catkins in leaf axils of the previous year's growth, the pistillate in 2–many-flowered spikes in the leaf axils. Acorns maturing in the second year, about 15–30 cm long, with a broad usually shallow cup, borne singly or in clusters of 2–5. The common name is in reference to the red fall foliage color, red petioles, and reddish interior wood. This is a different species from "southern red oak" (*Q. falcata*).

Northern red oak is a member of the red oak subgroup (subg. *Erythrobalanus* = sect. *Lobatae*). It hybridizes with related species, including scarlet oak (*Q. coccinea*), northern pin oak (*Q. ellipsoidalis*), shingle oak (*Q. imbricata*), scrub oak (*Q. ilicifolia*), blackjack oak (*Q. marilandica*), swamp oak (*Q. palustris*), willow oak (*Q. phellos*), Shumard oak (*Q. shumardii*), and black oak (*Q. velutina*).

Variation within the species: There are different interpretations of variation patterns among trees of northern red oak. A single species without formally variants is sometimes recognized, or two varieties may be recognized.

Quercus rubra var. *ambigua* (A. Gray) Fernald
SY= *Q. borealis* Michx. f.
SY= *Q. rubra* var. *borealis* (Michx. f.) Farw.

Quercus rubra var. *rubra*
SY= *Q. maxima* (Marsh.) Ashe
SY= *Q. borealis* var. *maxima* (Marsh.) Ashe

Var. *rubra* has a shallow cup, to 3 cm wide, enclosing 1/4–1/5 of the nut. Var. *ambigua* has a deeper cup, to 2 cm wide, enclosing 1/3 of the nut. McDougal and Parks (1984, 1986) found evidence of correspondence between morphological types and flavonoid chemotypes but the evolutionary status and geographic distribution of these have not been worked out in detail.

Distribution
Northern red oak is widely distributed throughout much of the eastern United States and southeastern Canada. It grows from Quebec, Ontario, Nova Scotia, and New Brunswick southward to southwestern Georgia, Alabama, northern Mississippi, northern Arkansas, and eastern Oklahoma. Northern red oak extends westward through Minnesota and Iowa, south through eastern Nebraska and Kansas to eastern Oklahoma. It occurs locally in eastern and southwestern Louisiana and western Mississippi. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Adaptation: Northern red oak commonly grows on mesic slopes and well-drained uplands, less commonly on dry slopes or poorly drained uplands, at (0-) 150–1800 meters in elevation. It typically grows on lower and middle slopes, in coves, ravines, and on valley floors, most commonly on N- and E-facing slopes and on clay, loam, and sandy or gravelly soils. Best growth is in full sun and well drained, slightly acidic, sandy loam. It occurs as a dominant in many natural communities, including mixed mesophytic and pine-oak.

Northern red oak is intermediate in shade tolerance but generally unable to establish beneath its own canopy. Seedlings usually do not reach sapling or pole size unless gaps are created in the canopy. Northern red oak is often replaced by more shade-tolerant species such as sugar maple and American basswood.

Flowering occurs in April–May, during or before leaf development, while fruiting (August–) September–October.

General: Northern red oak generally first bears fruit at about 20–25 years, although most trees do not produce acorns in abundance until 40–50 years. Good crops are produced every 2–5 years. In most years, birds, mammals, and insects commonly destroy up to 80% of the crop and nearly the entire crop can be eliminated in poor years. Seeds on the soil surface are particularly vulnerable to rodent predation, and germination frequencies are much higher when a layer of leaf litter covers acorns. Under natural conditions, acorns generally germinate in the spring after over-wintering breaks dormancy.

Germination and seedling establishment may be successful in full and partial shade, but early growth is reduced by shade, poor soil, and competing herbaceous vegetation. Seedlings in mature stands may be present in large number, but few survive more than a few years or grow to more than 15–20 cm in height. Under optimal conditions, northern red oak is fast growing and trees may live up to 500 years.

Seedlings, saplings, and small poles of northern red oak can sprout if cut or burned. Although young oaks typically stump sprout readily, older and larger individuals also may sprout.

Management
The tight, relatively thin bark of northern red oak makes the trees more susceptible to fire damage than in species of oak with rougher, corkier bark. Apart from immediate mortality, damaged basal cambial tissue permits the entry of insects and heart-rot decay that may ultimately kill the tree. Even so, northern red oak is adapted to periodic fire, which is integrally associated with oak forests. Older, larger individuals often survive fire and seedlings, saplings, and pole-sized individuals commonly sprout vigorously from the stumps or root collar after being top-killed by fire. Increased fire suppression has favored more shade-tolerant hardwoods and resulted in a decrease in oaks.

Acorns can maintain viability in controlled storage for up to 2–3 years. They should be stratified at 1-3° C for several months; those from northern populations require the longer period. Growth is best

when sown as soon as ripe into permanent position or in an outdoor seedbed protected from predation. Cuttings obtained from young trees can be rooted if treated with hormones. Transplants of bare root stock are best done in spring. Because of its usefulness and popularity, northern red oak is commonly available in ball-and-burlap and in containers.

The gypsy moth and numerous other insects can attack northern red oak, occasionally causing serious damage. Numerous caterpillars enjoy oak foliage, but feeding damage is usually not severe. Oak decline is a serious disease of northern red oak and has affected the species throughout much of the central Appalachian region.

Oak wilt

Northern red oak is susceptible to oak wilt, a fungal disease that invades the water-conducting vessels and plugs them. As water movement is slowed, the leaves wilt and rapidly drop off the tree. The disease begins with a crinkling and paling of the leaves, followed by wilting and browning from the margins inward. Necrosis may be strongest along the veins or between them. The symptoms move down branches toward the center of the tree and the tree may die within 1–3 months, although some diseased trees may survive up to a year. The disease may be spread by insects (primarily beetles) or pruning tools, but most of the tree loss in oak wilt centers results from transmission through root spread between adjoining trees. A trench (dug and then immediately filled) between neighboring trees severs the roots and prevents fungus spread. Dead and infected trees must be destroyed – once a tree has become infected, there is little chance to save it. The wood may be used for firewood provided it is debarked or covered and sealed during the spring and summer (Johnson and Appel 2000; Roberts 2000; Wisconsin Dept. of Natural Resources 2000; City of Austin 2000).

This disease most seriously infects species of the red oak group (including black and live oaks). Overcup oak, bur oak, white oak, and other members of the white oak group are not as susceptible and can be planted in oak wilt centers. Oak wilt has reached epidemic proportions in Texas and in the mid-West from Iowa and Minnesota through Michigan and Wisconsin into Ohio, West Virginia, and Pennsylvania.

Cultivars, Improved and Selected Materials (and area of origin)

These plant materials are somewhat available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under ”United States Government.” The Natural Resources Conservation Service will be listed under the subheading “Department of Agriculture.”

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Revised: 19jun02 jsp; 29may03 ahv; 060809 jsp

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Plant Fact Sheet

RED MAPLE

Acer rubrum L.

Plant Symbol = ACRU

Contributed by: USDA NRCS New York State Office



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Alternative Names
swamp maple

Uses
Erosion control: Red maple is available in quantity for revegetation work and landscaping. It is a valuable riparian buffer plant due mostly to it's tolerance of wetter soils.

Wildlife: Red maple seeds provide food for squirrels and some birds. The species is not preferred by deer as a browse source, so in heavy deer pressure this species is over abundant in forest regeneration.

Wood: The wood is not desirable for lumber or veneer.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
This plant may become weedy or invasive in some regions or habitats and may display desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at plants.usda.gov.

Description
Acer rubrum L., red maple, is a wide-ranging native tree that is very well adapted to most soil and site conditions. This species is one of the early harbingers of fall as it turns color well in advance of other eastern deciduous trees, especially when it is located in wet sites. The fiery colors of fall are typically a brilliant red. Conversely, it is also one of the earliest flowering trees in the spring. Red maple has the smallest winged seeds (samaras) of all native maples, about 5/8-3/4 inches long. Also, the samaras ripen in the spring- a trait shared only with silver maple which has much larger samaras. This maple is a medium sized tree with fairly rapid growth (2-5 ft/yr), but not as fast as the much larger growing silver maple.

Adaptation and Distribution
Red maple is adapted to wet sites where it associates with black ash, cottonwood, and black gum. Some forested wetlands are referred to as maple swamps due to their stands of red maple. However, red maple is also well adapted to well drained but moist soils of upland sites where its companions are sugar maple, beech, black cherry and the birches. This capability makes this species a common tree in home landscapes where the fall colors can be displayed. The range of red maple extends from Florida to the Maritimes and west to Texas and Minnesota. Red maple is shade tolerant.

For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment
Red maple seed is easily germinated in nature or in nurseries. The seed can be direct planted with no pre-treatment. The seedlings have moderately fast growth and are usually outplanted as 1 year old or 2 year old bareroot stock.

Management
Red maple seedlings must be protected from fire and livestock, and are greatly aided where weed and grass

competition is controlled. This is particularly true in any plantings where grass sod is the cover between trees. Weed control mulch or fabric, or herbicide treatments are recommended for the first three years or longer.

Pests and Potential Problems

Few pests seriously bother red maple, although the Asian long-horned beetle is a dire threat to the species if eradication efforts fail.

Cultivars, Improved, and Selected Materials (and area of origin)

There are many selections in the horticultural trade that have mostly been selected for a growth form oddity. These are not recommended for riparian buffer use, rather the typical growth form is preferred. Purchasing stock of known origin will aid in assuring adaptation, and nurseries should be willing to provide this information.

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Edited: 31Jan2002 JLK; 24may06jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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Plant Fact Sheet

FLOWERING DOGWOOD

Cornus florida L.

Plant Symbol = COFL2

Contributed by: USDA NRCS Plant Materials Program



Robert H Mohlenbrock
USDA NRCS 1995
Northeast Wetland Flora
@USDA NRCS PLANTS

Uses

Wildlife: The fruit is choice fall and winter food of the gray squirrel and fox squirrel, bobwhite, cedar waxwing, cardinal, flicker, mockingbird, robin, wild turkey, and woodpecker. The leaves and twigs are choice food for the white-tailed deer. It is not an important nesting plant.

Ornamental: It is an important ornamental tree used around homes and office buildings because of its striking display when it is in full bloom.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

Cornus florida L., flowering dogwood, is a small, bushy tree which rarely attains a height of more than 40 feet or a diameter of 12 to 18 inches. The leaves are opposite one another and from 3 to 6 inches long. The deeply ridged and broken bark resembles alligator hide. Flowering dogwood has large, showy, deeply notched bracts, 4 of which surround each cluster of inconspicuous perfect flowers, in bloom from May to June. The fruit clusters on this shrub-like tree are scarlet red.

Adaptation and Distribution

Flowering dogwood is adapted to most upland sites but grows best on rich, well-drained soils on middle and lower slopes. It develops best as an understory species in association with other hardwoods.

Flowering dogwood is distributed throughout the eastern United States. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment

Plants can be grown from seed planted 1/2 inch deep in late winter.

Management

In tree harvest or timber stand improvement operations, specify that 5 or 6 dogwoods per acre be left in the forest for aesthetic purposes and as a food source for squirrels, turkeys, deer, and non-game birds. Leave all dogwoods along highways and roads.

Pests and Potential Problems

There are several wood boring insects and canker diseases that attack the main stem while others invade the branches and leaves.

Cultivars, Improved, and Selected Materials (and area of origin)

Seedlings can be purchased from most commercial hardwood nurseries.

Prepared By & Species Coordinator:

USDA NRCS Plant Materials Program

Edited: 01Feb2002 JLK ; 25may06jsp

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Plant Fact Sheet

HONEY LOCUST

Gleditisia triacanthos L.

Plant Symbol = GLTR

Contributed by: USDA NRCS East Texas Plant Materials Center



Herman, D.E., et al. 1996. *North Dakota tree handbook*

Alternate Names

Honey–shucks, Sweet Locust, Three-thorned-acacia, Thorn tree, Thorny Locust, Sweet-bean

Uses

Landscaping

Thornless and fruitless varieties have been developed by the horticultural industry and are used extensively in landscaping. The trees are very hardy and are often used in parking lot islands and along side walks. The open canopy and small leaves will not shade out turf grasses or other landscape plants.

Wildlife

Honey locust is used extensively by wildlife. The bean pods are a favorite food of the white-tailed deer, squirrels, rabbits, hogs, opossums, and raccoons. Domestic animals such as sheep, goats, and cattle will also forage on the honey locust bean pods. Browsing and grazing animals, such as deer, cattle, and sheep utilize the tender shoots in spring and the bark of young trees in winter. Honey locust is capable of forming dense thickets of thorny vegetation which provides excellent cover for a wide variety of game animals and birds. Flowers of this species are incredibly attractive to pollinating insects.

Timber

Wood from the honey locust is very dense, shock resistant and commonly used in the timber industry. Honey locust wood is easily split, capable of obtaining a high luster finish, and is durable when in contact with soil. For these reasons, timber from honey locust has been used as fence posts, railroad ties, furniture, warehouse or shipping pallets, tool handles and fuel.

Ethnobotanical

Native Americans used the dried pulp from the seed pods as a sweetening agent and a minor food source. The wood was used to make bows, and a variety of medicines were made from various parts of the plant.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness

This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at plants.usda.gov. Please consult the Related Web Sites on the Plant Profile for this species for further information.

Description and Adaptation

Honey locust is a woody, long lived, native, deciduous, legume (Fabaceae family), and is capable of obtaining 100 feet in height. The doubly compound leaves are alternate and dark green in color. Large, red thorns are often found on the branches and trunk of wild trees. The thorns typically have 3 points, but may have more, especially those on the trunk. The bark is dark gray and black with deep fissures that form large "plates" of bark on mature trees. Long, twisted seed pods form in late summer, and turn from green to dark

reddish brown as they mature. The size of these pods is highly variable, and they give off a very strong, sweet aroma when they ripen and fall to the ground.

Honey locust is a pioneering woody species commonly found in overgrown pastures, fields, fence lines, and wood lot edges. It has a very broad range of adaptation, and is distributed nationwide, excluding Oregon and Washington. The greatest concentration of plants can be found in the central portions of the U.S. It prefers moist, fertile, alluvial soils. It will withstand periods of drought and prolonged wetness, and is commonly found in the upland areas along river drainages.

Establishment
This plant is often distributed by animals which have consumed the seed and passed them through their gut. This can be imitated by scarifying the seed mechanically or by using an acid bath. Seeds soaked in hot water (85 -90°C) and allowed to cool to room temperature have also germinated well. Seed that has been treated with these methods can be planted into a well prepared seed bed or container, approximately ½ inch deep. Seedling should be strong enough for transplanting at one year of age. Root cuttings have also been successfully used for propagation. Honey Locust requires full sun, and will not tolerate shading.

Management
Once established, trees are generally maintenance free. Pruning of lower limbs will encourage tall, upright growth.

Pests and Potential Problems
Honey Locust has few significant pests. Canker can sometimes be a problem, but rarely kills the tree.

This plant can become a nuisance, and will dominate a site if left unchecked or mismanaged. Honey locust can produce numerous thorns that are capable of puncturing implement tires. Though not listed as a toxic plant, contact with thorns often results in sore wounds that are slow to heal.

Environmental Concerns
Due to rapid growth, aggressive re-sprouting, and density of the wood, this plant has excellent potential for use as a biofuel either by direct burning of the wood or cellulosic ethanol production.

Control
Honey locust is intolerant of fire. Timely, periodic burning will eliminate it from open areas. Herbicides may also be used for control and suppression.

Cutting young trees results in excessive re-spouting from the stump and roots, compounding the original problem exponentially. Stumps from cut trees must be treated with herbicide to prevent aggressive re-sprouts from forming dense thickets of thorny trees.

Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Cultivars, Improved, and Selected Materials (and area of origin)
Thornless and fruitless varieties are readily available through the nursery industry.

Prepared By: *R. Alan Shadow*, Soil Conservationist, USDA/NRCS East Texas Plant Materials Center, Nacogdoches, TX

Species Coordinator: *R. Alan Shadow*, Soil Conservationist, USDA/NRCS East Texas Plant Materials Center, Nacogdoches, TX

Edited: 090108 jsp

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Natural Resources Conservation Service

Plant Fact Sheet

KENTUCKY COFFEETREE

Gymnocladus dioicus (L.) K. Koch

Plant Symbol = GYDI

Contributed by: USDA NRCS Plant Materials Center, Manhattan, Kansas & Kansas State University, Research Forestry



USDA Forest Service, Northeastern Area Archives, USDA Forest Service

Alternate Names: American coffee bean, American coffee berry, American mahogany, chico du Canada, chicot, chiot, chiot tree, coffeebean, coffeebean-tree, coffeenut, coffeetree, dead tree, geweihbaum, Kentucky coffeetree, Kentucky mahogany, mahogany, mahogany-bean, nettle-tree, nicker tree, nicker treet, stump tree
Also: Gymnocladus dioica (L.) Koch

PARTS OF THIS PLANT ARE POISONOUS-See Environmental Concerns section of this document

Uses

Industry: Timber, the strong, heavy wood is used in general construction and fence posts although the rot resistant wood is soft and the staples pull out easily. Pioneer settlers used the coarse-grained, light brown to reddish-brown wood in cabinetry. Also used for ornamental purposes in large area landscape plantings and parks.

Wildlife: Kentucky coffeetree is used by nesting birds. Due to the tree's toxic plant parts such as the leaves and raw seeds, there is little wildlife usage as a source of food.

Ethnobotanic: While native to North America, Native Americans introduced the tree to some parts of the continent as they used the pulp from the wood to treat insanity. A tea was also made from the leaves and pulp and used as a laxative. Early settlers used the seeds of the tree as a substitute for coffee. CAUTION! The seeds and pods contain the alkaloid cystisine (Seed Environmental Concerns). Cystisine is thought to be neutralized in the roasting process.

Conservation: Kentucky coffeetree was formerly planted around farmsteads. It is tolerant to a wide range of conditions such as drought, chalk (limestone), and urban conditions. The tree has been planted on mine spoils for soil reclamation and stabilization. This pest free tree is an alternative to ash and elm which have been ravaged by insects and disease.

Status

Kentucky coffeetree's numbers are declining rapidly due to over harvesting. The species is not invasive; it is only found in small clusters due to root sprouting and makes up a rare component of any woodland. Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description and Adaptation

General: Legume Family (Fabaceae): A medium to large, round-barked native deciduous tree reaching heights of 60-100 feet with a spread of 40 to 50 feet. Its short trunk, 1 to 2 feet in diameter, divides into several large branches that end in contorted, stout twigs. Its unique, thick, dark bark is gray to grayish-brown, often marked with deep, irregular furrows and plates that curl at their sides. The alternate,

bipinnately compound leaves are the largest of any native species, measuring from 1 to 3 feet in length by 18 to 24 inches in width, arranged in feather-fashion in 5 to 9 pairs of pinnae, the lowest are reduced to simple leaflets. Typically the leaves consist of six to 14 entire; more or less ovate (almond shaped) leaflets, 2 to 3 inches long.

Relatively hardy in zones 3 to 8, the tree adapts well to urban conditions. It prefers full sun, humus-rich, moist soil, and tolerates drought and occasional flooding. Considering its cultural tolerances, it should be on the list of "tough" trees. Kentucky coffeetree is a fast-growing tree when young with moderate to slow growth as the tree ages attaining 12 to 14 feet in 10 years.

Establishment
Seedlings may be planted in the field after one year. Transplant balled and burlapped trees into deep, rich, moist soil for best growth.

Management
Fertilize with formulations that promote woody growth rather than excessive foliar growth. Prune in winter or early spring; wood may be somewhat brittle. Longer, weaker branches should be pruned when young to promote a stronger structure.

Pests and Potential Problems: No serious insect or disease problems. Fallen leaf stalks and pods require some clean up.

Environmental Concerns: The leaves, seeds and pulp are poisonous and are toxic to livestock, humans, and pets. Sprouts eaten in the spring have produced toxicosis. Leaves, young sprouts, and seeds with gelatinous matter around them contain the toxin. Cattle have reportedly died after drinking from pools of water contaminated by fallen leaves and seeds from the tree.

Control
Animals should not be allowed to graze woodland areas where Kentucky coffeetree grows or where it has been cut and allowed to sprout, until spring grasses and herbage are abundant. Sprouts can be grubbed periodically as a preventative measure as only a few of these trees will be found in any woodland. Fence in large fruiting trees to prevent livestock from eating the fallen pods. This measure is desirable over removing a species that is so rare in the landscape.

Cultivars, Improved, and Selected Materials (and area of origin): Several cultivars are available in the nursery trade including selections that are predominately male such as 'Espresso', 'J.C. McDaniel' (Prairie Titan™), and 'Stately Manor', that produce no fruit. Espresso exhibits an upward, arching branch form resulting in an elm-like vase shape. Prairie Titan is a very symmetrical, upright spreading tree 60 to 70 feet tall with blue-green summer foliage, from the University of Illinois campus near Davenport Hall. Stately Manor is a narrow, upright form 50 feet tall and 20 feet wide, is possibly best for street tree use. 'Variegata' is a little known, slower growing cultivar with streaks of creamy white variegation and pink-purple new growth.

Prepared By:
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Species Coordinator:
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Edited: 0702 jd; 070227 jsp

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Plant Fact Sheet

SWEETGUM

Liquidambar styraciflua L.

Plant Symbol = LIST2

Contributed by: USDA NRCS Plant Materials Program



USDA NRCS National Plant Materials Center
Beltsville, MD

Alternate Names
redgum, sapgum, starleaf-gum, bilsted

Uses
Erosion Control: Sweetgum is a good choice as a windbreak tree because of its fast growth and tolerance of a wide variety of sites.

Wildlife: Its seeds are eaten by birds, squirrels, and chipmunks.

Timber: Sweetgum is primarily used for lumber, veneer, plywood, slack cooperage, railroad ties, fuel and pulpwood. Its wood is used for veneer, furniture, interior trim, and wooden ware, in addition to pulpwood for fine papers.

Recreation and Beautification: It is used as a specimen plant, shade tree, and street tree.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
Liquidambar styraciflua L., sweetgum, is native to southeastern, east-central, and south-central United States, southern Mexico, and central America. It is a large deciduous hardwood tree, which can grow to over 100 feet in height and 3 to 5 feet in diameter, with a symmetrical, cone-shaped crown. The bark is grayish brown, deeply furrowed into narrow, somewhat rounded ridges. The leaves are alternate, simple, and palmately lobed with 5-7 points resembling a star in shape, dark green and lustrous above, paler underneath. Flowers are monoecious, female, on a slender stalk terminated by a ½ inch diameter globose head consisting of 2-beaker ovaries subtended by minute scales. The fruit is a dangling brown, woody spiny tipped "gum ball" with seeds brownish and winged.

Adaptation and Distribution
In the wild, sweetgum grows in bottomland areas with rich, moist soil, but can tolerate a variety of soil conditions. The tree does not do well planted in locations where roots are limited in their development. It grows best on moderately coarse to fine soils that are well drained and slightly acid (pH 6.1- 6.5). It develops a deep taproot with numerous highly developed laterals on well drained bottomland sites and a shallow, wide spreading root system on poorly drained sites. Sweetgum is very intolerant to shade but tolerant to flooding. It also tolerates seaside sites if protected from high winds.

Sweetgum is distributed throughout the east and southeast portions of the United States. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment
Sweetgum can regenerate naturally from root sprouts following logging. It can be successfully established using quality seedlings with a large root-collar diameter of at least ¼ inch. Mycorrhizae can significantly improve seedling quality. Soil amended with as little as ½ inch of sewage sludge (disked into the soil) can result in better growth at outplanting.

Leafy cuttings taken with a heel can be readily rooted under mist in summer. Transplant balled and burlapped plants in spring into deep, moist, slightly acid soil, full sun. The root system is fleshy, not greatly fibrous, and takes a while to reestablish.

Seeds exhibit only a shallow dormancy, but germination rate is considerably increased by cold, moist stratification at 41 °F for 15 to 90 days in moist sand. Prechilled seeds should be broadcast or drilled to achieve a seedling density of 20-25 per square ft. Seeds should be sown on the soil surface and lightly pressed into the soil. A mulch of sawdust, sand or chopped pine needles should be applied. There are approximately 0.8 lb of clean seeds per bushel of fruit and the average number of seeds per lb is 82,000.

Management

Adequate sunlight is required for sweetgum to reach its potential. Young trees are able to withstand crowding, however, they become intolerant to competition with increasing age. Removal of overstory trees results in rapid growth of young sweetgum trees.

Pests and Potential Problems

Sweetgum is susceptible to iron chlorosis on high pH soils, frost damage to late summer shoot growth, occasional bleeding necrosis, leader dieback, sweetgum blight, leaf spots, sweetgum webworm, caterpillars, cottony-cushion scale, sweetgum scale, and walnut scale.

Cultivars, Improved, and Selected Materials (and area of origin)

'Burgundy,' 'Moraine,' 'Festival,' 'Obtusiloba,' 'Gumball,' 'Palo Alto,' 'Levis,' and 'Variegata.' Sweetgum seeds are commercially available from forest seed companies.

Prepared By & Species Coordinator:

USDA NRCS National Plant Materials Center
Beltsville, Maryland

Edited: 05Feb2002 JLK; 060802 jsp

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Plant Fact Sheet

BLACKGUM

Nyssa sylvatica Marsh

Plant Symbol = NYSY

Contributed by: USDA NRCS Plant Materials Program



Robert H Mohlenbrock
USDA NRCS 1991
Southern Wetland Flora
@ USDA NRCS PLANTS

Alternate Names
sourgum, pepperidge, tupelo, tupelo-gum

Uses
Erosion Control: Reestablishes well in erosion prone areas like burned over forest, abandoned fields, rolling hills and cold mountain swamps.

Wildlife: Black bears, foxes, wood ducks, wild turkeys, robins, woodpeckers, mockingbirds, brown thrashers, thrushes, flickers, and starlings frequently eat the fruit, while white-tailed deer and beavers browse the twigs, foliage and young sprouts. Additionally, provides cavity and nesting sites for a variety of birds and mammals and a good honey tree.

Timber: Its wood is used for light, nonsplitting woodwork such as in docks and wharves; veneer, containers, crossties and pallets.

Recreation and Beautification: Excellent ornamental plant for its straight bole, shapely crown and attractive autumn foliage.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
Nyssa sylvatica Marsh., blackgum, grows from Maine west to New York, extreme southern Ontario, central Michigan, Illinois, central Missouri, and south to central Florida. It is a medium- to large-sized tree, frequently 60 to 80 ft high and 3 to 4 ft in diameter; it typically has dense foliage with a conical crown on a straight trunk. The simple, alternate leaves are leathery, and densely clustered at the branchlets. The small greenish white flowers are borne singly or in clusters. The bark is reddish brown and broken into deep irregular ridges and diamond-shaped plates.

Adaptation and Distribution
It is adapted to a wide variety of sites, from the creek bottoms of the southern Coastal Plain to altitudes of 3,000 feet in North Carolina. It grows best on well-drained, light-textured soils on the low ridges of second bottoms and on the high flats of silty alluvium. It will tolerate brief spring flooding on alluvial sites and is common on the relatively dry upper and middle slopes in the Appalachian Mountains. On the drier uplands, it grows best on the loams and clay loams. It is well adapted to fire. Older trees have thick bark and relatively high moisture content. Although aboveground portions of young trees are top-killed by fire, it typically survives by sprouting from the root crown or caudex.

Blackgum is distributed throughout the East and lower Midwest. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment
Blackgum is usually found with a mix of other species including black cherry (*Prunus serotina*), dogwood (*Cornus florida*), hickory (*Carya* spp.), oak (*Quercus* spp.), eastern hophornbeam (*Ostrya virginiana*), and yaupon (*Ilex vomitoria*), it is shade tolerant and seldom grows as dominant tree but it usually grows in the intermediate crown class on most sites. It responds favorably to release from overtopping vegetation. Seedlings grow slowly under a fully stocked stand. At the time of disturbance large numbers of new seedlings can become established.

Smaller blackgum stumps sprout readily and larger stumps sprout and develop root suckers. Layering can be used to produce stocks.

Seed production is highly variable, disseminated primarily by gravity and birds, others generally fall to the ground and remain dormant in the litter or are carried by water. Seed overwinters on cool, damp soil and germinates the following spring. It requires nearly full sunlight for optimum early growth. The plant tolerates competition and can exist on unfavorable sites. Pre-chilled seeds must be sown in spring. Seeds are drilled at the rate of 15 per ft of row and covered with ½ - 1 inch of soil. A mulch of sawdust is often used. Beds must be kept moist.

It sprouts from the stump following disturbance. Smaller sour gum stumps sprout readily while larger stumps sprout occasionally. Sprouts arise from suppressed buds and are concentrated near the top of the stump. Stump sprouts can produce seeds at 2 years of age.

Management

Seedling establishment is best accomplished by shelterwood method. Regeneration can also be accomplished by clear-cutting if prior to a good seed fall or if advanced regeneration already exist. Due to the high palatability of seedlings and sprouts, blackgum can be protected by controlling deer populations. It often competes with loblolly and shortleaf pine for water and light, reducing its growth and development. Basal tree injections with herbicide is effective control method for crown kill. Intermediate trees respond favorably to release from overhead vegetation; seedlings respond to reduction in canopy cover with relatively rapid height growth.

Pests and Potential Problems

Tupelo leaf miner (*Antispila nyssaefolia*) and forest tent caterpillar (*Malacosoma disstria*) attack blackgum causing growth loss and occasional mortality.

Prepared By & Species Coordinator:

USDA NRCS Plant Materials Program

Edited: 05Feb2002 JLK; 060802 jsp

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Plant Fact Sheet

JAPANESE BLACK PINE

Pinus thunbergii Parl.

Plant Symbol = PITH2

Contributed by: USDA NRCS Northeast Plant Materials Program



J.S. Peterson
USDA NRCS NPDC
@ PLANTS

Alternate Names
Pinus thunbergiana Franco

Uses
Japanese black pine had been among the best species for planting along Northeastern seashores until about 1990. The species has suffered from insects and diseases and has fallen rapidly in esteem.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
Japanese black pine is an introduced evergreen. In its most favorable habitat, Japanese black pine can reach a height of 100 feet, but in beach plantings, it is usually less than 20 feet tall. Its spreading, loosely swaying branches are orange-yellow in color, and form an irregular silhouette. The blackish-gray bark is furrowed into irregular plates. Its evergreen foliage consists of bright green bundles of 2 stiff, sharp-pointed needles, 3-5 inches long. The large, grayish-white terminal buds are oblong, with fringed scales at the tips. After 4 or 5 years of age, nut-brown colored, short-stalked cones, 2-3 inches long, are produced. Fruiting and seed production are usually prolific. There are 34,000 seeds per pound.

Adaptation and Distribution
This pine is adaptable and will grow on a wide variety of soils under adverse conditions. Japanese black pine exhibits excellent drought tolerance but poor shade tolerance; it tolerates moderately well-drained soils. This pine is more salt-spray resistant than any of the native pines.

Japanese black pine is distributed primarily throughout the eastern United States. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Japanese black pine typically grows on medium fertility, slightly acid, loamy to sandy soils. Establishment is by planting bare-root or container-grown plants 2-3 years old. On sand dunes, the use of container-grown plants is recommended. It may be established using bare-root two-year-old seedlings where soil and moisture conditions are good for plant establishment. It is desirable to dig a hole 2-3 times larger than the container, backfill with peat moss, then mix thoroughly with the sand. Place the roots in the hole and backfill around them. Water immediately. Japanese black pine is grown in nurseries from seed, using conventional propagation practices.

Management
Some protection from strong winds the first and second years may improve survival. Average growth is 12-18 inches per year.

Pests and Potential Problems
European pine shoot moth (*Rhyacionia buolinana*) frequently kills terminal growth of young trees, resulting in irregularly formed trees. Japanese black pine is also susceptible to red-pine scale (*Matsucoccus resinosae*).

Prepared By & Species Coordinator:
USDA NRCS Northeast Plant Materials Program

Edited: 05Feb2002 JLK; 060809 jsp

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Plant Fact Sheet

BALD CYPRESS

Taxodium distichum (L.) L.C. Rich.

Plant Symbol = TADI2

Contributed by: USDA NRCS Plant Materials Program



J.S. Peterson
USDA NRCS NPDC
@PLANTS

Alternate Names
southern-cypress, swamp-cypress, red-cypress, yellow-cypress, white-cypress, tidewater red-cypress, gulf-cypress

Uses
Erosion Control: Riverine swamps of bald cypress reduce damage from floods and act as sediment and pollutant traps as they cause floodwaters to spread out, slow down, and infiltrate the soil.

Timber: Its wood is valuable for building construction, fence posts, planking in boats, river pilings, doors, blinds, flooring, shingles, garden boxes, caskets, interior trim and cabinetry.

Wildlife: Its seeds are eaten by wild turkey, wood ducks, evening grosbeak, squirrels, waterfowl, and wading birds. Cypress domes provide unique watering places for a variety of birds and mammals and breeding sites for frogs, toads, salamanders, and other reptiles. Yellow-throated warblers forage in the Spanish moss often found hanging on the branches. Its tops provide nesting sites for bald eagles, ospreys, herons, and egrets.

Site Rehabilitation: It has potential for rehabilitating margins of surface-mined lakes. Cypress domes can serve as tertiary sewage treatment facilities for improving water quality and recharging groundwater.

Beautification: This species has been planted as a water tolerant tree species used for shading and canopy closure in mosquito control programs. It has been successfully planted throughout its range as an ornamental and along roadsides.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
Bald cypress is a large, slow-growing but long-lived, deciduous conifer, which frequently reaches 100 to 120 feet in height and 3 to 6 feet in diameter. Its trunk is massive, tapered and buttressed. The leaves are alternate, linear and flat with blades generally spreading around the twig. The bark is thin and fibrous with an interwoven pattern of narrow flat ridges and narrow furrows. Its male and female flowers form slender tassle-like structures near the edge of the branchlets. Bald cypress trees produces cone fruit, and there are approximately 5,200 seeds per pound. It develops a taproot as well as horizontal roots that lie just below the surface and extend 20 to 50 feet before bending down. It develops knees that grow above water providing additional support.

Adaptation and Distribution
Bald cypress is generally restricted to very wet soils consisting of muck, clay or fine sand where moisture is abundant and fairly permanent. It is usually found on flat or nearly flat topography at elevations less than 100 feet above sea level. Its thin bark offers little protection against fire and during years of drought when swamps are dry, fire kills great numbers of cypress.

Bald cypress is widely distributed along the Atlantic Coastal Plain from southern Delaware to southern Florida, westward along the lower Gulf Coast Plain to southeastern Texas. Inland, it grows along streams

of the southeastern states and north in the Mississippi valley to southeastern Oklahoma, southeastern Missouri, southern Illinois, and southwestern Indiana. For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Website.

Establishment
Establishment of bald cypress stands can be accomplished by either seeds or sprouts. Seeds are produced annually and good seed production occurs about every 3 years. Seeds are dispersed more frequently by flood waters. Under swamp conditions, the best seed germination generally takes place on a sphagnum moss or a wet-muck seedbed. On better drained soils, seed usually fails to germinate due to lack of surface water. Soil saturated for 1 to 3 months after seedfall is required for germination. Seedlings require light for good growth, thus control of competing vegetation is necessary.

Bald cypress will produce vigorous sprouts from the stumps of both young and old trees, following disturbance.

Management
The best management practice for regenerating this species is canopy thinning. Through thinning, competition is controlled and overhead light is provided for newly germinated seedlings. Nutria, a swamp rodent, often clips or uproots newly planted seedlings before the root systems are fully established, thus killing them. Control of nutria population is necessary.

Severe fire after logging or drainage destroys seeds and roots in the soil, favoring willows and hardwoods to take over.

Pests and Potential Problems
Brown pocket rot known as “pecky cypress” which is caused by the fungus *Stereum taxodi* attacks the heartwood. The forest tent caterpillar (*Malacosma disstria*) and fruit-tree leafroller (*Archips argyrospila*) larvae build webs and feed on needles causing dieback and eventually death.

Cultivars, Improved, and Selected Materials (and area of origin)
‘Emerson’ and ‘Pendens’ are 2 cultivars of bald cypress that are commercially available.

Prepared By & Species Coordinator:
USDA NRCS Plant Materials Program

Edited: 05Feb2002 JLK; 060818 jsp

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Fact Sheet ST-73
November 1993

Amelanchier arborea
Downy Serviceberry[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Downy Serviceberry grows 25 to 40 feet tall and can spread to 20 feet (Fig. 1). This native large shrub or small tree has a moderate growth rate in most soils. Multiple stems are upright and highly branched forming a dense shrub with many small-diameter branches or, if properly pruned, a small tree. Trees can be trained to, and are offered by nurseries, with one trunk. The main ornamental features are white flowers followed by purple fruit in late spring or early summer. Fruits are produced before the leaves in spring and are quickly eaten by birds. Serviceberry puts on a brilliant fall color display ranging from yellow and orange to dull red. This tree is suitable for naturalistic plantings and will attract birds. The tree suckers from the base of the trunk, which can be a maintenance problem in urban plantings or in formal landscapes.

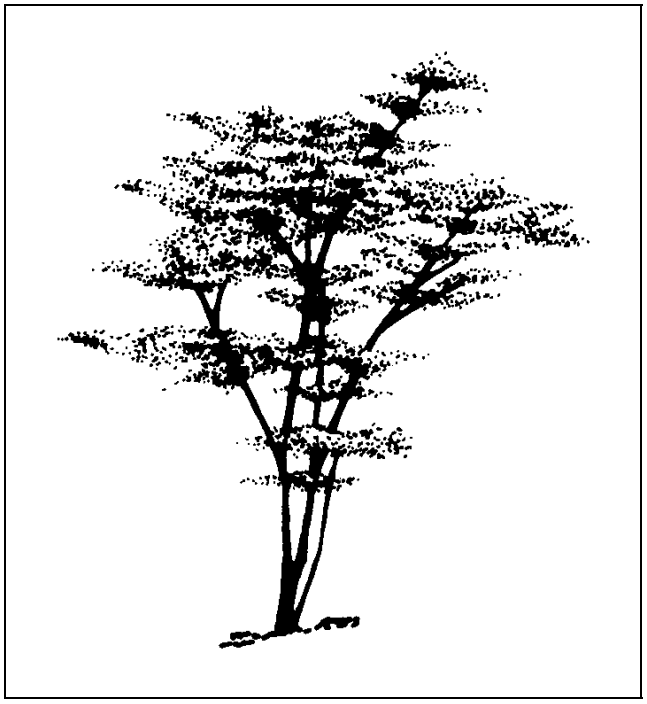


Figure 1. Middle-aged Downy Serviceberry.

GENERAL INFORMATION

Scientific name: *Amelanchier arborea*
Pronunciation: am-meh-LANG-kee-er ar-BORE-ee-uh
Common name(s): Downy Serviceberry, Juneberry
Family: *Rosaceae*
USDA hardiness zones: 5 through 8 (Fig. 2)
Origin: native to North America
Uses: container or above-ground planter; wide tree lawns (>6 feet wide); medium-sized tree lawns (4-6 feet wide); near a deck or patio; narrow tree lawns (3-4 feet wide); specimen; residential street tree
Availability: somewhat available, may have to go out of the region to find the tree

DESCRIPTION

Height: 25 to 35 feet
Spread: 15 to 20 feet
Crown uniformity: irregular outline or silhouette
Crown shape: round; upright; vase shape
Crown density: moderate
Growth rate: slow
Texture: fine

1. This document is adapted from Fact Sheet ST-73, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

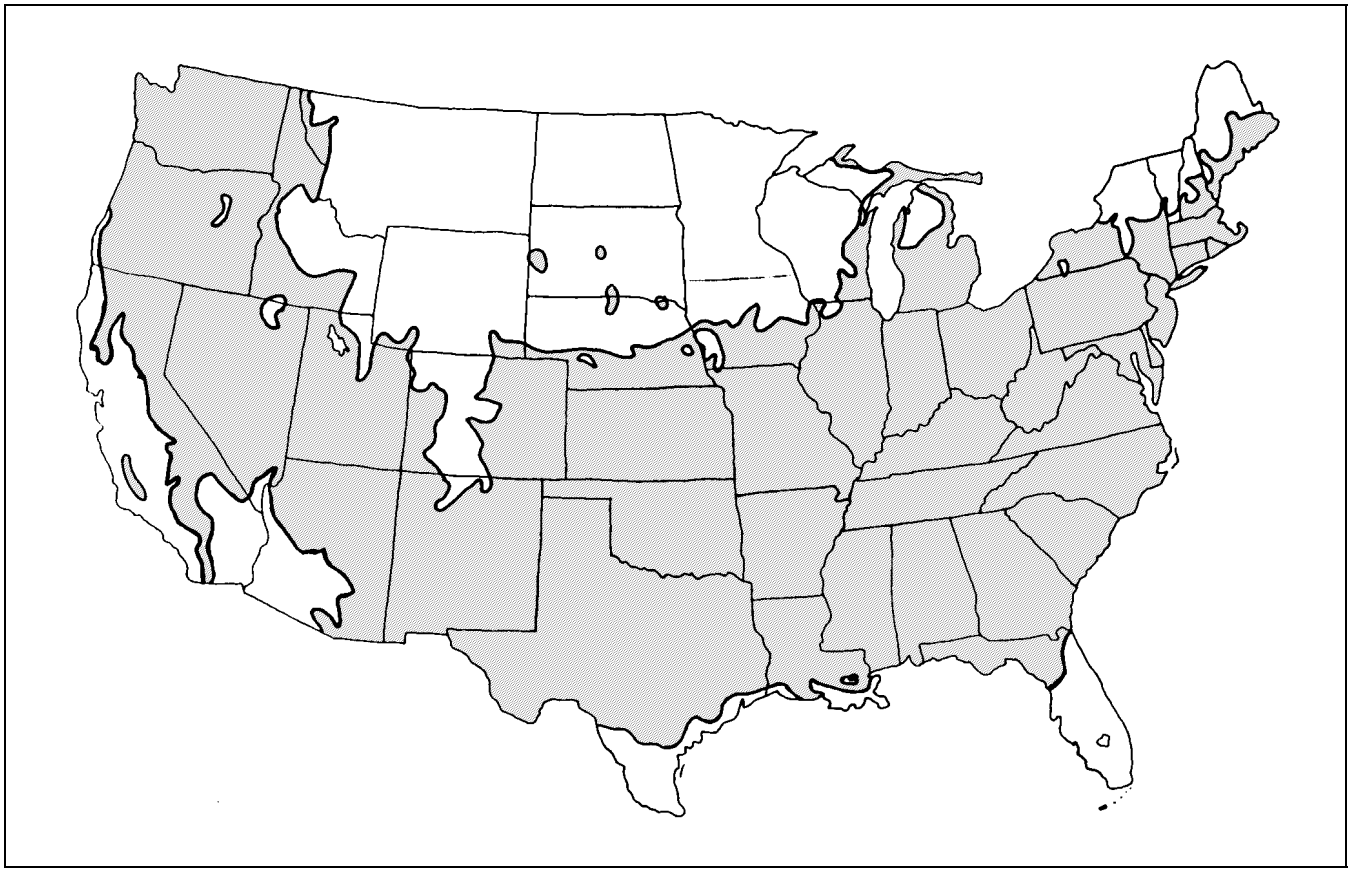


Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: serrate
Leaf shape: elliptic (oval); oblong; obovate
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches; less than 2 inches
Leaf color: green
Fall color: orange; red; yellow
Fall characteristic: showy

Flower

Flower color: white
Flower characteristics: spring flowering; very showy

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: fleshy
Fruit color: purple
Fruit characteristics: attracts birds; suited for human consumption; no significant litter problem; showy

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; routinely grown with, or trainable to be grown with, multiple trunks; grow mostly upright and will not droop; not particularly showy; tree wants to grow with several trunks but can be trained to grow with a single trunk; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: resistant
Current year twig color: brown; gray
Current year twig thickness: thin

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; well-drained
Drought tolerance: moderate
Aerosol salt tolerance: moderate

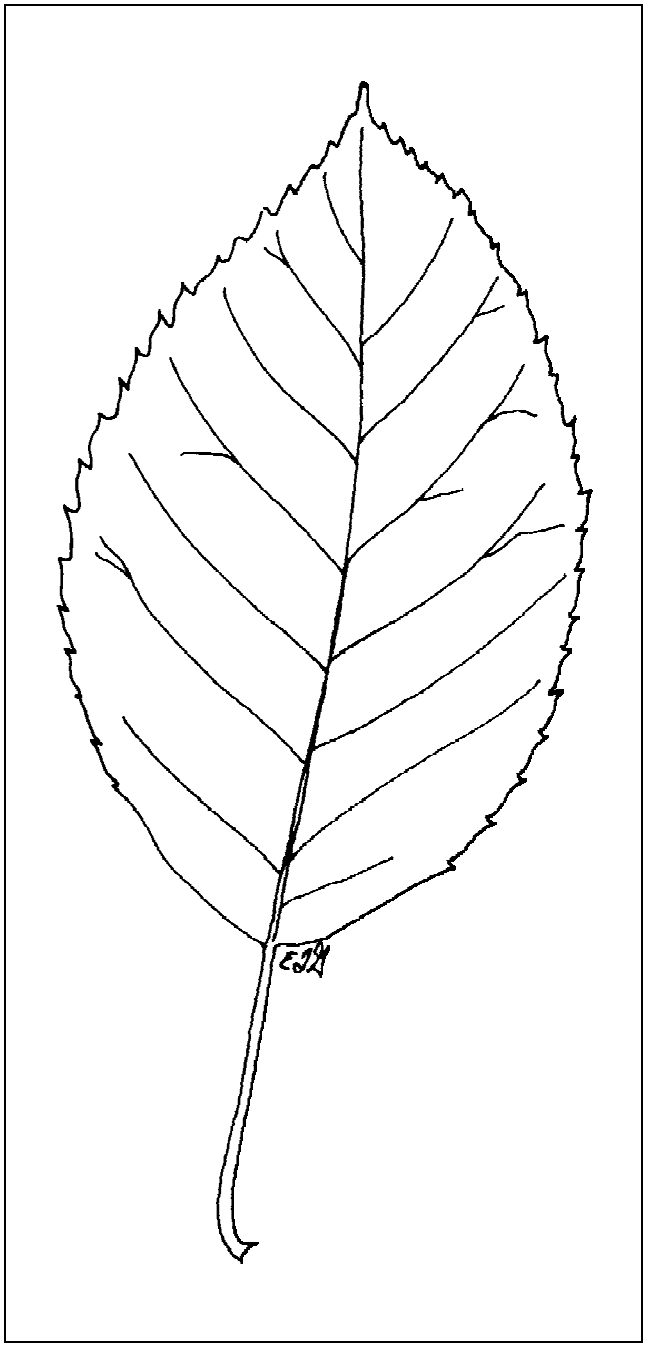


Figure 3. Foliage of Downy Serviceberry.

Soil salt tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: seeds itself into the landscape
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Although native trees are often found growing along stream banks as an understory tree, they also tolerate drier, rockier soils, and grow well in urban areas. They may lose some leaves in drought to avoid injury in dry weather. They are well-suited for planting in shrub borders and in wet soils. Their small stature and moderately-slow growth rate make it ideally suited for planting beneath power lines, if provided with some irrigation during drought.

Pests

Cambium miners cause concern when noticed but are not very damaging to the tree. The mines can extend from a twig all the way down to the roots. The mines form light-colored lines in the bark. No controls are usually suggested.

A leaf miner will mine leaves, particularly the lower half of the leaf. The mines are irregular in shape.

The leaves of amelanchier are skeletonized by at least two insects. The first insect forms small cocoons on the undersides of leaves. Skeletonized leaves look as though they have windows in them after the insects scrape tissue off the top and bottom of the leaves. The second insect is the larva of the pear sawfly. The larvae are black to greenish black and look slimy. Adult sawflies lay eggs in early and late summer. Heavily skeletonized leaves drop off.

Several borers attack amelanchier. Healthy trees are considered less susceptible so regular fertilization and watering during dry spells will help prevent borer attacks.

Spider mites will feed on amelanchier. These insects are hard to detect as they are so small. The main symptom of mite injury is the loss of green leaf coloration. If the infestation is heavy, very fine webbing may be seen. Horticultural oil sprays help control mite infestations.

Aphids of several types suck juices from amelanchier. Heavy infestations cause distortion of the foliage and new growth, and deposit large amounts of sticky honeydew on lower foliage. Black sooty mold will grow on the honeydew.

Diseases

Witches broom, also called black mildew, infects the growing point causing the formation of many stems. The cluster of stems is called the witches broom. Another symptom is a black fungal growth, coating the undersides of the leaves. The damage to the tree is usually not serious and the brooms can be pruned off. No chemical controls are suggested.

Leaf blight can cause leaf drop when a severe infection occurs. The disease causes small purple spots on the leaves. The spots enlarge and turn brown, later a small black dot will be seen in the center of the spot. Large numbers of spots cause infected leaves to drop.

Fire blight is characterized by the sudden wilting and death of branch tips. The blossoms wilt, blacken and hang on the twig. The bark is shriveled and has small bumps or blisters on it. Sometimes gum oozes out of the infected area and a crack forms between the diseased and healthy bark. Control with chemicals is difficult. Diseased branches should be pruned out. Make the cut at least four inches beyond the diseased area. Disinfect pruning tools with bleach between cuts. Fertilizing heavily with nitrogen increases susceptibility to fire blight.

Powdery mildews of several types cause white powdery growth on the leaves of amelanchier. Late in the season no controls may be needed.

Fruit rot be a problem in wet weather. The fruits are often eaten by birds so may not be around long enough to become diseased.

Cedar rusts can be troublesome.

Fact Sheet ST-95
November 1993

Betula nigra 'Heritage' 'Heritage' River Birch[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

A North American native, 'Heritage' river birch can grow 50 to 80 feet tall but is often seen at 40 to 50 feet (Fig. 1). It will grow about 30 inches or more each year in USDA hardiness zone 7, faster in the south. It has a narrow, pyramidal to oval crown with many fine branches when young, spreading wider and becoming more oval with age with several branches eventually becoming dominant. It has scaly, beige or creamy white bark, which remains an attractive pinkish-white for a longer period of time than the species. The leaves are generally shaped like a triangle.

GENERAL INFORMATION

Scientific name: *Betula nigra* 'Heritage'
Pronunciation: BET-yoo-luh NYE-gruh
Common name(s): 'Heritage' River Birch
Family: *Betulaceae*
USDA hardiness zones: 4 through 9A (Fig. 2)
Origin: native to North America
Uses: hedge; wide tree lawns (>6 feet wide); medium-sized tree lawns (4-6 feet wide); near a deck or patio; screen; shade tree; specimen; residential street tree
Availability: somewhat available, may have to go out of the region to find the tree

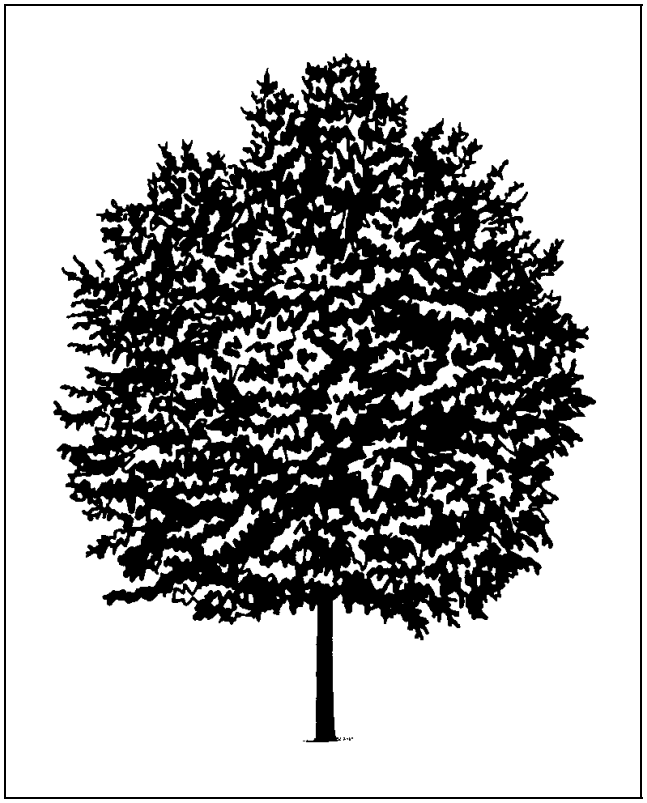


Figure 1. Middle-aged 'Heritage' River Birch.

DESCRIPTION

Height: 40 to 50 feet
Spread: 25 to 35 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: oval; pyramidal; upright
Crown density: dense

1. This document is adapted from Fact Sheet ST-95, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Growth rate: fast
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: double serrate
Leaf shape: ovate; rhomboid
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: not showy

Flower

Flower color: brown
Flower characteristics: inconspicuous and not showy; spring flowering; winter flowering

Fruit

Fruit shape: elongated
Fruit length: 1 to 3 inches
Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; tree wants to grow with several trunks but can be trained to grow with a single trunk; very showy trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown; reddish
Current year twig thickness: thin

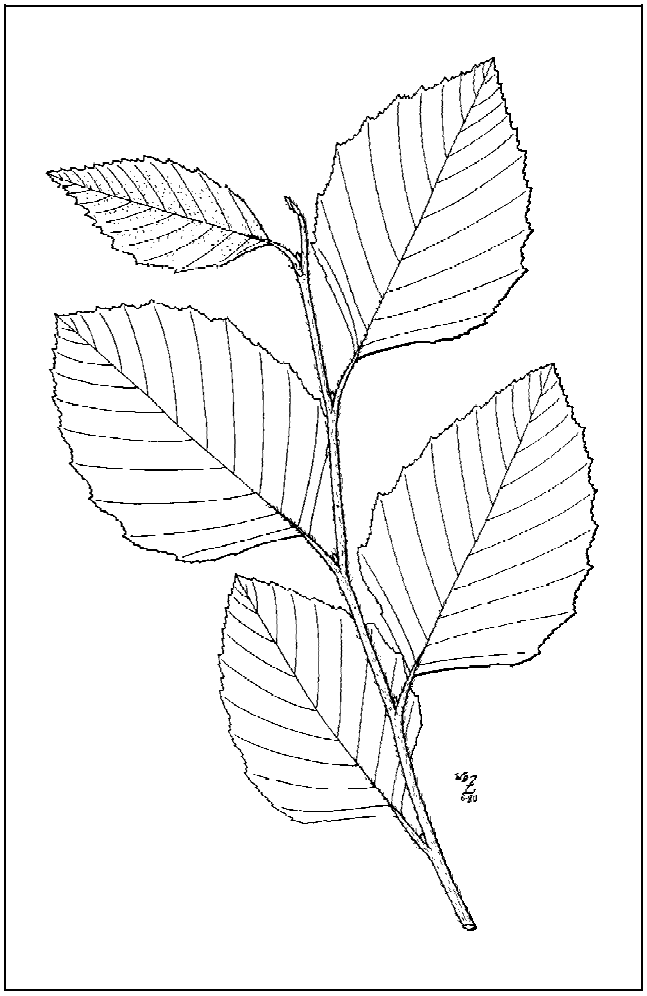


Figure 3. Foliage of 'Heritage' River Birch.

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; extended flooding; well-drained
Drought tolerance: moderate
Aerosol salt tolerance: low
Soil salt tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

'Heritage' river birch can be trained with one central leader or as a multi-stemmed tree. Like the species, it branches low on the trunk which makes it well-suited for use as a specimen tree, but the trunk must be cleared up for street or other urban uses to allow for pedestrian and vehicular clearance. Some nurseries plant two or three liners together to form a clump but these trunks will not fuse into one strong trunk. In addition, one of the trunks usually outgrows and suppresses the others. It should be grown more as a single-trunked specimen. The branches droop when they are wet, so be careful locating them close to areas where clearance is needed for vehicular traffic.

It is very well-suited for planting along steam banks and in other areas which are inundated with water for weeks at a time. River birch is seen in the wild almost exclusively along stream banks. 'Heritage' river birch tolerates low soil oxygen, periodic flooding, clay, and prefers moist soil. The tree requires an acid soil, otherwise it becomes chlorotic. 'Heritage' river birch is hardy, grows rapidly, but tends to be short-lived (30 to 40 years) in many urban settings including street tree plantings. This might be due to inadequate water supply in dry soil or root rots in continually wet soil. But like the callery pears, it will look great for about two decades or more and this is better than many other trees commonly planted in urban areas. Although the tree tolerates heat well in the south, situate the tree so it receives adequate water since leaves may scorch in dry soil. Not a tree to plant and forget due to irrigation requirement. Not for confined street tree pits or tree lawns in the south unless provided with irrigation. Although it is better adapted to heat than other birches, not a highly heat-tolerant tree.

Propagation of 'Heritage' river birch is by softwood cuttings but the plant is patented.

Pests and Diseases

No pests or diseases are of major concern. 'Heritage' river birch is reportedly resistant to bronze birch borer. Susceptible to leaf miner and scorch, and to leaf spots in wet climates. Aphids and caterpillars infest foliage.

Fact Sheet ST-138
November 1993

Celtis laevigata
Sugarberry[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

This very large, broad, fast growing deciduous North American native tree has a rounded vase crown with spreading, pendulous branches (Fig. 1). The medium-textured, light green leaves turn bright yellow in fall and can be showy in some years. Leaves have a longer, more slender tip than *Celtis occidentalis*. The grey-brown to silvery bark has some warty projections or corky ridges, making it attractive in wintertime. The bark is far less warty than *Celtis occidentalis*. Open-grown Sugarberry commonly reaches 50 to 70 feet in height with a similar spread, and makes a wonderful shade tree. It could be grown and used more in urban areas but, unfortunately, appears to compartmentalize injury poorly, resulting in branch and trunk rot. Be sure to locate the tree where mechanical injury will not occur.

GENERAL INFORMATION

Scientific name: *Celtis laevigata*
Pronunciation: SELL-tiss lee-vih-GAY-tuh
Common name(s): Sugarberry, Sugar Hackberry
Family: *Ulmaceae*
USDA hardiness zones: 5 through 10 (Fig. 2)
Origin: native to North America
Uses: Bonsai; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; reclamation plant; shade tree; residential street tree
Availability: grown in small quantities by a small number of nurseries

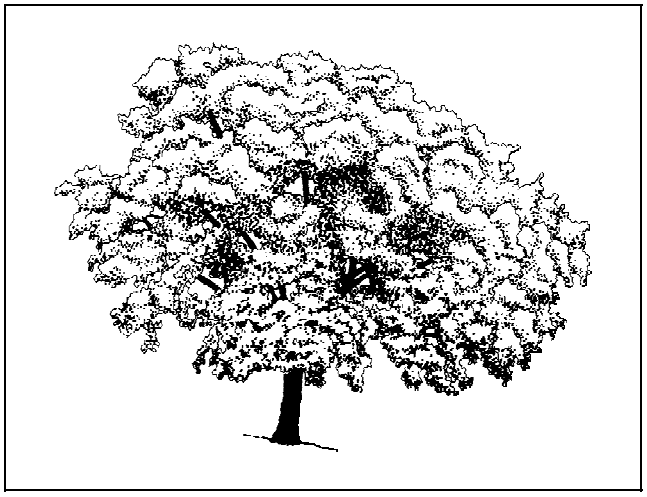


Figure 1. Mature Sugarberry.

DESCRIPTION

Height: 50 to 70 feet
Spread: 50 to 60 feet
Crown uniformity: irregular outline or silhouette
Crown shape: round; vase shape
Crown density: moderate
Growth rate: fast
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: serrate
Leaf shape: lanceolate; ovate
Leaf venation: bowed; banchidodrome; pinnate; reticulate

1. This document is adapted from Fact Sheet ST-138, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

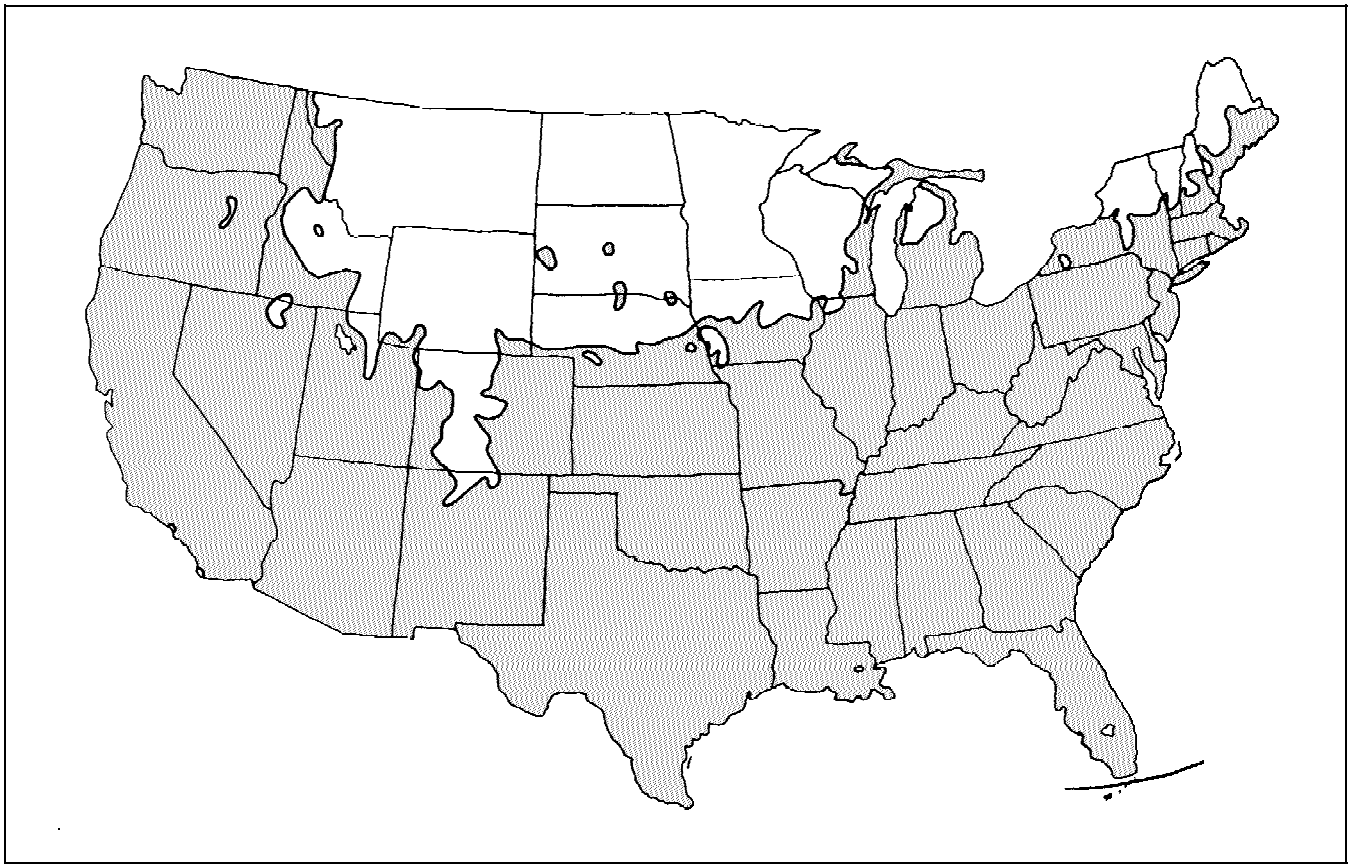


Figure 2. Shaded area represents potential planting range.

Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: showy

Flower

Flower color: green
Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: fleshy
Fruit color: black; red
Fruit characteristics: attracts birds; attracts squirrels and other mammals; inconspicuous and not showy; fruit, twigs, or foliage cause significant litter

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; showy trunk; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown; green
Current year twig thickness: thin

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; alkaline; extended flooding; well-drained
Drought tolerance: high
Aerosol salt tolerance: high
Soil salt tolerance: good

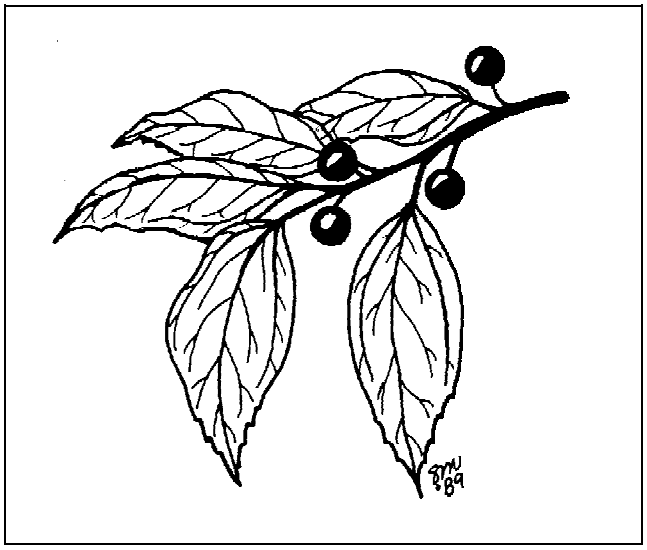


Figure 3. Foliage of Sugarberry.

Other

Roots: surface roots can lift sidewalks or interfere with mowing
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: not particularly outstanding
Invasive potential: seeds itself into the landscape
Pest resistance: no pests are normally seen on the tree

USE AND MANAGEMENT

The tiny, berry-like, sweet fruits attract many birds, and Sugarberry should be included in any natural landscape setting. It is not normally grown by wholesale nurseries. It will grow rapidly and require regular pruning and training to develop a strong branch structure and to keep it looking neat in the nursery. Lack of popularity may be due to the open, awkward appearance of young trees and susceptibility to trunk rot in mature trees. But it appears to be no more sensitive to trunk rot than Laurel Oak. Avoid injury to the trunk and existing trees will serve you for many years.

Sugarberry will grow in a variety of soil types but grows best in moist, fertile soils in a full sun location, though it will tolerate partial shade. It is sensitive to highly alkaline soils. Chlorosis develops on alkaline soil, but witches broom and nipple gall are not a problem as they are on *Celtis occidentalis*. Sugarberry is moderately drought- and salt-tolerant once established and is very adaptable, growing in wet sites fairly well. Skilled pruning is required several times during the first 15 years of life to prevent formation of weak branch crotches and multiple trunks. But once this is accomplished, trees should grow with little care. Avoid pruning large-diameter branches from the trunk since the tree compartmentalizes decay poorly. A number of southern cities use Sugarberry as a street tree while others ban it. Give this tree a try in some of your urban and suburban landscapes.

The wood is used in much the same way as elm in the lumber industry for plywood, furniture and veneer.

'All Seasons' has a rounded crown, bright yellow fall foliage, and is very hardy (USDA hardiness zone 5). In the North and Midwest, the native *Celtis occidentalis* is used in place of *Celtis laevigata*. Somewhat similar in overall appearance, it is a smaller tree (to 60 feet) with a more warty bark and smaller, sandpapery leaves than *Celtis laevigata*.

Propagation is by seed.

Pests

The most common insect on Hackberry causes the Hackberry nipple gall. A pouch or gall forms on the lower leaf surface in response to feeding. There are sprays available if you care to reduce this cosmetic problem, but galls generally do no harm to the tree.

Scales of various types may be found on Hackberry. These may be controlled with horticultural oil sprays.

Diseases

Trunk rot, leaf spots, witches broom.

Several fungi cause leaf spots on Hackberry. The disease is worse during wet weather but chemical controls are seldom needed.

Generally resistant to witches broom. Witches broom is caused by a mite and powdery mildew. The main symptom is clusters of abnormally short twigs which are scattered throughout the tree crown. Prune out the clusters of twigs when practical.

Powdery mildew may coat the leaves with white powder. The leaves may be uniformly coated or only in patches.

Sugarberry is a favority host for mistletoe.

Fact Sheet ST-212
November 1993

Crataegus phaenopyrum Washington Hawthorn[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Washington Hawthorn grows 20 to 35 feet tall in a wide pyramidal shape (Fig. 1). The tree has a rapid growth rate when young, slowing with age. It is tolerant of many different soil types. The small, white, abundant flowers, produced in clusters in late spring are followed by showy orange to red fruit that persist into winter, if not eaten by birds. The fall leaf color is orange to red and can be quite striking.

GENERAL INFORMATION

Scientific name: *Crataegus phaenopyrum*
Pronunciation: kruh-TEE-gus fee-no-PYE-rum
Common name(s): Washington Hawthorn
Family: *Rosaceae*
USDA hardiness zones: 4 through 8A (Fig. 2)
Origin: native to North America
Uses: Bonsai; recommended for buffer strips around parking lots or for median strip plantings in the highway; screen; specimen; residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 20 to 35 feet
Spread: 20 to 25 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms

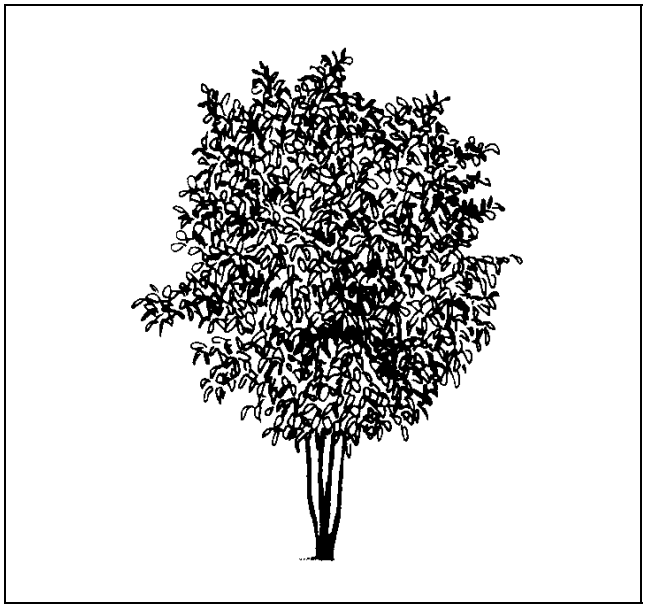


Figure 1. Middle-aged Washington Hawthorn.

Crown shape: pyramidal
Crown density: moderate
Growth rate: medium
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: lobed; serrate
Leaf shape: ovate
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches; less than 2 inches

1. This document is adapted from Fact Sheet ST-212, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Leaf color: green
Fall color: copper
Fall characteristic: not showy

Flower

Flower color: white
Flower characteristics: showy; spring flowering

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: fleshy
Fruit color: orange; red
Fruit characteristics: attracts birds; no significant litter problem; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; not particularly showy; should be grown with a single leader; thorns are present on the trunk or branches
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown
Current year twig thickness: thin

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate
Soil salt tolerance: poor

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant

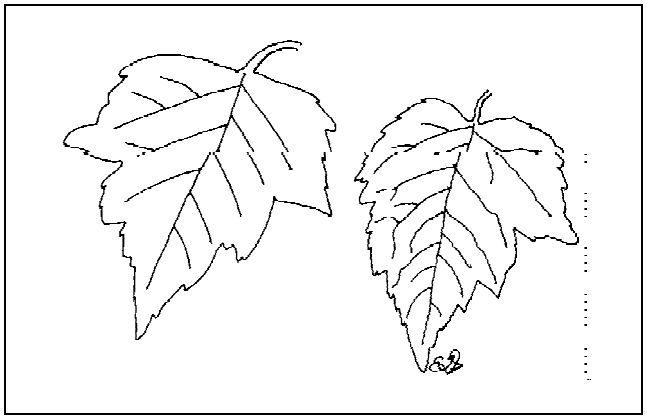


Figure 3. Foliage of Washington Hawthorn.

Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: very sensitive to one or more pests or diseases which can affect tree health or aesthetics

USE AND MANAGEMENT

With lower branches removed, this Hawthorn is quite useful as a street tree where there will not be heavy pedestrian traffic. The thorns are about three inches long and contact with them can be painful. Left unpruned it creates a nice specimen in a lawn with lower branches persisting all the way to the ground. This characteristic also makes it quite suitable as a screen. The bright fruit makes a show in the fall and winter which many people will comment on. Like other Hawthorns, the major problem with the tree is sensitivity to a large variety of insects and diseases.

Older trees are susceptible to splitting apart in ice storms. Crotches with embedded bark are most susceptible. Prune to a single trunk to help prevent this problem.

The cultivar 'Fastigiata' has an upright growth habit.

Pests

Aphids can be controlled with strong sprays of water from a garden hose, if the colony is in the lower branches. Sometimes the aphids themselves are not seen but the distorted growth, honeydew on the leaves, and sooty mold growing on the honeydew are obvious.

Borer attacks may be prevented if the trees are kept in good vigor with regular fertilization.

Leaf miners symptoms are brown blotches on the leaves.

Lace bugs can be a serious, though occasional, problem. The insect feeding on the undersides of the leaves causes chlorotic flecks on the upper leaf surfaces. The lower sides of the leaves are covered with small, brown, sticky flecks.

The pear slug skeletonizes Hawthorn leaves and these sawfly larvae have a slimy appearance. A few insects can be washed off with a garden hose.

Tent caterpillar nests can be pruned out while still small. Sprays of *Bacillus thuringiensis* may be used. Do not burn nests while the nests are in the tree. The injury from the fire may exceed that caused by the insects.

Scales may be controlled with horticultural oil sprays.

Spider mites are so small they can cause much foliage discoloration before being detected.

Diseases

Fire blight: This disease can be severe in some parts of the country. The first noticeable symptom of fire blight is the browning of branch tips. The tips appear to be burned or scorched and the dead, brown leaves droop but hang on the tree. Cankers form and the bacteria is washed farther down the branch by rain. The bacteria, *Erwinia amylovora*, are spread from diseased to healthy twigs by rain, bees, and other mechanical means. There is no satisfactory chemical control. The disease is less of a problem if trees are not located near apple or pear orchards. Prune out blighted branch tips by cutting a foot or two beyond the diseased wood. Over-fertilizing with nitrogen fertilizer may increase tree susceptibility to fire blight.

Leaf blight attacks most Hawthorns but especially English Hawthorn. The symptoms are small reddish brown spots on the leaves which may run together. Infected leaves drop in August and severely infected trees may be completely bare.

Cedar Hawthorn rust causes orange or rust colored spots on the leaves leading to early defoliation. The fruits and twigs are also attacked. Juniper is an alternate host. Cedar-quince rust attacks fruits. Washington, Lavelle and Cockspur Hawthorn are resistant to rust diseases.

Scab causes leaf spotting and defoliation. The fruit have black raised spots on them.

Powdery mildew causes a white powdery growth on the leaves.

Fact Sheet ST-214
November 1993

Crataegus viridis 'Winter King' 'Winter King' Southern Hawthorn[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

'Winter King' Southern Hawthorn is a North American native tree which slowly reaches 20 to 30 feet in height and spread (Fig. 1). It is very dense and thorny which makes it a popular choice for use as a hedge or as a screen. Unlike other Hawthorns, the thorns are small and inconspicuous. The dark green, deciduous leaves turn beautiful shades of bronze, red, and gold in the fall before dropping. The handsome, silver-grey bark peels off in sections to reveal the inner orange bark, making 'Winter King' Southern Hawthorn a striking specimen planting in the winter landscape. The white blooms are followed by large, orange/red fruits which persist on the naked tree throughout the winter, adding to its landscape interest. The tree was originally selected for the outstanding winter berry color. The original tree from which the cultivar was selected is about 100 years old and 25 feet tall.

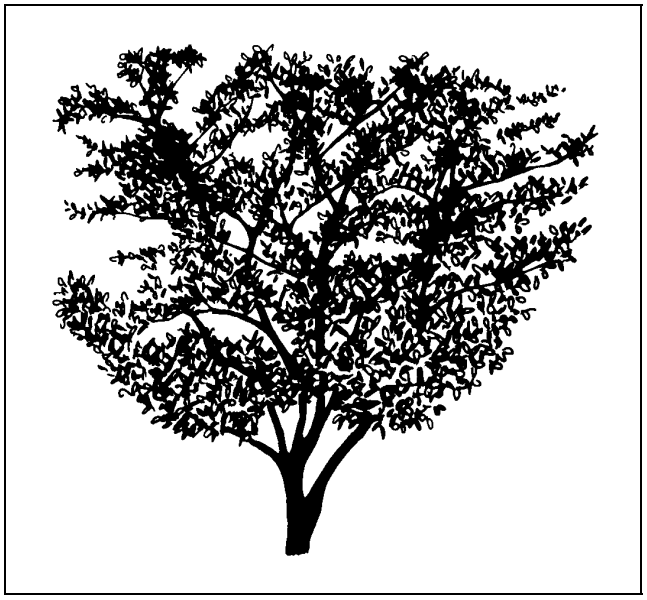


Figure 1. Middle-aged 'Winter King' Southern Hawthorn.

GENERAL INFORMATION

Scientific name: *Crataegus viridis* 'Winter King'
Pronunciation: kruh-TEE-gus VEER-ih-diss
Common name(s): 'Winter King' Southern Hawthorn, 'Winter King' Green Hawthorn
Family: *Rosaceae*
USDA hardiness zones: 4 through 7 (Fig. 2)
Origin: native to North America
Uses: container or above-ground planter; hedge; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); reclamation plant; screen; small parking lot islands (< 100 square feet in size); narrow tree lawns (3-4 feet wide); specimen; residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 20 to 30 feet
Spread: 20 to 30 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms

1. This document is adapted from Fact Sheet ST-214, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Crown shape: round; vase shape
Crown density: moderate
Growth rate: medium
Texture: fine

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: lobed; serrate
Leaf shape: ovate
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: less than 2 inches
Leaf color: green
Fall color: no fall color change
Fall characteristic: not showy

Flower

Flower color: white
Flower characteristics: spring flowering; very showy

Fruit

Fruit shape: round
Fruit length: .5 to 1 inch; < .5 inch
Fruit covering: fleshy
Fruit color: orange; red
Fruit characteristics: attracts birds; no significant litter problem; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; showy trunk; tree wants to grow with several trunks but can be trained to grow with a single trunk; thorns are present on the trunk or branches
Pruning requirement: requires pruning to develop strong structure
Breakage: resistant
Current year twig color: brown; reddish
Current year twig thickness: medium

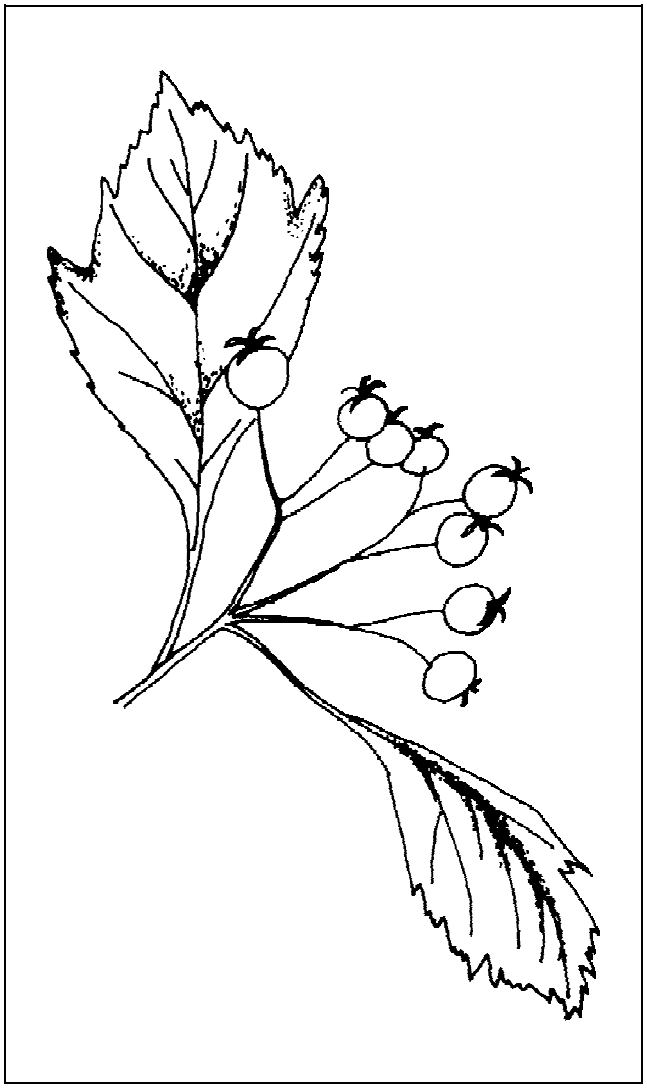


Figure 3. Foliage of 'Winter King' Southern Hawthorn.

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: low
Soil salt tolerance: poor

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

The multiple trunks and wide pyramidal to rounded shape make this adaptable tree well suited for the low maintenance landscape as a specimen. If lower branches are removed from the trunks, a more vase shape can be maintained. It has become quite popular and is available in many areas.

'Winter King' Southern Hawthorn should be grown in full sun on well-drained soil. It is a very adaptable tree well suited for the urban landscape. The short thorns are usually not a problem, even on trees planted near streets. It is among the best of the many Hawthorns that are available, receiving the Pennsylvania Horticultural Society's 1992 Styer Gold Medal Award.

Transplant in the spring for best establishment.

Propagation is by grafting.

Pests

Problem pests are aphids, borers, caterpillars, and leaf miners

Diseases

It is susceptible to cedar-hawthorn rust but is more resistant than the species.

Fact Sheet ST-267
November 1993

Fraxinus pennsylvanica 'Marshall's Seedless' 'Marshall's Seedless' Green Ash[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

This somewhat irregularly-shaped tree when young, becomes an oval with age (Fig. 1). Green Ash will reach a height of about 50 feet with a spread of 40 feet. Upright main branches bear twigs which droop toward the ground then bend upward at their tips much like Basswood. This usually does not interfere with traffic flow beneath the tree since branches do not droop to the ground. The glossy dark green foliage will turn yellow in the fall, but color is often muted in the south. This cultivar was supposed to be seedless but there are female trees in the population which set seed. The seeds can be produced in abundance and are considered messy. This fast growing tree will adapt to many different landscape conditions and can be grown on wet or dry sites, preferring moist. Trees in USDA hardiness zones 8 and 9 may grow 6 to 10 feet in one year when they are young and irrigated. Some cities have overplanted Green Ash, and 'Marshall Seedless' is not recommended any more due to weak branch crotches, insect problems and fruit set.

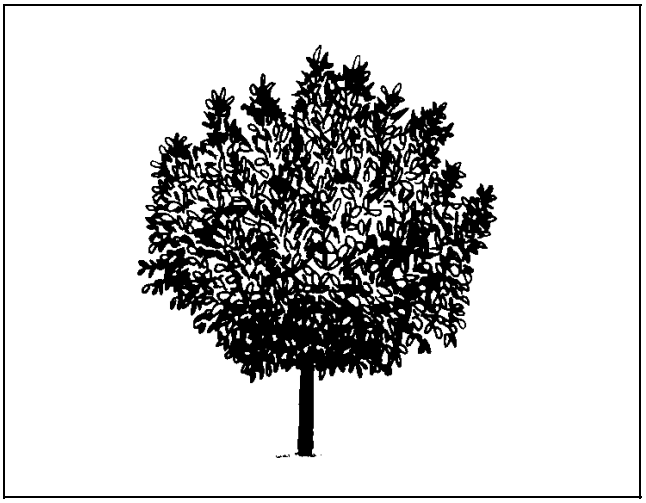


Figure 1. Middle-aged 'Marshall's Seedless' Green Ash.

GENERAL INFORMATION

Scientific name: *Fraxinus pennsylvanica* 'Marshall's Seedless'
Pronunciation: FRACK-sih-nus pen-sill-VAN-ih-kuh
Common name(s): 'Marshall's Seedless' Green Ash
Family: *Oleaceae*
USDA hardiness zones: 3 through 8A (Fig. 2)
Origin: native to North America
Uses: large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; reclamation plant; shade tree; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 50 to 60 feet
Spread: 40 to 50 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: oval; upright

1. This document is adapted from Fact Sheet ST-267, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: November 1993.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

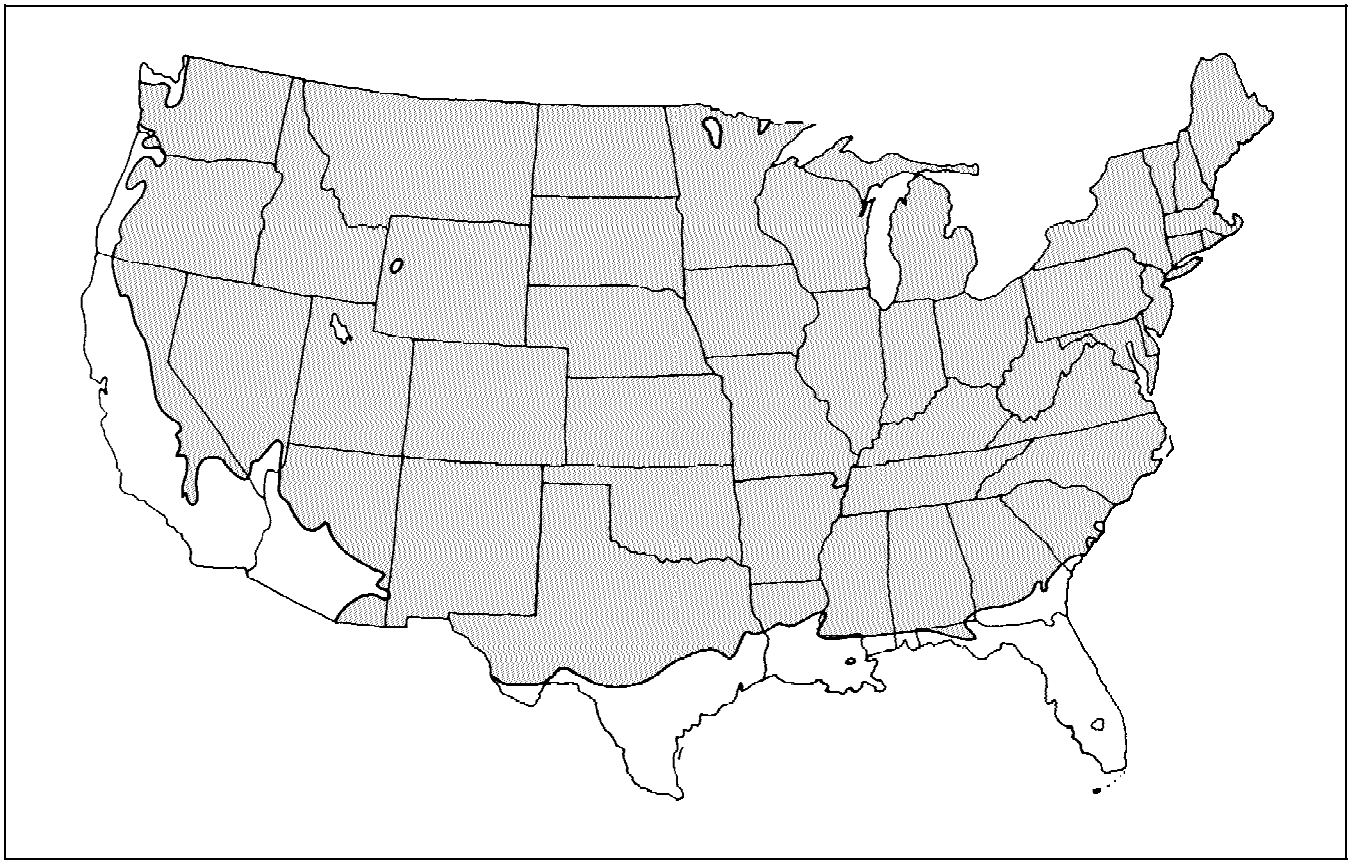


Figure 2. Shaded area represents potential planting range.

Crown density: moderate
Growth rate: fast
Texture: medium

Foliage

Leaf arrangement: opposite/subopposite (Fig. 3)
Leaf type: odd pinnately compound
Leaflet margin: crenate; entire; serrate
Leaflet shape: lanceolate; ovate
Leaflet venation: pinnate
Leaf type and persistence: deciduous
Leaflet blade length: 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: showy

Flower

Flower color: green
Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

There is no fruit on this tree.

Trunk and Branches

Trunk/bark/branches: grow mostly upright and will not droop; not particularly showy; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown; gray
Current year twig thickness: thick
Wood specific gravity: 0.56

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; alkaline; extended flooding; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate
Soil salt tolerance: moderate

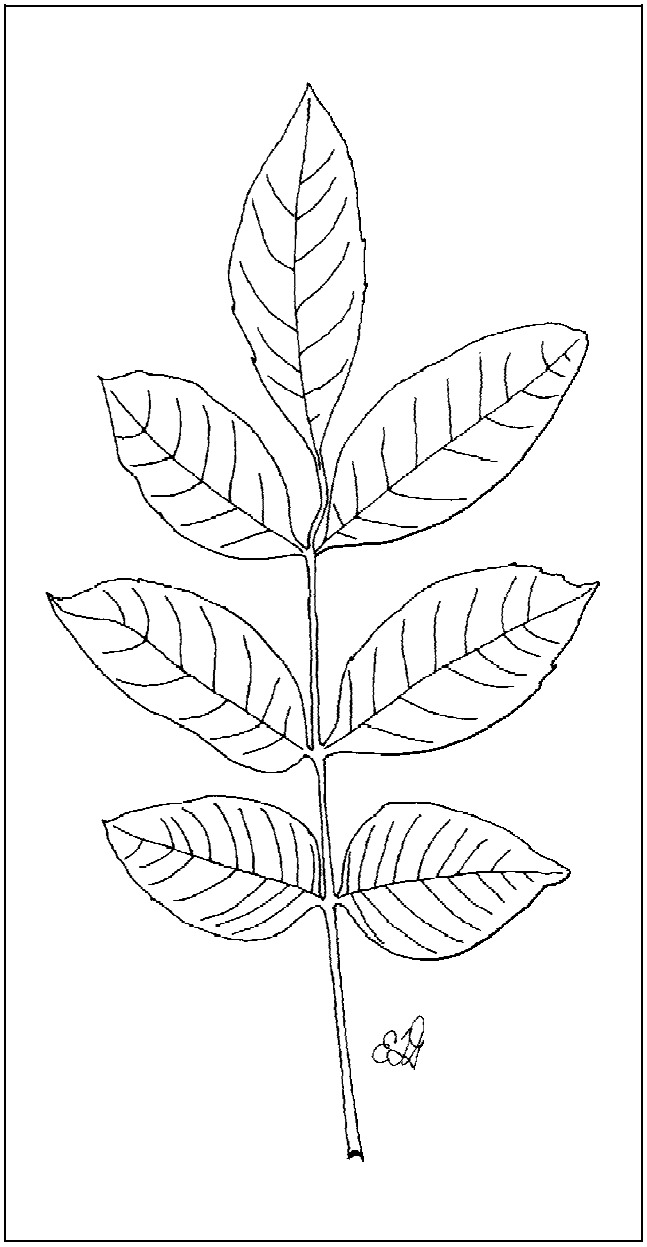


Figure 3. Foliage of 'Marshall's Seedless' Green Ash.

Other

Roots: surface roots can lift sidewalks or interfere with mowing
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Verticillium wilt susceptibility: susceptible
Pest resistance: very sensitive to one or more pests or diseases which can affect tree health or aesthetics

USE AND MANAGEMENT

Green Ash requires regular pruning when it is young to develop a nice central trunk. It tends to develop a number of dominant upright trunks or multiple leaders if it is pruned improperly or left unpruned. Some nursery operators routinely top them in the nursery to create a bushy tree. This is not a good practice and these trees should not be planted because they will not stay together in a strong storm. Be sure the trees have one central leader (one trunk) and branches which are well spaced along the trunk. If two major branches originate opposite each other, remove one to improve tree structure and strength.

Green Ash adapts quite well to city street tree planting pits and other confined soil spaces, probably due to its tolerance to flooded and wet soil. However, extensive use as a street tree would be a risk because of potential insect and disease problems, especially borers. Like some other rapidly-growing trees, surface roots can develop and become a nuisance as they lift curbs, sidewalks and make mowing difficult. Planting only in well-drained uncompacted soil may help keep surface rooting in check. Using root barriers around the edge of planting pits and along sidewalks would deflect roots down, encouraging deeper rooting and less maintenance problems. Green Ash roots can tolerate the low soil oxygen conditions present at these greater soil depths. Trees transplant easily from field nurseries or from containers and adapt to urban soils including those with high pH, salt and droughty or compacted sites. Not really for heavy clay soil.

Seedling grown trees often produce an abundance of seed which can be a nuisance, and female trees often have undesirable flower galls. Superior crown form and branching habit of other cultivars makes planting them very desirable. A few other cultivars are available and have been tested for eight-years in USDA hardiness zone 8a and appear vigorous with yellow fall color: 'Marshall Seedless'- some seeds, yellow fall color, fewer insect problems, but losing popularity due to trees breaking apart and the population has apparently become contaminated with females since some are setting seed - 'Newport' may be superior; 'Patmore' - excellent street tree, straight trunk, good yellow fall color, seedless, USDA hardiness zone 3 to 7; 'Summit' - female, yellow fall color, straight trunk but pruning required to develop strong structure, abundant seeds and flower galls can be a nuisance. Cultivars are budded onto seedling rootstocks.

Pests

Borers are common on Ash and they can kill trees. The most common borers infesting Ash are Ash borer, lilac borer and carpenterworm. Ash borer bores into the trunk at or near the soil line causing tree dieback. Lilac borer causes swellings on the trunk and limbs where the insect enters the tree. The carpenterworm larvae bore into the heartwood but come to the outside of the tree to push out frass and sawdust. Heavily infested trees can be severely weakened. Keep trees as healthy as possible by fertilizing regularly and watering during dry weather.

Aphids are often seen but are usually not serious.

In late summer, fall webworm covers branches with webbing. The nests in branches close to the ground can be pruned out when first noticed.

The Ash flower-gall looks like a disease but is actually a mite problem. The mites feed on the flowers causing abnormal growth. The galls dry out and persist on the tree into winter.

Diseases

A rust disease causes distorted leaves and swollen twigs. Small, yellow, cup-like structures, producing yellow spores, appear on the infected areas. Controls are usually not needed.

A number of fungi cause leaf spots on Ash. The disease is worse in wet years and is partially controlled by gathering and disposing of diseased, fallen leaves.

Anthracnose is also called leaf scorch and leaf spot. Infected parts of the leaves turn brown, especially along the margins. Infected leaves fall prematurely. Rake up and destroy infected leaves. Chemical controls are not practical or economical on large trees. Trees in the south can be severely affected.

Canker diseases cause branch dieback and death of the tree when the trunk is infected. Try to keep trees healthy with regular fertilization.

Powdery mildew makes a white coating on the leaves.

Ash ring spot virus causes chlorotic green and reddish spots or rings on the leaves. Infected trees may be stunted and dieback.

Verticillium wilt causes branches of infected trees to wilt and die, eventually the entire tree may die. Keep trees healthy and fertilize infected trees with high nitrogen fertilizer to suppress disease symptoms.

Fact Sheet ST-386
October 1994

Magnolia x soulangiana Saucer Magnolia[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Saucer Magnolia is a multi-stemmed, spreading tree, 25 feet tall with a 20 to 30-foot spread and bright, attractive gray bark (Fig. 1). Growth rate is moderately fast but slows down considerably as the tree reaches about 20-years of age. Young trees are distinctly upright, becoming more oval, then round by 10 years of age. Large, fuzzy, green flower buds are carried through the winter at the tips of brittle branches. The blooms open in late winter to early spring before the leaves, producing large, white flowers shaded in pink, creating a spectacular flower display. However, a late frost can often ruin the flowers in all areas where it is grown. This can be incredibly disappointing since you wait 51 weeks for the flowers to appear. In warmer climates, the late-flowering selections avoid frost damage but some are less showy than the early-flowered forms which blossom when little else is in flower.

GENERAL INFORMATION

Scientific name: *Magnolia x soulangiana*
Pronunciation: mag-NO-lee-uh x soo-lan-jee-AY-nuh
Common name(s): Saucer Magnolia
Family: *Magnoliaceae*
USDA hardiness zones: 5 through 9A (Fig. 2)
Origin: not native to North America
Uses: container or above-ground planter; espalier; near a deck or patio; shade tree; specimen; no proven urban tolerance
Availability: generally available in many areas within its hardiness range

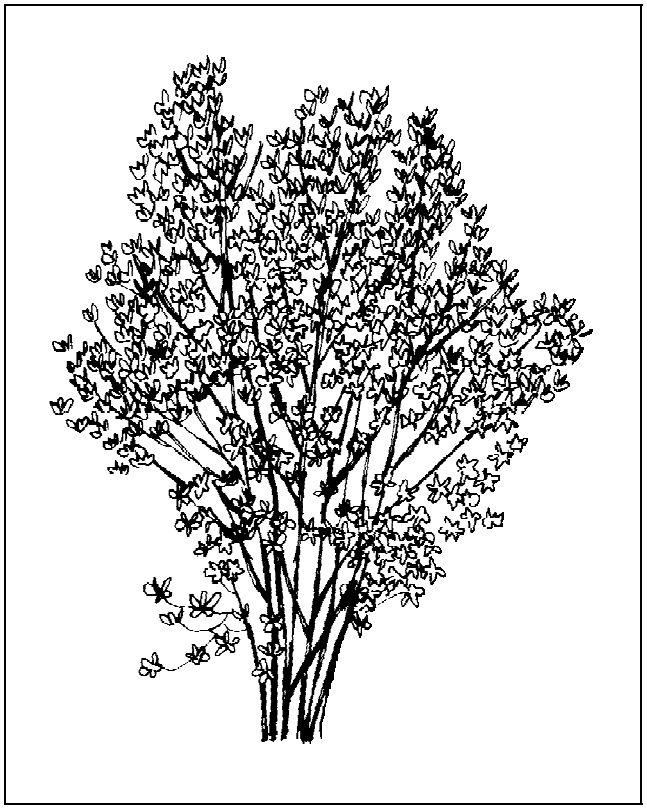


Figure 1. Middle-aged Saucer Magnolia.

DESCRIPTION

Height: 20 to 25 feet
Spread: 20 to 30 feet
Crown uniformity: irregular outline or silhouette
Crown shape: round; upright
Crown density: open
Growth rate: medium

1. This document is adapted from Fact Sheet ST-386, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Texture: coarse

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: entire; undulate
Leaf shape: oblong; obovate
Leaf venation: banchidodrome; pinnate
Leaf type and persistence: deciduous
Leaf blade length: 4 to 8 inches; 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: showy

Flower

Flower color: pink; white
Flower characteristics: spring flowering; very showy; winter flowering

Fruit

Fruit shape: elongated; irregular
Fruit length: 1 to 3 inches
Fruit covering: dry or hard
Fruit color: red
Fruit characteristics: inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; showy trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown
Current year twig thickness: medium

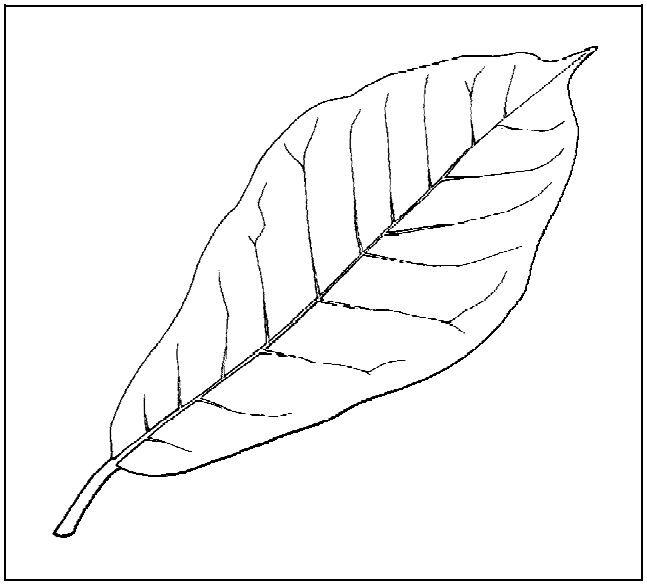


Figure 3. Foliage of Saucer Magnolia.

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; well-drained
Drought tolerance: moderate
Aerosol salt tolerance: none

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

The tree is best used as a specimen in a sunny spot where it can develop a symmetrical crown. It can be pruned up if planted close to a walk or patio to allow for pedestrian clearance but probably looks its best when branches are left to droop to the ground. The light gray bark shows off nicely, particularly during the winter when the tree is bare.

Saucer Magnolia grows best in a sunny location in rich, moist but porous soil. It will tolerate poor drainage for only a short period of time. Growth will be thin and leggy in a shaded spot but acceptable in part shade. Saucer Magnolia dislikes dry or alkaline soil but will otherwise grow very well in the city. Transplant in the spring, just before growth begins, and use balled and burlapped or containerized plants. Older plants do not like to be pruned and large wounds may not close well. Train plants early in their life to develop the desired form.

Some Saucer Magnolia cultivars will be hard to find: ‘Alba’ - flowers almost white; ‘Alexandrina’ - flowers almost white; ‘Amabalis’ - flowers white; ‘Andre LeRoy’ - flowers dark pink to purplish outside, cup shaped; ‘Brozzonii’ - flowers white shaded with purple; ‘Burgundy’ - deep purple flowers, blooms earlier; ‘Grace McDade’ - flowers white with pink at the petal bases; ‘Lennei’ - flowers rosy purple outside, white flushed with purple inside, flowers large, blooms later; ‘Lilliputian’ - slow grower to 10 to 15 feet tall; ‘Lombardy Rose’ - similar to Lennei except flowers continue to open for several weeks; ‘Niemetzi’ - upright growth; ‘Rubra’ - (‘Rustica’, ‘Rustica Rubra’) - similar to ‘Lennei’; ‘San Jose’ - large flowers nearly as dark as ‘Lennei’; ‘Speciosa’ - similar to ‘Alba’ but it is last of the cultivars to bloom, a tall, upright, fast-growing tree; ‘Spectabilis’ - flowers almost white; ‘Verbanica’ - flowers clear rose pink outside, late blooming, slow-growing to 10 feet tall.

Pests

Generally it is pest free. Scales of various types may infest twigs. Magnolia scale is the most common scale and can be one half-inch-across. Overwintering scales are usually controlled with horticultural oil applied in the spring.

Tulip-Poplar weevil (sassafras weevil) feeds as a leaf miner when young and chews holes in the leaves as an adult.

Diseases

The tree is generally disease free. Magnolia may be subject to leaf spots caused by bacteria or a large number of fungi. Leaf spots rarely require chemical controls. Rake up and dispose of infected leaves.

Canker diseases will kill branches. Cankers on branches can be pruned out. Keep trees healthy with regular fertilization and by watering in dry weather.

Verticillium wilt may cause death of a few branches or may kill the tree. Prune out dead branches and fertilize with high nitrogen fertilizer.

Fact Sheet ST-384
October 1994

Magnolia virginiana Sweetbay Magnolia[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Sweetbay Magnolia is a graceful southern, evergreen to semi-evergreen, wide columnar tree, ideal for use as a patio tree or specimen (Fig. 1). It can grow to a mature height of 40 feet in the north or to 60 feet in the south. Trees glimmer in the wind due to the whitish-green undersides of the leaves. They are very noticeable as you drive by them on interstates along water-logged woodlands. The tree provides excellent vertical definition in a shrub border or as a free standing specimen and flourishes in moist, acid soil such as the swamps in the eastern U.S. and along stream banks. The creamy-white, lemon-scented flowers appear from June through September, and are followed by small red seeds which are used by a variety of wildlife. It can be trained into a multi-trunked, spreading specimen plant, or left with the central leader intact as a wide column.

GENERAL INFORMATION

Scientific name: *Magnolia virginiana*
Pronunciation: mag-NO-lee-uh ver-jin-ee-AY-nuh
Common name(s): Sweetbay Magnolia, Swamp Magnolia
Family: *Magnoliaceae*
USDA hardiness zones: 5 through 10A (Fig. 2)
Origin: native to North America
Uses: espalier; wide tree lawns (>6 feet wide); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; near a deck or patio; specimen; residential street tree; no proven urban tolerance

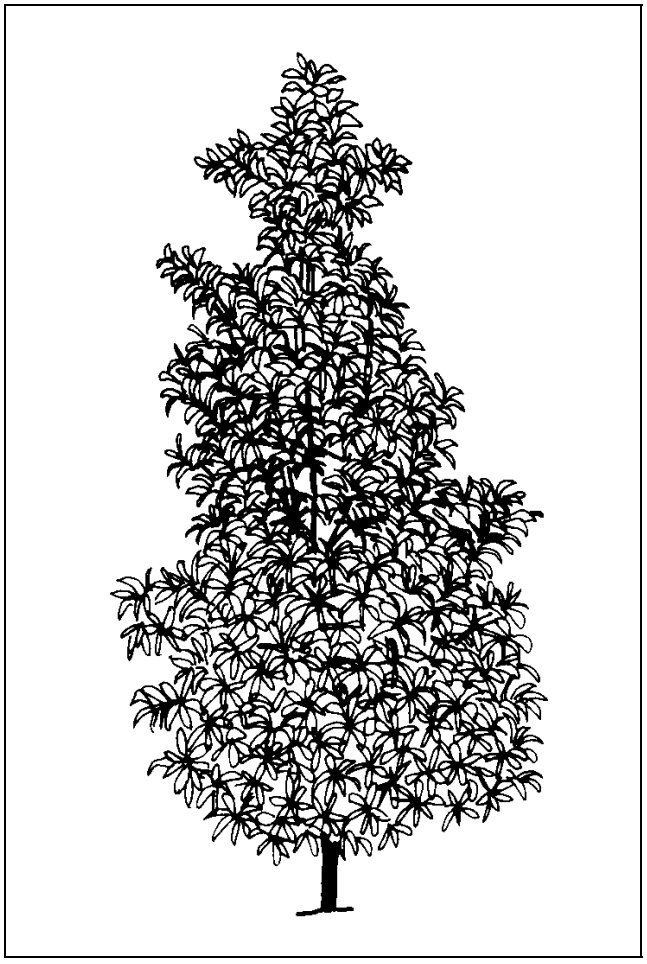


Figure 1. Middle-aged Sweetbay Magnolia.

Availability: generally available in many areas within its hardiness range

1. This document is adapted from Fact Sheet ST-384, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

DESCRIPTION

Height: 40 to 50 feet
Spread: 15 to 25 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: columnar; vase shape
Crown density: moderate
Growth rate: medium
Texture: medium

Foliage

Leaf arrangement: alternate
Leaf type: simple
Leaf margin: entire
Leaf shape: elliptic (oval); oblong
Leaf venation: banchidodrome; pinnate
Leaf type and persistence: deciduous; evergreen; semievergreen
Leaf blade length: 2 to 4 inches; less than 2 inches
Leaf color: green
Fall color: no fall color change
Fall characteristic: not showy

Flower

Flower color: white
Flower characteristics: pleasant fragrance; summer flowering; very showy (Fig. 3)

Fruit

Fruit shape: elongated
Fruit length: 1 to 3 inches
Fruit covering: dry or hard
Fruit color: green; red
Fruit characteristics: attracts birds; attracts squirrels and other mammals; no significant litter problem; showy

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; routinely grown with, or trainable to be grown with, multiple trunks; grow mostly upright and will not droop; showy trunk; tree wants to grow with several trunks but can be trained to grow with a single trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure



Figure 3. Flower of Sweetbay Magnolia.

Breakage: resistant
Current year twig color: green
Current year twig thickness: thin

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; extended flooding; well-drained
Drought tolerance: No entries found.
Aerosol salt tolerance: low
Soil salt tolerance: poor

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Sweetbay Magnolia makes an excellent tree for planting next to buildings, in narrow alleys or corridors, or in other urban areas with limited space for horizontal crown expansion. It has not been planted extensively in downtown urban areas, but its flood and drought tolerance and narrow crown combine to make it a good candidate. It usually maintains a good, straight central leader, although occasionally the trunk branches low to the ground forming a round multi-stemmed, spreading tree. It should be grown and planted more often.

Sweetbay Magnolia roots easily from softwood cuttings, grows freely near coastal areas, and is happiest in southern climates. It is thriving in the Auburn Shade Tree Evaluation trials in Alabama without irrigation. However, in the confined soil spaces typical of some urban areas, occasional irrigation is recommended.

The species is deciduous in USDA hardiness zones 7 and 8 (evergreen farther south) but the variety *australis* and cultivar 'Henry Hicks' are evergreen; 'Havener' has larger flower petals.

Pests and Diseases

Scales sometimes infest foliage and twigs, particularly on dry sites where the tree is under stress.

Tulip-Poplar weevil (sassafras weevil) feeds as a leaf miner when young and chews holes in the leaves as an adult.

Leaf spots occasionally occur on the foliage but are of little concern.

Fact Sheet ST-395
October 1994

Malus x 'Snowdrift' 'Snowdrift' Crabapple[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

'Snow Drift' Crabapple is a splendid tree and little pruning is required to develop a well-formed, rounded canopy (Fig. 1). Unfortunately, it is moderately or severely affected by fireblight disease. There appears to be little variation in shape among trees of this cultivar, a characteristic which is coveted by landscape architects. The bright white flowers in the spring give a refreshing look to the landscape and are followed by small, red-orange fruit eaten by birds. Fall color is good, providing a dull yellow glow for two or three weeks. Some Crabapples are alternate bearers, blooming heavily only every other year.

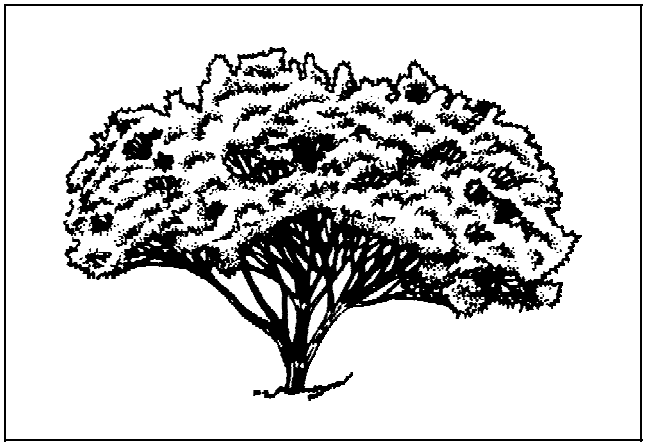


Figure 1. Mature 'Snowdrift' Crabapple.

GENERAL INFORMATION

Scientific name: *Malus x* 'Snowdrift'
Pronunciation: MAY-lus
Common name(s): 'Snowdrift' Crabapple
Family: *Rosaceae*
USDA hardiness zones: 4 through 8A (Fig. 2)
Origin: not native to North America
Uses: Bonsai; container or above-ground planter; espalier; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; near a deck or patio; small parking lot islands (< 100 square feet in size); narrow tree lawns (3-4 feet wide); specimen; residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 15 to 25 feet
Spread: 15 to 25 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: oval; round
Crown density: dense
Growth rate: medium
Texture: medium

1. This document is adapted from Fact Sheet ST-395, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: crenate; serrate; serrulate
Leaf shape: elliptic (oval)
Leaf venation: banchidodrome; pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches; less than 2 inches
Leaf color: green
Fall color: yellow
Fall characteristic: not showy

Flower

Flower color: white
Flower characteristics: spring flowering; very showy

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: fleshy
Fruit color: orange; red
Fruit characteristics: attracts birds; no significant litter problem; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; not particularly showy; tree wants to grow with several trunks but can be trained to grow with a single trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown; reddish
Current year twig thickness: medium; thin

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: moderate
Aerosol salt tolerance: moderate
Soil salt tolerance: moderate

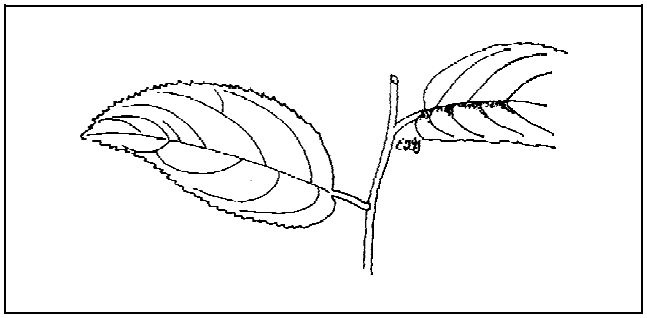


Figure 3. Foliage of 'Snowdrift' Crabapple.

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Plants are used as specimens, patios, and along streets to create a bright glow of color each spring. Some pruning to remove and train lower branches is needed along streets and in other areas where vehicular or pedestrian clearance is needed. The pruning requirement can be minimized by specifying tree-form Crabapple from the nursery. The trees are attractive during the summer, bearing glossy green foliage and a moderately dense crown. Popular around overhead powerlines due to their small stature, a row of Crabapples along each side of the street or median strip can "make" a neighborhood. Select plants which have been grafted onto EMLA 106 or 111 rootstock to reduce root suckering.

They are best grown in a sunny location with good air circulation and have no particular soil preferences, except soil should be well drained. Crabapple is well-adapted to compacted urban soil, tolerates drought and poor drainage well and is somewhat tolerate of salt-spray. Well adapted to all areas within its hardiness zone range, including Texas and Oklahoma. It is a very adaptable tree for urban landscapes. Do not overfertilize since this could increase the incidence of disease. Root pruned trees appear to transplant most easily. Crabapples grow well in the Texas panhandle but are not extremely drought tolerant and are not well suited for high pH soil.

According to the Ornamental Crabapple Society, other Crabapples adapted for street tree and urban use include 'Adams', 'Bob White', 'David', 'Donald Wyman', 'Profusion', 'Red Splendor' and *Malus floribunda*. Be sure to specify tree form plants for street tree use since branching may be too low on trees grown for specimen use. Contact the Ornamental Crabapple Society, Morton Arboretum, Lisle, Illinois 60532 for more information on Crabapples.

Other white flowered cultivars include: 'Baccata Columnaris' - narrow crown, white flowers, red or yellow fruit; 'Baccata Gracilis' - slow-growing, shrub-like, white flowers, fruit small and dark red, annual bearer; 'Baccata Jackii' - upright form, white flowers, bright red fruit, annual bearer, also good to excellent disease resistance; 'Callaway' - pink buds, white flowers, red fruit; 'David' - pink buds open to white flowers, scarlet fruit, good to excellent disease resistance; 'Dolgo' - pink buds, white flowers, large red fruits; 'Donald Wyman' - disease-resistant but susceptible to fire blight, glossy red showy fruit; 'Ellwangeriana' - red fruit, disease-resistant; 'Floribunda' - pink to red bud opens to single white flower, yellow or red fruit - commonly available; 'Gloriosa' - pink bud opens to white flower, red, large fruit; 'Golden Hornet' - upright arching habit, white flower, yellow fruit; 'Gorgeous' - pink bud opens to large, white flower, red to orange fruit; 'Harvest Gold' - white flowers followed by yellow fruits; 'Hupehensis' - Tea Crabapple - pink buds open to white flowers, greenish fruit; 'Katherine' - double flowers opening pink, fading to white, fruit yellow and red; 'Mary Potter' - pink buds open to single white flowers, red and fairly large fruit, susceptible to scab and powdery mildew; 'Red Jade' - weeping habit, white flowers, red fruit persisting after leaves drop; 'Sargenti' - dwarf, pink bud opens to white flowers, small dark red fruit; 'Tanner' - white flowers, red fruits, susceptible to diseases; 'Tschonoski' - white flowers, vigorous growth, good bronze red fall color, fruit brownish; 'White Angel' - white flowers, glossy red fruit persisting into winter; 'White Candle' - pink buds open to white flowers, red fruit, upright growth habit; 'Zumi Calocarpa' - white flowers, bright red persistent fruit.

One of the best Crabapples for the south is *Malus* x Callaway.

Disease-resistant cultivars include: 'David', 'Dolga', 'Donald Wyman', 'Ellwangeriana', 'Inglis', 'Jackii', 'Jewelberry', 'Margaret', 'Mary Potter' 'Mount Arbor Special', 'Prairifire', 'Professor Sprenger', 'Tomiko'.

Pests

Aphids infest branch tips and suck plant juices, and are quite common. They can deform newly emerging foliage and secret honey dew creating a sticky mess beneath the tree, but will not kill the tree.

Fall webworm makes nests on the branches and feeds on foliage inside the nest. Small nests can be pruned out or sprayed with *Bacillus thuringiensis*. Controlling severe infestations may require other chemicals.

Scales of various types are controlled with horticultural oil.

Borers can be a problem on stressed trees.

Mites are too small to see easily so they can cause much foliage discoloration before being detected. Mites can be controlled to a degree with horticultural oil, but other chemicals are often required by the time mites are detected. The mite infestation can also be severe by the time foliage chlorosis or bronzing is evident.

Eastern tent caterpillar builds tents or nests in trees in early summer or late spring. Feeding occurs on foliage outside the nest. Defoliation can be extensive if infestation is severe, and repeated defoliations for several years can weaken trees. Small nests can be removed by pruning them from the tree. Spray with *Bacillus thuringiensis* or other approved chemical. Do not burn nests while they are still in the tree.

Diseases

Fairly susceptible to disease.

Scab infection takes place early in the season and dark olive green spots appear on the leaves. In late summer the infected leaves fall off when they turn yellow with black, spots. Infected fruits have black, slightly raised spots. Use resistant varieties to help avoid this severe problem.

Fire blight susceptible trees have blighted branch tips, particularly when the tree is growing rapidly. Leaves on infected branch tips turn brown or black, droop, and hang on the branches. The leaves look scorched as by a fire. The trunk and main branches become infected when the bacteria are washed down the branches. Cankers form and are separated from adjacent healthy bark by a crack. The infected bark may be shredded. Use resistant cultivars when available since severe infections on susceptible trees can kill the tree.

Powdery mildew coats leaves with white fungal growth resembling powder.

Cedar apple rust causes brown to rusty-orange spots on the leaves. Badly spotted leaves fall prematurely, and defoliation can be heavy. Redcedars (*Juniperus virginiana*) are the alternate host.

Crabapples are subject to several canker diseases. Prune out infected branches, avoid unnecessary wounding, and keep trees healthy.

Fact Sheet ST-437
October 1994

Phellodendron amurense
Amur Corktree[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Growing 30 to 40 feet tall with an equal or much greater spread, Amur Corktree has a short trunk and an open, rounded, spreading canopy which makes it ideal as a durable shade tree (Fig. 1). Male clones can be used for street and parking lot planting because they produce no fruit. The deciduous, dark green, pinnately compound leaflets change to bronze and yellow in the fall before dropping. The insignificant yellow/green flowers appear in late May to early June on 2 to 3.5-inch-long panicles, and are followed by small black drupes which sometimes persist into winter, if not first devoured by birds. These black fruits give off a strong odor when crushed and create a mess on a sidewalk and some people may find it more desirable to only plant male trees ('Macho') which will not produce this fruit. The species can naturalize as seeds readily germinate in the landscape.

GENERAL INFORMATION

Scientific name: *Phellodendron amurense*
Pronunciation: fell-oh-DEN-drawn am-moor-EN-see
Common name(s): Amur Corktree, Chinese Corktree
Family: *Rutaceae*
USDA hardiness zones: 3B through 8 (Fig. 2)
Origin: not native to North America
Uses: recommended for buffer strips around parking lots or for median strip plantings in the highway; shade tree; specimen; residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common

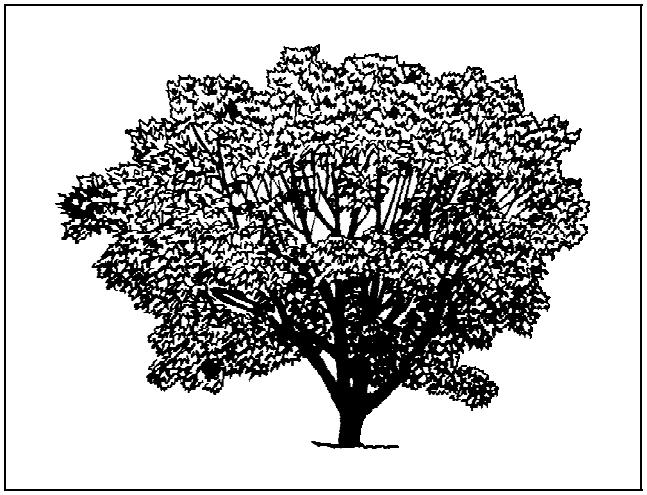


Figure 1. Middle-aged Amur Corktree.

Availability: somewhat available, may have to go out of the region to find the tree

DESCRIPTION

Height: 30 to 40 feet
Spread: 40 to 60 feet
Crown uniformity: irregular outline or silhouette
Crown shape: round; spreading; vase shape
Crown density: open
Growth rate: medium
Texture: medium

Foliage

Leaf arrangement: opposite/subopposite (Fig. 3)
Leaf type: odd pinnately compound
Leaflet margin: entire; undulate

1. This document is adapted from Fact Sheet ST-437, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

Leaflet shape: elliptic (oval); ovate
Leaflet venation: pinnate; reticulate
Leaf type and persistence: deciduous
Leaflet blade length: 2 to 4 inches
Leaf color: green
Fall color: copper; yellow
Fall characteristic: showy

Flower

Flower color: green; white
Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

Fruit shape: oval
Fruit length: .5 to 1 inch; < .5 inch
Fruit covering: fleshy
Fruit color: black; green
Fruit characteristics: attracts birds; attracts squirrels and other mammals; fruit, twigs, or foliage cause significant litter; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; showy trunk; tree wants to grow with several trunks but can be trained to grow with a single trunk; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: resistant
Current year twig color: brown; gray
Current year twig thickness: thick

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate

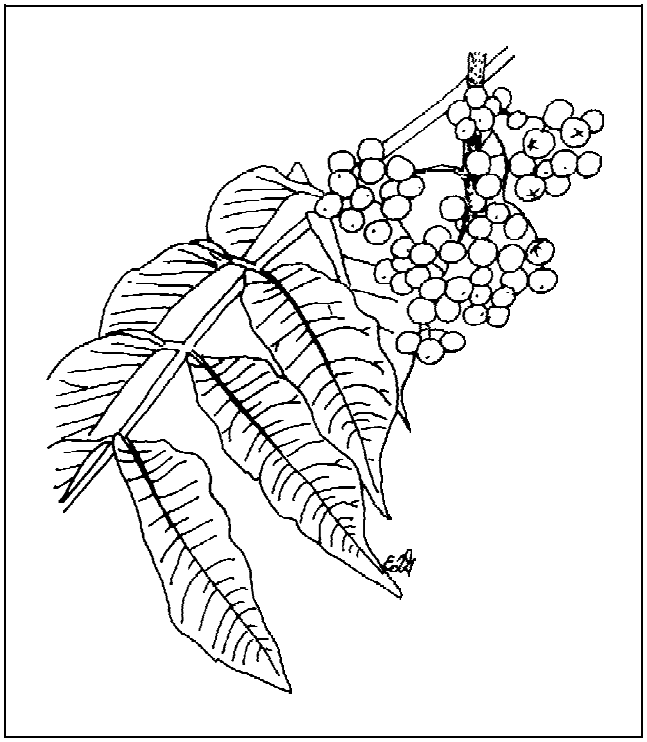


Figure 3. Foliage of Amur Corktree.

Other

Roots: surface roots can lift sidewalks or interfere with mowing
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: No entries found.
Verticillium wilt susceptibility: susceptible
Pest resistance: no pests are normally seen on the tree

USE AND MANAGEMENT

The attractive grey/brown bark is deeply ridged and furrowed, and on mature trees it takes on a corky texture. Branches are usually borne low on the trunk, droop and grow horizontally forming a spreading habit. The shallow root system needs plenty of room to expand in order to establish the tree properly.

The fruitless (male) cultivar 'Macho' has thick, leathery leaves and a more pleasing, upright-spreading growth form. 'Macho' should be planted instead of the species due to its less spreading and less drooping habit which makes it more suited for street tree planting. Pruning usually is not required once good branch structure is established early in the life of the tree. Allow for adequate soil space for root development so they do not lift sidewalks and pavement. 'Shademaster' is also fruitless and available in the trade.

Amur Corktree grows rapidly and prefers to be grown in full sun on deep, rich soil but will tolerate any soil, acid or alkaline. It tolerates wet soil and drought. Once highly recommended as a street and urban-tolerant tree, it does not appear to hold up to the rigors of city life under certain conditions, particularly restricted soil spaces (although the experts appear to disagree as to the tolerance of this tree to city life - the tree may be more sensitive to soil conditions than is commonly realized).

Propagation is by seed, which germinate readily.

Pests and Diseases

This tree is virtually pest-free.

Fact Sheet ST-537
October 1994

Pyrus calleryana 'Bradford' 'Bradford' Callery Pear[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

'Bradford' is the original introduction of Callery Pear and has an inferior branching habit when compared to other cultivars which have since been developed (Fig. 1). It has many vertical limbs with embedded bark packed closely on the trunk and grows about 40 feet high by 30 to 45 feet wide but the crown is dense and the branches long and not tapered, making it quite susceptible to wind and ice damage and other breakage. However, it does put on a gorgeous, early spring display of pure white blossoms, and the small, red/brown fruits which follow will attract quite a number of birds who find them delicious. Fruit set may be increased by planting two or more cultivars of Callery Pear together. Fall color is incredible, ranging from red and orange to dark maroon.

GENERAL INFORMATION

Scientific name: *Pyrus calleryana* 'Bradford'
Pronunciation: PIE-rus kal-ler-ee-AY-nuh
Common name(s): 'Bradford' Callery Pear
Family: *Rosaceae*
USDA hardiness zones: 5 through 9A (Fig. 2)
Origin: not native to North America
Uses: container or above-ground planter; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; screen; shade tree; small parking lot islands (< 100 square feet in size); narrow tree lawns (3-4 feet wide); specimen; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

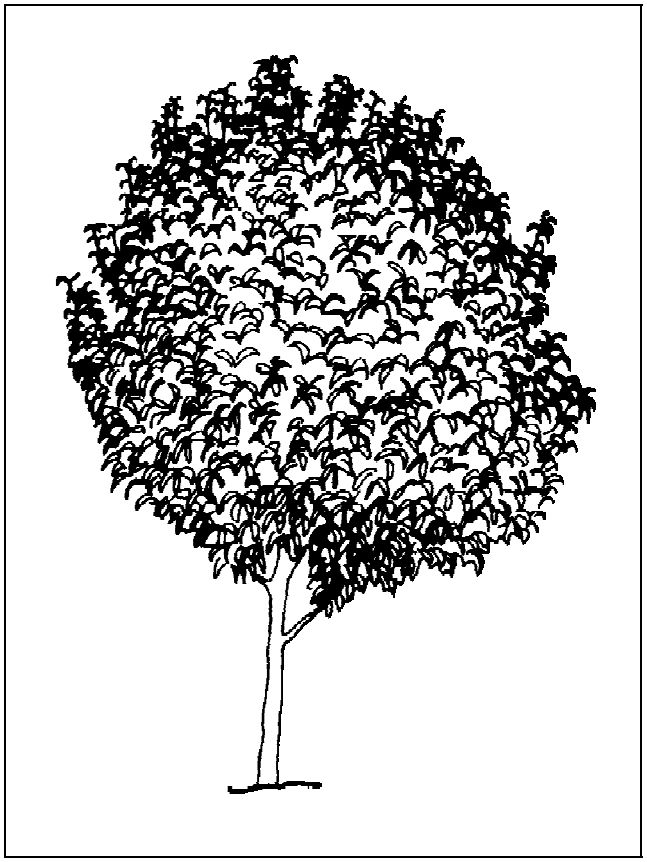


Figure 1. Young 'Bradford' Callery Pear.

1. This document is adapted from Fact Sheet ST-537, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

DESCRIPTION

Height: 30 to 40 feet
Spread: 30 to 40 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: oval; round
Crown density: dense
Growth rate: fast
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: crenate; serrate
Leaf shape: ovate
Leaf venation: pinnate; reticulate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches; less than 2 inches
Leaf color: green
Fall color: orange; purple; red; yellow
Fall characteristic: showy

Flower

Flower color: white
Flower characteristics: spring flowering; very showy

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: dry or hard
Fruit color: brown; tan
Fruit characteristics: attracts birds; attracts squirrels and other mammals; inconspicuous and not showy; no significant litter problem; persistent on the tree

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; routinely grown with, or trainable to be grown with, multiple trunks; not particularly showy; no thorns
Pruning requirement: requires pruning to develop strong structure

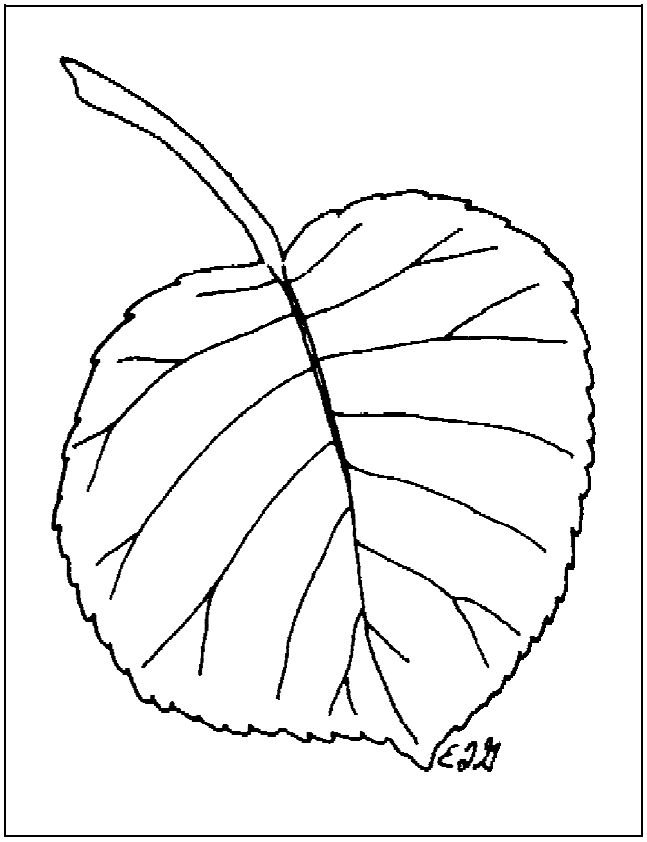


Figure 3. Foliage of 'Bradford' Callery Pear.

Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown
Current year twig thickness: thick

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate
Soil salt tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

The major problem with the 'Bradford' Callery Pear has been too many upright branches growing too closely together on the trunk. Prune the trees early in their life to space lateral branches along a central trunk. This is not easy and a skilled pruning crew is needed to build a stronger tree. Even following pruning by a skilled crew, trees often look misshappen with most of the lower foliage removed and the lower portions of the multiple trunks showing. This tree probably was not meant to be pruned, but without pruning has a short life, thus 'Bradford' Pear defines a Catch-22.

Callery Pear trees are shallow-rooted and will tolerate most soil types including clay and alkaline, are pest- and pollution-resistant, and tolerate soil compaction, drought and wet soil well. 'Bradford' is the most fireblight-resistant cultivar of the Callery Pears. Unfortunately, as 'Bradford' and some of the other cultivars approach 20 years old, they begin to fall apart in ice and snow storms due to inferior, tight branch structure. But they are certainly beautiful and grow extremely well in urban soil until then and probably will continue to be planted because of their urban toughness. As you plan downtown street tree plantings, remember that in downtown sites many other trees succumb before this one due to a variety of reasons, but the Callery Pears seem to hang on pretty well despite the problems with branch attachments and multiple trunks.

'Autumn Blaze' has wonderful fall color earlier than other cultivars.

Pests

Aphids cause distorted growth and deposits of honeydew.

Scales can be seen on 'Bradford' but usually they are not serious.

Several borers may attack pear. Keep trees healthy to prevent attacks.

Diseases

Slightly susceptible to fireblight when grown in the south but the damage is usually only noticed at branch tips. 'Bradford' shows the best resistance to

fire blight in tests conducted in the southeast of all Callery Pear cultivars tested.

Tips of fire blight-infected branches appear scorched and burnt. The leaves droop, turn brown, but remain hanging on the tree. The bacteria wash down the branch and form cankers. Bark inside the canker often shreds and peels. When a canker girdles a branch, that branch dies. The Callery Pears are resistant, but not immune to this disease and some cultivars are apparently more resistant than others. Prune out infected branches well below the infected area.

Fact Sheet ST-538
October 1994

Pyrus calleryana 'Redspire' 'Redspire' Callery Pear[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

'Redspire' Callery Pear quickly grows 35 to 45 feet high and 20 feet wide, with upright-spreading, thornless branches (Fig. 1). The narrow crown enable this tree to be used in tight overhead spaces. The silhouette appears as a fat column growing wider than 'Whitehouse' and 'Capital' but narrower than 'Bradford' and 'Aristocrat'. In spring before the new leaves unfold, the tree puts on a nice display of pure white flowers larger than 'Bradford' or 'Aristocrat'. Flowering may be subdued in USDA hardiness zone 8b and it occurs at about the same time as 'Bradford' Callery Pear. The leaves emerge as red/purple, then become 1.5 to 3 inches long, glossy green with wavy margins and a red blush. They turn yellow to orange in fall in the south putting on an attractive display before dropping. Fall color may be subdued in the north. The small, pea-sized, red/brown fruits which form are quite attractive to birds and other wildlife, and mummify on the tree persisting for several months to a year. Planting two or more cultivars of Callery Pear together could increase fruit set.

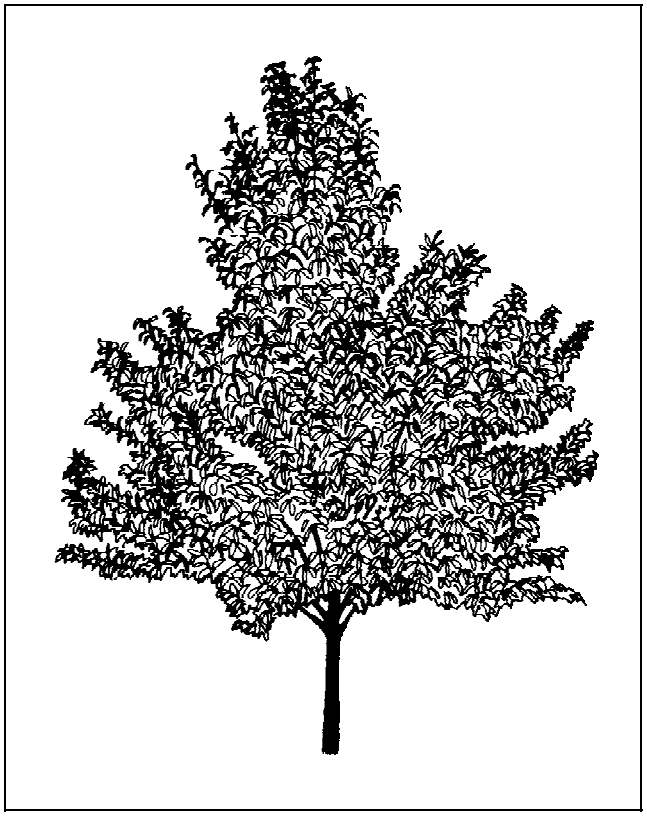


Figure 1. Young 'Redspire' Callery Pear.

GENERAL INFORMATION

Scientific name: *Pyrus calleryana* 'Redspire'
Pronunciation: PIE-rus kal-ler-ee-AY-nuh
Common name(s): 'Redspire' Callery Pear
Family: *Rosaceae*
USDA hardiness zones: 5 through 9A (Fig. 2)
Origin: not native to North America
Uses: container or above-ground planter; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; screen; shade tree; small parking lot islands (< 100 square feet in size); narrow tree lawns (3-4 feet wide); specimen; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage,

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2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 35 to 45 feet
Spread: 20 to 30 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: pyramidal
Crown density: moderate
Growth rate: fast
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: crenate; sinuate; undulate
Leaf shape: ovate
Leaf venation: pinnate; reticulate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches; less than 2 inches
Leaf color: green
Fall color: orange; yellow
Fall characteristic: showy

Flower

Flower color: white
Flower characteristics: spring flowering; very showy

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: dry or hard
Fruit color: brown; tan
Fruit characteristics: attracts birds; attracts squirrels and other mammals; inconspicuous and not showy; no significant litter problem; persistent on the tree

Trunk and Branches

Trunk/bark/branches: bark is thin and easily damaged from mechanical impact; routinely grown with, or trainable to be grown with, multiple trunks; grow mostly upright and will not droop; not particularly showy; tree wants to grow with several

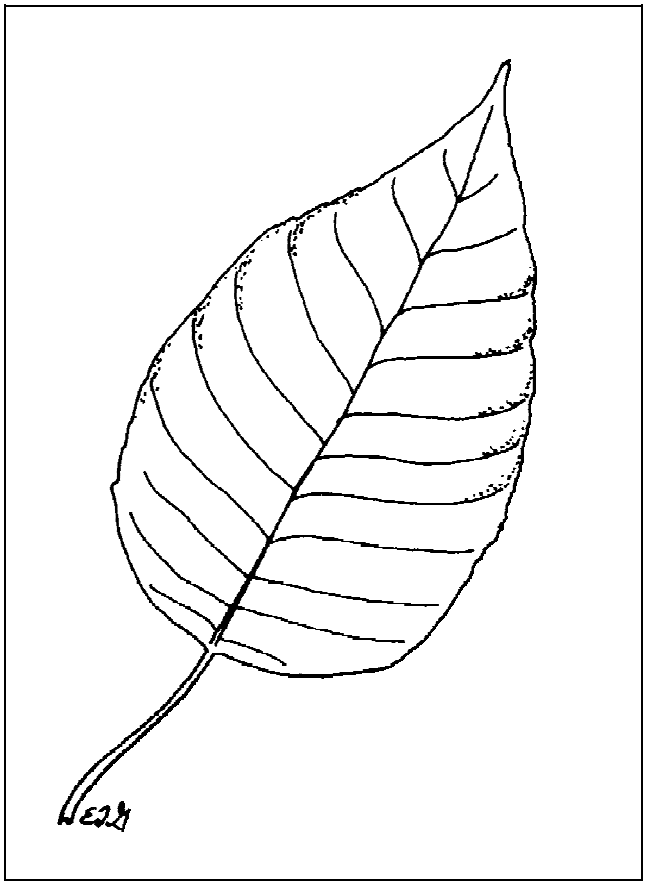


Figure 3. Foliage of 'Redspire' Callery Pear.

trunks but can be trained to grow with a single trunk; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: resistant
Current year twig color: brown
Current year twig thickness: thick

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate
Soil salt tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: very sensitive to one or more pests or diseases which can affect tree health or aesthetics

USE AND MANAGEMENT

Planted commonly as a street tree or in parking lot islands, it is also quite suited for downtown tree pits due to its urban tolerance. Like 'Bradford' pear, it is able to tolerate small soil spaces. It looks great located along a street on 20 to 25-foot-centers and creates a 'corridor' for traffic flow.

Fire blight susceptibility was light to moderate in tests conducted at Auburn University. Others report resistance to fireblight. It has a fruit set which could create a nuisance for some. Pruning the trees early in their life to space lateral branches along a central trunk should help in developing a strong, well-structured tree. Only buy trees with well-spaced branches. This cultivar has a better form than 'Bradford' and is easier to train to a strong structure.

Callery Pear trees are shallow-rooted and will tolerate most soil types including alkaline and clay, are pest- and pollution-resistant, and tolerate drought and wet soil well. It is a very adaptable tree suited for downtown and other restricted soil spaces.

Propagation is by cuttings.

Pests

Aphids cause distorted growth and deposits of honeydew.

Scales occasionally affect pears.

Several borers may attack pear. Keep trees healthy to prevent attacks.

Diseases

In tests conducted in Kentucky and Alabama, 'Redspire' Callery Pear was light to moderately susceptible to fire blight. Tips of infected branches appear scorched and burnt. The leaves droop, turn brown, but remain hanging on the tree. The bacteria wash down the branch and form cankers. Bark inside the canker often shreds and peels. When a canker girdles a branch, that branch dies. Prune out infected branches well below the infected area.

Fact Sheet ST-592
October 1994

Sophora japonica Scholar Tree[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Sophora species grows to a height of 40 to 60 feet and spread of 30 to 45 feet, forming a fine-textured, round canopy even as a young tree (Fig. 1). It has a rapid growth rate and tolerates polluted city conditions, heat, and drought. The tree prefers a sunny, open location on any light soil. The very showy, greenish-white to yellow flowers are produced in mid to late summer and provide an airy feel to the tree for several weeks. A yellow dye can be made by boiling the dried flowers and buds in water. The young green twigs turn a dark grey with age. The species tree must be at least 10-years-old to bloom, but the cultivar 'Regent' blooms at six to eight-years-old.

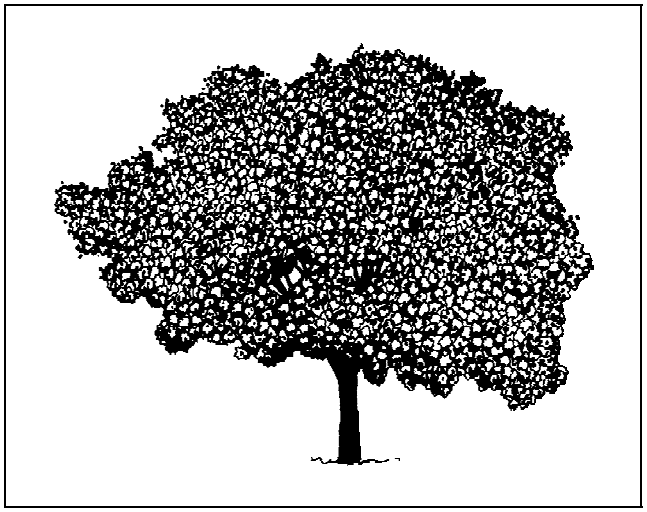


Figure 1. Middle-aged Scholar Tree.

GENERAL INFORMATION

Scientific name: *Sophora japonica*
Pronunciation: sah-FOR-uh juh-PAWN-ih-kuh
Common name(s): Scholar Tree, Japanese Pagoda Tree
Family: *Leguminosae*
USDA hardiness zones: 5 through 8A (Fig. 2)
Origin: not native to North America
Uses: large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; near a deck or patio; shade tree; specimen; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 40 to 70 feet
Spread: 40 to 70 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: round
Crown density: moderate
Growth rate: medium
Texture: fine

1. This document is adapted from Fact Sheet ST-592, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

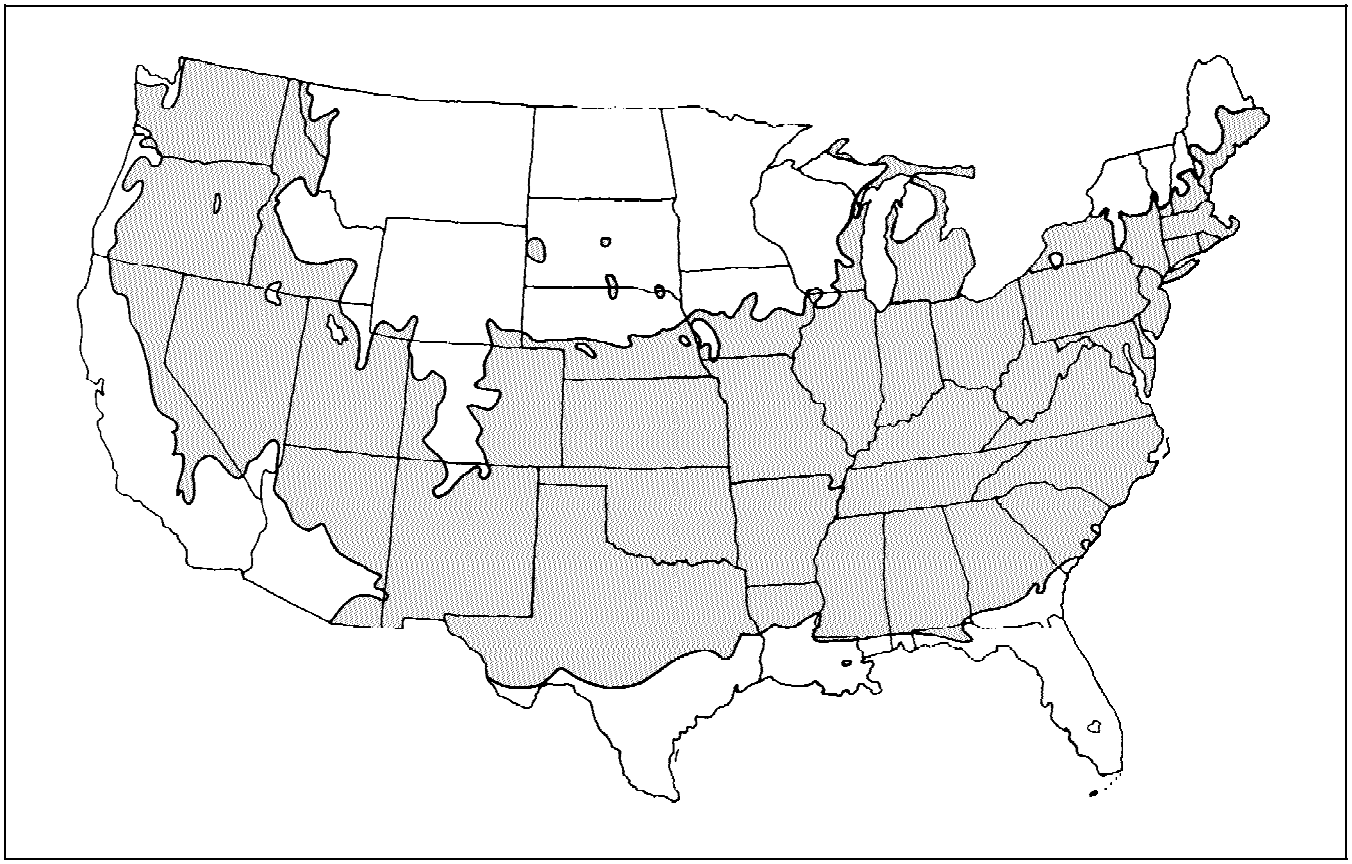


Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: odd pinnately compound
Leaflet margin: entire
Leaflet shape: ovate
Leaflet venation: pinnate
Leaf type and persistence: deciduous
Leaflet blade length: less than 2 inches
Leaf color: green
Fall color: yellow
Fall characteristic: not showy

Flower

Flower color: white; yellow
Flower characteristics: showy; summer flowering

Fruit

Fruit shape: elongated; pod
Fruit length: 6 to 12 inches; 3 to 6 inches
Fruit covering: dry or hard
Fruit color: brown; yellow
Fruit characteristics: does not attract wildlife; fruit, twigs, or foliage cause significant litter; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; not particularly showy; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: green
Current year twig thickness: medium; thin

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate

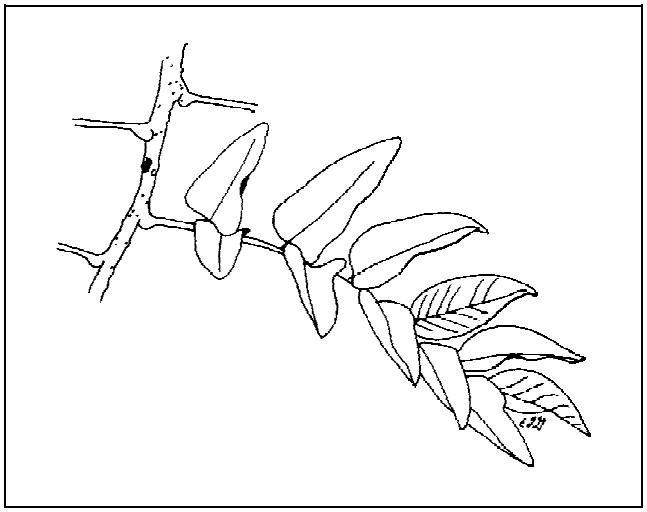


Figure 3. Foliage of Scholar Tree.

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

The tree drops flower petals creating a creamy white carpet for several weeks on the ground, but they can temporarily stain sidewalks. The yellow fruit pods form in late summer and are quite showy, dropping later in the winter and could be a nuisance to some people. But they are small and fairly easily washed away. The leaflets are small, creating light shade beneath the tree and are mostly washed away with rain or fall into shrub beds or between the grass blades.

Some trees come from the nursery with multiple trunks or branches clustered together at one spot on the trunk. Buy those with one central trunk growing up the center of the tree or prune the tree to a central leader to create a strong, durable structure. Space branches along the central leader to ensure good branch attachment. It may take several prunings to train the tree to the proper form.

This urban-tough tree is highly recommended for urban street tree planting. Also makes a nice medium-sized patio tree and is well-suited for parking lot planting, creating shade from its spreading canopy. It is adapted to restricted soil spaces, and tolerates drought in reasonable soil and is tolerant of salt spray. Best when planted in full sun and well-drained, not wet, soil.

Sophora species has a few cultivars: 'Fastigiata' - upright habit; 'Pendula' - weeping habit; 'Princeton Upright' - upright form suitable for narrow sites, somewhat smaller than the species; 'Regent' - oval crown and blooms at an early age, has glossy leaves which shed soot and dirt, readily available in nurseries.

Pests

Potato leafhopper kills young stems causing profuse branching or witches broom on small branches. It usually is not a problem on larger trees.

Diseases

Sophora species is generally pest- and disease-free.

Occasionally, Scholar Tree will get a fungus canker about two-inches or less across, have raised reddish brown margins and light brown centers. The infected stem is killed when the fungus girdles the stem. Another fungus is sometimes found on dead branches on *Sophora* species. Frost injury may give both fungi an entrance into the tree. Prune out dead, damaged, or diseased branches.

Twig blight or dieback can be a problem occasionally. Prune out infected branches and avoid unnecessary wounding. Keep trees vigorous by regular fertilization.

Powdery mildew forms a fungus mat which looks like a white coating on the leaves. The disease is usually not serious.

Fact Sheet ST-639
October 1994

Tilia cordata 'Greenspire' 'Greenspire' Littleleaf Linden[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

'Greenspire' Littleleaf Linden grows 50 to 75 feet tall and can spread 40 to 50 feet, but is normally seen 40 to 50 feet tall with a 35 to 40-foot-spread in most landscapes (Fig. 1). This tree has a faster growth rate than the species and a dense pyramidal to oval crown which casts deep shade. The leaves are smaller than the species adding a delicate touch to the tree. From a distance the tree almost resembles a narrow version of the Bradford Callery Pear. This cultivar of Littleleaf Linden is more popular than the species or any of the other cultivars. It is a prolific bloomer, the small fragrant flowers appearing in late June and into July. Many bees are attracted to the flowers, and the dried flowers persist on the tree for some time. Japanese beetles often skeletonize Linden foliage, in certain areas in the northern part of its range. Defoliation can be nearly total and mature trees can be killed by severe infestations. Planting Linden in areas with severe infestations of this pest may not be wise. However, at least one reference reports that defoliation by Japanese beetles is common but control is seldom needed.

GENERAL INFORMATION

Scientific name: *Tilia cordata* 'Greenspire'
Pronunciation: TILL-ee-uh kor-DAY-tuh
Common name(s): 'Greenspire' Littleleaf Linden
Family: *Tiliaceae*
USDA hardiness zones: 3 through 7A (Fig. 2)
Origin: not native to North America
Uses: container or above-ground planter; hedge; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; screen; shade tree; specimen; sidewalk cutout

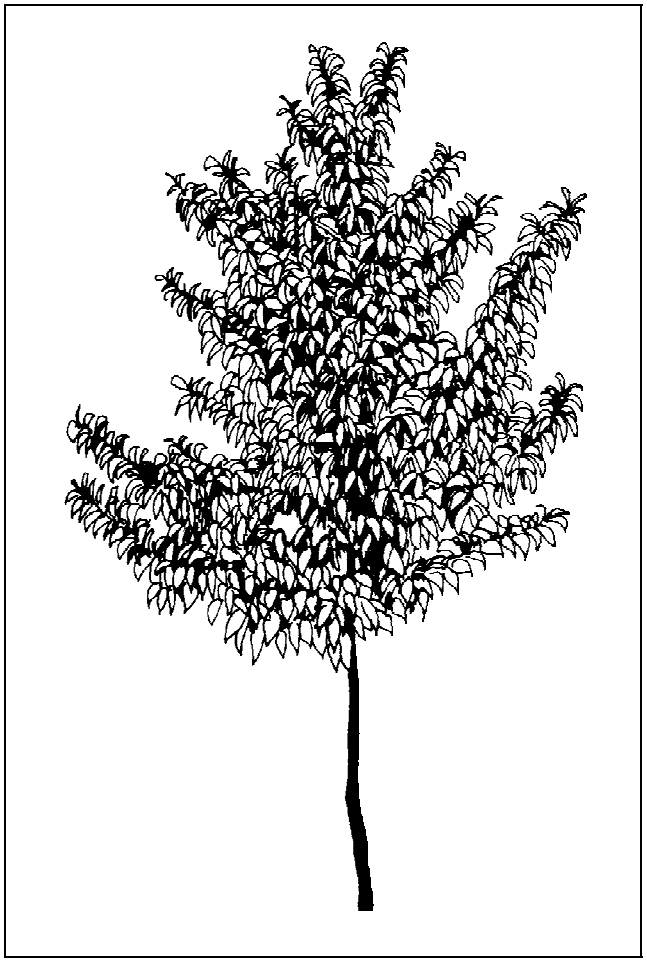


Figure 1. Middle-aged 'Greenspire' Littleleaf Linden.

1. This document is adapted from Fact Sheet ST-639, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.



Figure 2. Shaded area represents potential planting range.

(tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 40 to 60 feet
Spread: 35 to 50 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: pyramidal
Crown density: dense
Growth rate: medium
Texture: medium

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: serrate
Leaf shape: cordate; orbiculate
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: 2 to 4 inches
Leaf color: green
Fall color: yellow
Fall characteristic: not showy

Flower

Flower color: yellow
Flower characteristics: pleasant fragrance; showy; summer flowering

Fruit

Fruit shape: round
Fruit length: < .5 inch
Fruit covering: dry or hard
Fruit color: brown; tan
Fruit characteristics: does not attract wildlife; no significant litter problem; persistent on the tree; showy

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; not particularly showy; should be grown with a single leader; no thorns

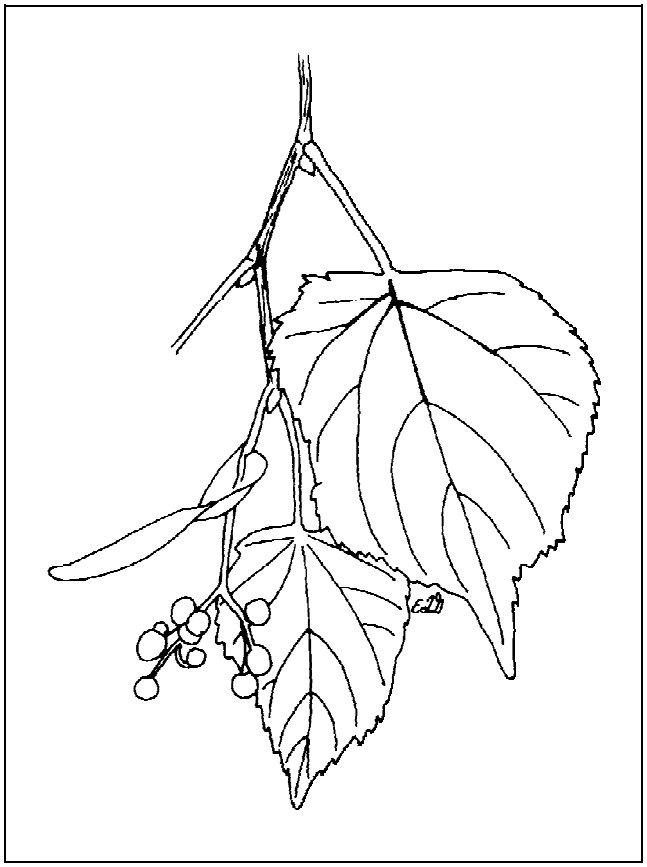


Figure 3. Foliage of 'Greenspire' Littleleaf Linden.

Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown; green
Current year twig thickness: thin

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; acidic; occasionally wet; alkaline; well-drained
Drought tolerance: moderate
Aerosol salt tolerance: none

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Verticillium wilt susceptibility: susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Small lateral branches arise from the straight, central trunk in an upswept curve and bend toward the ground as they grow older. Due to the radially produced, small diameter branches, this may be the least-maintenance cultivar. Multiple trunks and upright, large-diameter branches occasionally develop on the species and they may be poorly attached to the trunk, but this cultivar does not appear to have this problem. Although the tree usually grows with good form without much pruning, be sure to purchase and train Linden to one central trunk with well-spaced, small-diameter lateral branches. The cultivars 'Glenleven' and 'June Bride' have also been developed for their very straight trunk. Linden may sprout from the base and these will have to be removed from time to time.

The tree grows in sun or partial shade, will tolerate alkaline soil if it is moist, and it transplants well. It is not particularly tolerant of drought, scorching at the leaf margins in summer drought. But this apparently does little long-term harm. It is more tolerant of heat and compact soil than American Basswood. Many communities plant Linden along the streets due to its rapid growth rate and dense, symmetrical crown but littleleaf Linden is sensitive to road salt.

The wood of Linden is clear white, soft and often used for drawer sides in inexpensive furniture. Though not as soft as balsa wood, it sands poorly and is difficult to finish.

There are several other cultivars: 'Chancellor' - upright when young but becoming pyramidal, fast growth, with a straight, single trunk: 'Glenleven' - conical (pyramidal), fast growth, straight trunk, more open canopy than species; 'June Bride' - pyramidal, glossy leaves, profuse flowering; 'Pyramidalis' - widely pyramidal; 'Rancho' - narrow, upright growth habit, very small, fine textured leaf - a beautiful tree; 'Sterling' is supposed to resist Japanese beetles.

Pests

Despite susceptibility to various insects and diseases, control is usually not needed except for Japanese beetle.

Japanese beetles often skeletonize Linden foliage, in certain areas in the northern part of its range.

Defoliation can be nearly total and mature trees can be killed by severe infestations. Planting Linden in areas with severe infestations of this pest is not recommended.

Aphids can be a problem on Linden causing the production of honeydew. This is more of a nuisance than a life threatening problem.

Several caterpillars feed on Linden. Have the insect identified then apply the appropriate control, if needed. *Bacillus thuringiensis* will not be effective against sawfly larvae. Fall webworm nests can be pruned out when still small.

Lace bugs cause discoloration of the leaves. The insects are found on the undersides of the leaves and can cause some early defoliation but are otherwise harmless.

Spider mites cause leaves to become stippled and yellowed. The mites are usually not discovered until there is a significant infestation.

Diseases

No diseases are usually serious.

Anthracnose causes elongated light brown areas next to the veins. The spots may be anywhere on the leaf but are most often near the tip. The spots are bordered by a distinct black band. Severe infections defoliate the tree. The disease does not require chemical controls every year but repeated severe infections may justify spraying.

Leaf blight causes leaves to brown and fall. The early symptoms are round, brown spots with dark borders. The spots become numerous leading to leaf browning and drop.

Several fungi cause cankers and dieback on branches and trunks. Remove infected branches as they occur and avoid wounding the tree. Fertilizing infected trees may help.

Powdery mildew forms a white coating on the leaves but is usually not serious and does not require treatment.

Verticillium wilt causes dieback and death of individual branches or the entire tree. Keep trees healthy with a regular fertilizer program to help prevent the disease.

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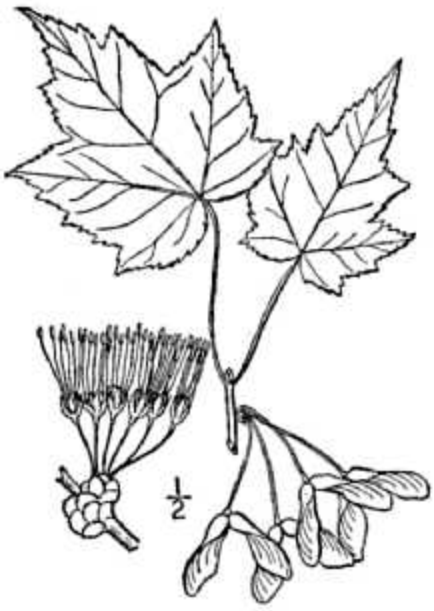
Plant Guide

RED MAPLE

Acer rubrum L.

Plant Symbol = ACRU

Contributed By: USDA NRCS National Plant Data Center & the Biota of North America Program



Britton & Brown. 1913
Illustrated flora of the northern states and Canada
@ PLANTS

Alternate common names
Carolina red maple, Drummond red maple, scarlet maple, soft maple, swamp maple, water maple

Uses
Red maple has long been valued as an ornamental tree (shade, specimen, autumn accent, or wet site) because of its ease of establishment, rapid growth, brightly colored flowers and fruit, and fall leaf colors (ranging from clear yellow to orange to vivid red) displaying coloring during different seasons of the year. This tree is preferred over silver maple or boxelder when a fast growing maple is needed. Red maple can be planted onto many types of disturbed sites in rehabilitation projects.

The white, fine-grained wood is used for furniture, flooring, cabinetry, paneling, veneer, musical instruments, tool handles, cutting boards, butcher blocks, wooden bowls, boxes and crates, and many other uses. Red maple is an excellent wood for fuel and is also used for saw timber and pulpwood. But because of susceptibility to defects and disease and poor form of individuals of sprout-clump origin, the timber is often low in quality.

The sap of red maple is sometimes used for producing maple syrup. Although its sap has only about half the sugar content as sugar maple (*A. saccharum*), the syrup tastes good. Saponins in the sap may cause excessive frothing of the concentrate.

Native Americans used red maple bark as an analgesic, wash for inflamed eyes and cataracts, and as a remedy for hives and muscular aches. Tea brewed from the inner bark has been used for treating coughs and diarrhea. Pioneers made cinnamon-brown and black dyes from a bark extract. Iron sulphate was added to the tannin from red maple bark to make ink.

Because of the abundance and wide distribution red maple, its early-produced pollen may be important to the biology of bees and other pollen-dependent insects. Most references describe red maple as wind pollinated, but insect pollination may be important, as many insects, especially bees, visit the flowers. The seeds, buds and flowers are eaten by various wildlife species. Squirrels and chipmunks store the seeds. White-tailed deer, moose, elk browse red maple, and rabbits, which find the stump sprouts especially palatable, especially in fall and winter. Cavities in red maples in river floodplain communities are often well suited for cavity nesters such as the wood duck and others.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values. This species has been introduced in many areas of the U.S., outside of its native range.

Description
General: Maple Family (Aceraceae). A native tree growing to 20 m tall, usually with a narrow compact

crown, single-boled, or often in clumps of stems from one stump due to prolific sprouting; bark gray and thin, becoming furrowed into long narrow scaly ridges on older trunks and branches. The leaves are deciduous, opposite, long-petioled, blades 6-10 cm long and usually about as wide, with 3 shallow short-pointed lobes, sometimes with two smaller lobes near the base, dull green and smooth above, lighter green or silvery beneath and more or less hairy. The flowers are pink to dark red, about 3 mm long, the male (staminate) flowers fascicled and the female (pistillate) flowers in drooping racemes. The flowers appear to be bisexual but they are functionally male or female, and individual trees may be all male or all female or some trees may have both types, each type on a separate branch (the species technically polygamo-dioecious), or the flowers may be functionally bisexual. Fruits: winged nutlets (samaras) in a pair, 2-2.5 cm long, clustered on long stalks, red to red-brown. The common name is in reference to the red twigs, buds, flowers, and fall leaves.

Variation within the species: Red maple is highly variable and many varieties and forms have been identified. The following varieties are commonly recognized:

Var. *drummondii* (Hook. & Arn. ex Nutt.) Sarg.
Var. *trilobum* Torr. & Gray ex K. Koch

Red maple forms natural hybrids with silver maple (*A. saccharinum*): *Acer* X *freemanii* E. Murray.

Distribution: Red maple is one of the most widely distributed trees in eastern North America, extending from Newfoundland and Nova Scotia west to southern Ontario, Minnesota, Wisconsin, and Illinois, then south through Missouri, eastern Oklahoma, and southern Texas, and east to southern Florida. Its distribution has been increased past its native range through broad cultivation and naturalization of the cultivated forms.

Adaptation
Red maple is also one of the most successful and abundant species in the Eastern Deciduous Forest, arguably the most abundant, reproducing aggressively by seeds and sprouts after fire, logging, and abandonment of farmland. It is most abundant on bottomlands and is tolerant of waterlogged soils and flooding, but it is a "supergeneralist," growing on the widest variety of sites and in the greatest range of conditions (sunny or shady, high or low nutrients, dry or moist) of any North American species, from 0-900 meters. Because red maple grows well in shade, is a key late-successional species, but it also is a successful early successional invader of disturbed sites. "It will probably continue to increase in dominance in the overstory during the next century, causing widespread replacement of the historically dominant trees of the forests of the eastern United States" (Abrams 1998, p. 355). Fire suppression has contributed greatly to the spread of red maple (the thin bark makes it highly susceptible to fire damage) but no single trait is responsible for its success.

Flowering: (February-)March-April, before the vegetative buds, one of the first trees to flower in the spring; fruiting: April-June, before leaf development is complete.

Establishment
Red maple is a prolific seed producer and trees as young as four years may begin to bear seeds. Good seed crops are usually produced in alternate years. Seedbed requirements are minimal and up to 95% of viable seeds germinate in the first 10 days; some survive in the duff and germinate the following year. Because the mature seeds are dispersed in spring and can germinate immediately, seedlings can become established with a 3-4 month advantage over most associated woody species. A bank of persistent seedlings often accumulates beneath a forest canopy.

Seedlings can survive 3-5 years of moderate shade, but establishment and early growth are best after disturbance. Male (staminate) trees may grow faster than female ones. Average longevity for red maple is about 80-100 years, but trees are known to reach 200 years of age.

Vegetative reproduction under natural conditions is common from sprouts from the stump or root crown or root suckers after fire or mechanical damage. Buds located at the base of stems commonly sprout 2-6 weeks after the stem is cut.

Management
Red maple is easily transplanted and is one of the easiest trees to grow. It is abundantly available in commerce, in ball-and-burlap and in container, but where other fertile trees grow in the area, volunteers usually are common. Propagation of cultivars is by budding onto seedling understock or rooted stem cuttings – the species form (although rarely propagated) by rooted stem cuttings or by seeds. Softwood cuttings are propagated under mist, using 1000-3000 ppm IBA, in about four weeks.

Despite its value and wide use (even to the point of over-planting in some areas), red maple has some

drawbacks as a lawn and street tree. As a street tree, it often becomes too large, and it does not respond well to some urban stresses, particularly protracted drought because of the planting site or long spells of hot dry weather. One of the "soft maples," red maple branches are weak and somewhat brittle and are subject to storm damage. The bark is thin and easily damaged by mechanical impact (including lawn mowers, weed eaters, and even increment boring) as well as fire, allowing entry of various damaging fungi and insects – butt rot, trunk rot fungi, heart rot, and stem diseases are common in damaged trees, although pests and pathogens otherwise are relatively few. As in some other maples, feeder roots develop close to the surface and turf and other shallow-rooted plants must compete directly with the tree for water. Turf beneath the canopy often is stunted and mowing may be difficult because of the protruding roots.

Growth in alkaline soils may lead to leaf chlorosis and a weakly growing tree, especially among the cultivars. Fertilization in spring can help overcome this. Graft incompatibilities have appeared between some cultivars of red maple and their rootstock, the trees often breaking off at the union between scion and rootstock, but propagation by softwood cutting has circumvented this problem.

Cultivars, Improved and Selected Materials (and area of origin)

Many cultivars of red maple have been developed. Selections have been made for color tints and brightness, timing of onset of coloration, crown shape and branching pattern, cold hardiness, leaf size, only male flowers (no seeds or seedlings), and leafhopper resistance.

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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Plant Guide

RIVER BIRCH

Betula nigra L.

Plant Symbol = BENI

Contributed By: USDA NRCS National Plant Data Center



Robert Mohlenbrock
Midwestern Wetland Flora
USDA, NRCS, Wetland Sciences Institute
@ PLANTS

Alternative Names
Japanese red birch, black birch, red birch, water birch

Uses
Economic: River birch sap can be fermented to make birch beer or vinegar. The wood is used to manufacture inexpensive furniture, woodenware, wooden shoes, basket materials, toys, staves, and fuel.

Ethnobotanic: The leaves were chewed, or used as an infusion in the treatment of dysentery. An infusion of the bark was used to treat stomach problems and difficult urination (Moerman 1998).

Landscaping &Wildlife: *Betula nigra* is a very attractive ornamental tree. It is a desirable specimen for estates, golf courses, parks, and public grounds. Many species of birds eat the seeds including wild turkey and grouse. The leaves are browsed by white-tailed deer.

Conservation: River birch is used for strip mine reclamation and erosion control (Grelen 1990). It is used in forested riparian buffers to help reduce stream bank erosion, protect water quality, and enhance aquatic environments.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
General: Birch family (Betulaceae). River birch is a deciduous medium to large-sized native tree. The leaves are alternate, double serrated, wedge-shaped, and sharp pointed. The flowers are unisexual, borne in separate male and female catkins on the same tree. The bark is light brown to buff, paperlike; exfoliating on young trees, turning to scaly bark on older trees.

Distribution: River birch is distributed throughout North America. It extends from southern New England, west to Kansas and Minnesota, and south to Texas and Florida. For current distribution, please consult the Plant profile page for this species on the PLANTS Web site.

Adaptation
River birch can survive on drier soils, although it is best adapted to moist soils and is usually found along stream banks and in swampy bottomlands that are periodically flooded. Maximum development is reached in fertile areas with a pH of 6.5 to 4.0. It is intolerant of shade and requires full sunlight.

Establishment
Propagation by Seed: Sow seeds in containers or seed trays containing a seed germination medium to which a slow release fertilizer is added. Firm the medium and sow seeds thinly and evenly on top, and cover to desired depth with planting medium (Heuser 1997). Place pots in a sunny location in a cold frame. When seedlings are large enough to handle they should be placed into individual pots and grown in a cold frame for their first winter.

Management
Fertilize young trees in late winter before new growth begins to ensure faster growth. Don't prune this birch and other birches until summer because they are "bleeders" and should not be cut when the sap is flowing.

River birch is quite disease resistant but has severe problems in early spring with aphids and is favored by gypsy moth larvae.

Cultivars, Improved and Selected Materials (and area of origin)

Readily available through commercial nurseries. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government". The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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USDA NRCS
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Plant Guide

GINKGO

Ginkgo species

Plant Symbol = GINKG

Contributed by: USDA NRCS National Plant Data Center



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Alternative Names
Ginkgo biloba L., maidenhair tree

Uses
NOTE: Ingesting seeds may be toxic.

Commercial use: The Ginkgo wood is of little value due to its scarcity. It is lightweight, brittle, yellow and in China and Japan, is used for chess sets, chopping blocks and firewood. The leaves are harvested for uses as a blood thinner and to treat circulatory illnesses.

*Medical use: T*he extract from the Ginkgo leaves contains flavonoid glycosides, and ginkgolides. The extract is said to be a memory enhancer, and anti-vertigo agent. There are three effects on the human body: (1) it improves blood flow (including microcirculation in small capillaries) to most tissues and organs; (2) it protects against oxidative cell damage from free radicals (antioxidant); and (3) it blocks many of the effects of PAF (platelet aggregation, blood clotting) that have been related to the development of a number of cardiovascular, renal, respiratory and CNS (Central Nervous System) disorders.

Ginkgo is also added in small amounts to energy drinks, but it does not produce a noticeable effect, except as a placebo, or marketing tool from Ginkgo being listed on the label.

Side Effects: There are some undesirable effects of Ginkgo for individuals with blood circulation disorders, and those taking anti-coagulants (i.e., aspirin, warfarin). Recent studies have found that ginkgo has little or no effect on the anticoagulant properties or pharmacodynamics of warfarin. Ginkgo should not be used by people who are taking the anti-depressant drugs, monoamine oxidase inhibitors (MAOI) or by pregnant women. Ginkgo side effects include possible increased risk of bleeding, gastrointestinal discomfort, nausea, vomiting, diarrhea, headaches, dizziness, and restlessness. If any side effects are experienced, stop immediately taking Ginkgo supplements and consult your doctor.

Culinary use: The Ginkgo nut-like gametophytes inside the seeds are a traditional Chinese food often served at weddings. They are believed to have health benefits or have aphrodisiac qualities. Japanese cooks add Ginkgo seeds to dishes such as chawammushi, and cooked seeds are often eaten along with other dishes..

When eaten by children, in large quantities over a long period of time, the raw gametophyte (meat) of the seed can cause poisoning by MPN (4-methoxypyridoxine), which is heat-stable. Studies have demonstrated that convulsions caused by MPN can be prevented or terminated with pyridoxine. Some people are sensitive to the chemicals in the sarcotesta, the outer fleshy coating. These people should handle the seeds with care by wearing disposable gloves when preparing the seeds for consumption. The symptoms are dermatitis or blisters similar to that caused by contact with poison ivy. Seeds with the fleshy coating removed are perfectly safe to handle.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
General: The Ginkgo is a medium to large tree that reaches 20–35m tall, although some specimens in

China are over 50m tall. Ginkgo trees often have angular crown and long, somewhat erratic branches. They are usually deep rooted and resistant to wind and snow damage. Young trees are often tall and slender, and sparsely branched, and the crown becomes broader as the tree ages. Some old Ginkgos produce aerial roots, known as *chichi* (Japanese; "nipples") or *zhong-ru* (Chinese), which form on the undersides of large branches and grow downwards. Chichi growth is very slow, and may take hundreds of years to occur. The function, if any, of these thick aerial roots is unknown.

Ginkgo branches grow in length by growth of shoots with regularly spaced leaves. From the axils of these leaves, "spur shoots" (also known as short shoots) develop on second-year growth. Short shoots have very short internodes (so that several years' growth may only extend them by a centimeter or two) and their leaves are ordinarily unlobed. They are short and knobby, and are arranged regularly on the branches except on first-year growth. Because of the short internodes, leaves appear to be clustered at the tips of short shoots, and reproductive structures are formed only on them.

The leaves are unique among seed plants, being fan-shaped with veins radiating out into the leaf blade, sometimes bifurcating (splitting), but never anastomosing to form a network. Two veins enter the leaf blade at the base and fork repeatedy in two. This is known as dichotomous venation. The leaves are 5-10 cm (rarely to 15 cm) long. The old popular name "Maidenhair tree" is because the leaves resemble some of the pinnae of the Maidenhair fern *Adiantum capillus-veneris*.

Leaves of long shoots are usually notched or lobed, but only from the outer surface between the veins. They are borne both on the more rapidly growing branch tips, where they are alternate and spaced out, and also on the short, stubby spur shoots, where they are clustered at the tips. During summer, the leaves are a deep green, turning to brilliant yellow in the fall. They generally remain yellow for a time, then suddenly drop most of their leaves in what can seem like overnight.

Distribution:
For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: The ginkgo is a drought-resistant, adaptable species, and is very cold hardy thriving. It is also very pH adaptable, tolerates air pollution and soil salt pollution, making it an ideal candidate for adverse urban conditions. It will grow in almost any conditions, it prefers deep, sandy, moist soil and requires full sun.

Adaptation
Ginkgo is a slow-grower adaptable, hardy tree for use as a specimen or grown in groups for commercial production. It transplants well, establishes easily and is often planted in parks, arboreta and botanical gardens as a point of interest. Male cultivars are preferable, as not only is the odor of the fallen seeds unpleasant, but the abundant crops can also be very messy. Cultivars include 'Fastigiata,' a male form with an upright, columnar habit; 'Fairmont,' a narrow, pyramidal male form; and 'Shangri-la,' a fast-growing form with a compact crown and good fall color.

Establishment
Ginkgos are dioecious with separate female and male sexes. Male plants produce small pollen cones with sporophylls, each bearing two microsporangia spirally arranged around a central axis. Female plants do not produce cones. Two ovules are formed at the end of a stalk, and after pollination, one or both develop into seeds.

The seed is 1.5-2 cm long. Its outer layer, the sarcotesta is light yellow-brown, soft, and fruit-like. It is plum like and attractive, but the seedcoat contains butanoic acid, and smells like rancid butter when fallen on the ground. Beneath the sarcotesta is the hard sclerotesta, and a papery endotesta and nucellus.

The fertilization of ginkgo seeds is unusual in that it utilizes motile sperm; cycads are the only other seed plants with this feature. It was first discovered by the Japanese botanist Sakugoro Hirase in the early 1900s. When the pollen reaches the pollen chamber, two sperm are produced, one of which goes on to fertilize the ovule. The fertilization of ginkgo seeds is complete by the time they fall in autumn.

Pests and Potential Problems
The Ginkgo is disease resistance, insect-resistant wood and has the ability to form aerial roots and sprouts. This means the Ginkgo lives long, with some specimens claimed to be more than 2,500 years old; a 3,000 year-old.

Cultivars, Improved, and Selected Materials (and area of origin)
Ginkgos were once native throughout the Northern Hemisphere, but were rendered extinct in North America and Europe during the Pleistocene Ice Age.

They survived in the Yangste River valley in eastern China where they still grow today. The ginkgo has been cultivated for centuries in China and Japan and it is a sacred tree in the Far East. It grows well in Minnesota, Georgia, and Florida and in zones 8 and 9 of the southeast. It is a common urban planting in many Iowa cities.

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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Plant Guide

HONEY LOCUST

Gleditisia triacanthose L.

Plant Symbol = GLTR

Contributed By: USDA NRCS National Plant Data Center & the Biota of North America Program



R. Mohlenbrock
USDA, NRCS, Wetland Science Institute
@ PLANTS

Alternate common names
Common honey-locust, honey-shucks locust . honeylocust, honey locust

Uses
Honey-locust is widely planted as a hardy and fast-growing ornamental. It is often used in extreme urban stress areas such as parking lot islands and sidewalk tree squares and has been planted for erosion control, for windbreaks and shelterbelts, and as a vegetation pioneer for rehabilitation of strip-mine spoil banks. Because of the small leaflets and open crown, the trees cast a light shade that permits shade-tolerant turfgrass and partial-shade perennials to grow underneath. Cultivars have been selected for crown shape and branch angles and leaf color, and most are both thornless and fruitless. Over-use of honey-locust in cities has led to recommendations that its use be discouraged until adequate biodiversity is restored.

Honey-locust wood is dense, hard, coarse-grained, strong, stiff, shock-resistant, takes a high polish, and is durable in contact with soil. It has been used locally for pallets, crates, general construction, furniture, interior finish, turnery, firewood, railroad ties, and posts (fence posts may sprout to form living fences), but it is too scarce to be of economic importance. The wood also was formerly valued for bows.

The geographic range of honey-locust probably was extended by Indians who dried the legumes, ground the dried pulp, and used it as a sweetener and thickener, although the pulp also is reported to be irritating to the throat and somewhat toxic. Fermenting the pulp can make a potable or energy alcohol. Native Americans sometimes ate cooked seeds, they have also been roasted and used as a coffee substitute.

Honey-locust pods are eaten by cattle, goats, deer, opossum, squirrel, rabbits, quail, crows, and starling. White-tailed deer and rabbits eat the soft bark of young trees in winter, and livestock and deer eat young vegetative growth. Honey-locust is planted around wildlife plots and into pastures and hayfields to provide high-protein mast. Cattle do not digest the seeds, but sheep do.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
General: Pea Family (Fabaceae). Native trees growing to 20 meters tall, with an open crown, armed with thick-branched thorns to 20 cm long on the main trunk and lower branches. Bark blackish to grayish-brown, with smooth, elongate, plate-like patches separated by furrows. Leaves are deciduous, alternate, pinnately or bipinnately compound, 10-20 cm long, often with 3-6 pairs of side branches; leaflets paired, oblong, 1-3 cm long, shiny and dark

green above, turning a showy yellow in the fall, typically dropping early. Flowers are greenish-yellow, fragrant, small and numerous in hanging clusters 5-13 cm long, mostly either staminate (male) or pistillate (female), these usually borne on separate trees, but some perfect flowers (male plus female) on each tree (the species polygamo-dioecious). Fruits are flattened and strap-like pods 15-40 cm long and 2.5-3.5 cm wide, dark brown at maturity, pendulous and usually twisted or spiraled, with a sticky, sweet, and flavorful pulp separating the seeds; seeds beanlike, about 1 cm long. The common name "honey" is in reference to the sweet pulp of the fruits.

Variation within the species: *Gleditsia triacanthos* var. *inermis* (L.) Schneid. ("inermis" means unarmed) is occasionally found wild, apparently more as a populational variant than what is generally given formal taxonomic status as a variety. Such trees have provided stock for selection of some the thornless horticultural forms, but most of the latter are actually derived from buds or stem cuttings taken from the upper, thornless portions of physiologically mature trees thorny in the lower portions. Scions taken from this area generally remain thornless. Breeders also can control the sex of scions by selecting unisexual budwood for cuttings. Certain branches bear only one type of flower, and trees from cuttings of those branches will bear only that type.

Southern races of the species produce fruit more nutritious for stock feeding than northern races.

Natural hybridization between honey-locust and water-locust (*Gleditsia aquatica*) produces *Gleditsia* X *texana* Sarg., the Texas honey-locust.

Distribution
Honey-locust is essentially Midwestern in distribution, from the west slope of Appalachians to the eastern edge of Great Plains -- scattered in the east-central US from central Pennsylvania westward to southeastern South Dakota, south to central and southeastern Texas, east to southern Alabama, then northeasterly through Alabama to western Maryland. Outlying populations occur in northwestern Florida, west Texas, and west central Oklahoma. It is naturalized east to the Appalachians from South Carolina north to Pennsylvania, New York, and New England and Nova Scotia; sometimes a weed tree in India, New Zealand, and South Africa. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Adaptation: Honey-locust occurs on well-drained sites, upland woodlands and borders, rocky hillsides, old fields, fence rows, river floodplains, hammocks, and rich, moist bottomlands. It is most commonly found on moist, fertile soils near streams and lakes. It is tolerant of flooding and also is drought-resistant and somewhat tolerant of salinity. On bottomlands, it is a pioneer tree. On limestone uplands, it is an invader of rocky glades and abandoned farm fields and pastures. It is generally found below 760 meters, but up to 1500 meters in a few places. Flowering: May-June; fruiting: September-October, sometimes remaining on the tree through February.

General: Seed production begins on honey-locust trees at about 10 years and continues until about age 100, with optimum production at about 25-75 years of age. Some seed usually is produced every year but large crops usually occur every other year. The seeds are viable for long periods because of a thick, impermeable seed coat. Under natural conditions, individual seeds become permeable at different periods following maturation so that germination is spread over several years. The seeds are dispersed by birds and mammals, including cattle, which eat the fruits, and buffalo may have been historically important dispersal agents of the seeds. Germinability apparently is enhanced by passage through the digestive tract of animals. Honey-locust also reproduces from stump and root sprouts.

Honey-locust is generally shade-intolerant and reproduction is primarily in open areas, gaps, and at the edges of woods. The ability of honey-locust to invade prairie and rangeland is thought to be related to its tolerance of xeric conditions. Growth is rapid and trees live to a maximum of about 125 years.

Management
The only serious disease of honey-locust is a canker, which is occasionally fatal, but trees in landscape plantings may be damaged by a number of pests and pathogens. Damage to young honey-locust also may be caused by rabbits gnawing the bark and by browsing of livestock and deer.

Honey-locust is easily injured by fire because of its thin bark, but it sprouts after top-kill by fire. It appears to be excluded from prairies by frequent fire. Infrequent fires may create openings for reproduction in bottomland forests. Honey-locust is not a nitrogen fixer.

Cultivars, Improved and Selected Materials (and area of origin)

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture." These plant materials are readily available from commercial sources.

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Plant Guide

BLACKGUM

Nyssa sylvatica Marsh.

Plant Symbol = NYSY

Contributed by: USDA NRCS National Plant Data Center



Britton & Brown 1913
Illustrated Flora of the Northern States and Canada
@ PLANTS

Alternate Names
Black tupelo, blackgum, sour gum, pepperidge, tupelo, and tupelo-gum

Uses
Erosion Control: Reestablishes well in erosion prone areas like burned over forest, abandoned fields, rolling hills and cold mountain swamps.

Wildlife: Black bears, foxes, wood ducks, wild turkeys, robins, woodpeckers, mockingbirds, brown thrashers, thrushes, flickers, and starlings frequently eat the fruit, while white-tailed deer and beavers browse the twigs, foliage, and young sprouts. Additionally, provides cavity and nesting sites for a variety of birds and mammals and a good honey tree.

Timber: Its wood is used for light, non-splitting woodwork such as in docks and wharves; veneer, containers, crossties, and pallets.

Recreation and Beautification: Excellent ornamental plant for its straight bole, shapely crown and attractive autumn foliage.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
Nyssa sylvatica is a medium to large-sized native tree, frequently 60 to 80 ft tall and 3 to 4 ft in diameter. It typically has dense foliage with a conical crown on straight trunk. The simple, alternate leaves are leathery, and densely clustered at the branchlets. The small greenish white flowers are borne singly or in clusters. The bark is reddish brown and broken into deep irregular ridges and diamond-shaped plates.

Distribution: Blackgum grows from Maine west to New York, extreme southern Ontario, central Michigan, Illinois, central Missouri, and south to central Florida.

Adaptation
A wide variety of sites have adapted to the Blackgum. They range from the creek bottoms of the southern Coastal Plain to altitudes of 3,000 feet in North Carolina. It grows best on well-drained, light-textured soils on the low ridges of second bottoms and on the high flats of silt alluvium. Blackgum will tolerate brief spring flooding on alluvial sites and is common on the relatively dry upper and middle slopes in the Appalachian Mountains. On the drier uplands, it grows best on loam and clay loam. It is well adapted to fire. Older trees have thick bark and relatively high moisture content. Although aboveground portions of young trees are top-killed by fire, it typically survives by sprouting from the root crown or caudex.

Establishment
Blackgum is usually found in a mix of other species including black cherry (*Prunus serotina*), dogwood (*Cornus florida*), hickory (*Carya* spp.), oak (*Quercus*

spp.), eastern hophornbeam (*Ostrya virginiana*), and yaupon (*Ilex vomitoria*), it is shade tolerant and seldom grows as the dominant tree but it usually grows in the intermediate crown class on most sites. It responds favorably to releases from overtopping vegetation. Seedlings grow slowly under a fully stocked stand. At the time of disturbance, large numbers of new seedlings can become established.

Smaller blackgum stumps sprout readily and larger stumps sprout and develop root suckers. Layering can be used to produce stocks.

Propagation from Seed: Seed production is highly variable, disseminated primarily by gravity and birds, others generally fall to the ground and remain dormant in the litter or are carried by water. Seeds overwinter on cool, damp soil and germinate the following spring. Blackgum requires nearly full sunlight for optimum early growth. Pre-chilled seeds must be sown in spring. Seeds are drilled at the rate of 15 ft per row and covered with ½ - 1 inch of soil. A mulch of sawdust is often used. Beds must be kept moist.

Propagation from Stumps: Blackgum sprouts from the stump following disturbance. Smaller sour gum stumps sprout readily while larger stumps sprout occasionally. Sprouts arise from suppressed buds and are concentrated near the top of the stump. Stump sprouts can produce seeds at 2 years of age.

Management
Seedling establishment is best accomplished by the shelterwood method. Regeneration can also be accomplished by clear-cutting if prior to a good seed fall or if advanced regeneration already exist. Due to the high palatability of seedlings and sprouts, controlling deer populations can protect Black tupelo. It often competes with loblolly and short-leaf pine for water and light, reducing its growth and development. Basal tree injections with herbicide is an effective control method for crown kill. Intermediate trees respond favorably to release from overhead vegetation; seedlings respond to reduction in canopy cover with relatively rapid height growth.

Pests
Tupelo leaf minors (*Antispila nyssaefolia*) and forest tent caterpillar (*Malacosoma disstria*) attacks Black tupelo causing growth loss and occasional mortality.

Cultivars, Improved and Selected Materials (and area of origin)
Materials are readily available from nurseries throughout its range. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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Edited: 18apr02 jsp; 060802 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

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Fact Sheet ST-620
October 1994

Taxodium distichum
Baldcypress[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Narrowly to broadly pyramidal when young, Baldcypress, the state tree of Louisiana, eventually develops into a broad-topped, spreading, open specimen when mature (Fig. 1). Capable of reaching 100 to 150 feet in height, most landscape specimens are rarely seen in this open form because they are usually much younger and shorter. Trees grow at a moderately fast rate, reaching 40 to 50 feet in about 15 to 25 years. Although it is native to wetlands along running streams, growth is often faster on moist, well-drained soil. The pale green, needle-like leaves turn a brilliant coppery red in fall before dropping, but the bare branches and reddish gray, peeling bark provide much landscape interest during the winter. The trunk grows unusually thick toward the base, even on young trees. The small seeds are used by some birds and squirrels.

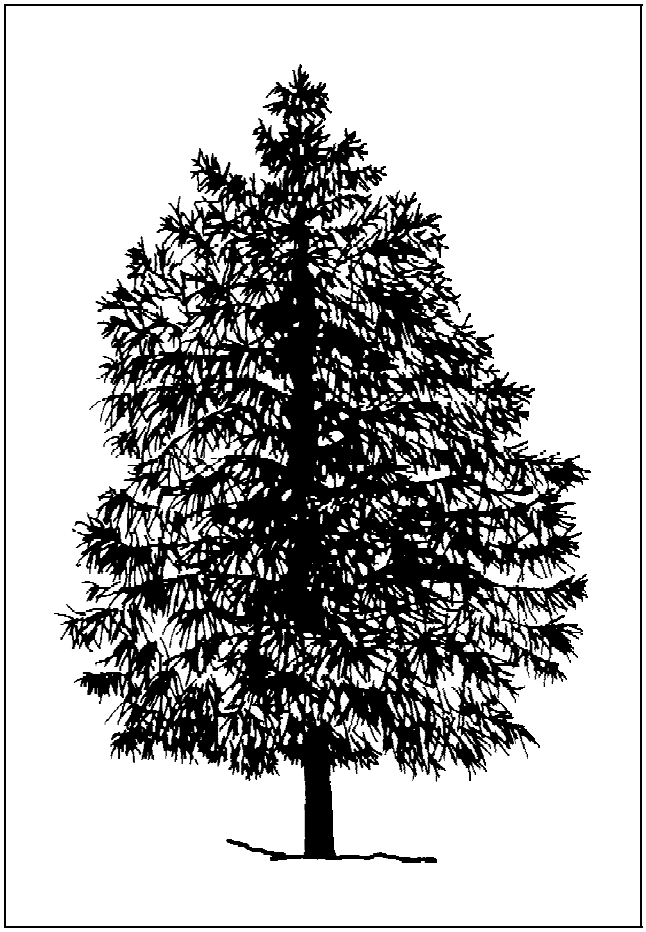


Figure 1. Middle-aged Baldcypress.

GENERAL INFORMATION

Scientific name: *Taxodium distichum*
Pronunciation: tack-SO-dee-um DISS-tick-um
Common name(s): Baldcypress
Family: *Taxodiaceae*
USDA hardiness zones: 5 through 10 (Fig. 2)
Origin: native to North America
Uses: hedge; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; reclamation plant; screen; shade tree; small parking lot islands (< 100 square feet in size); specimen; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common

1. This document is adapted from Fact Sheet ST-620, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

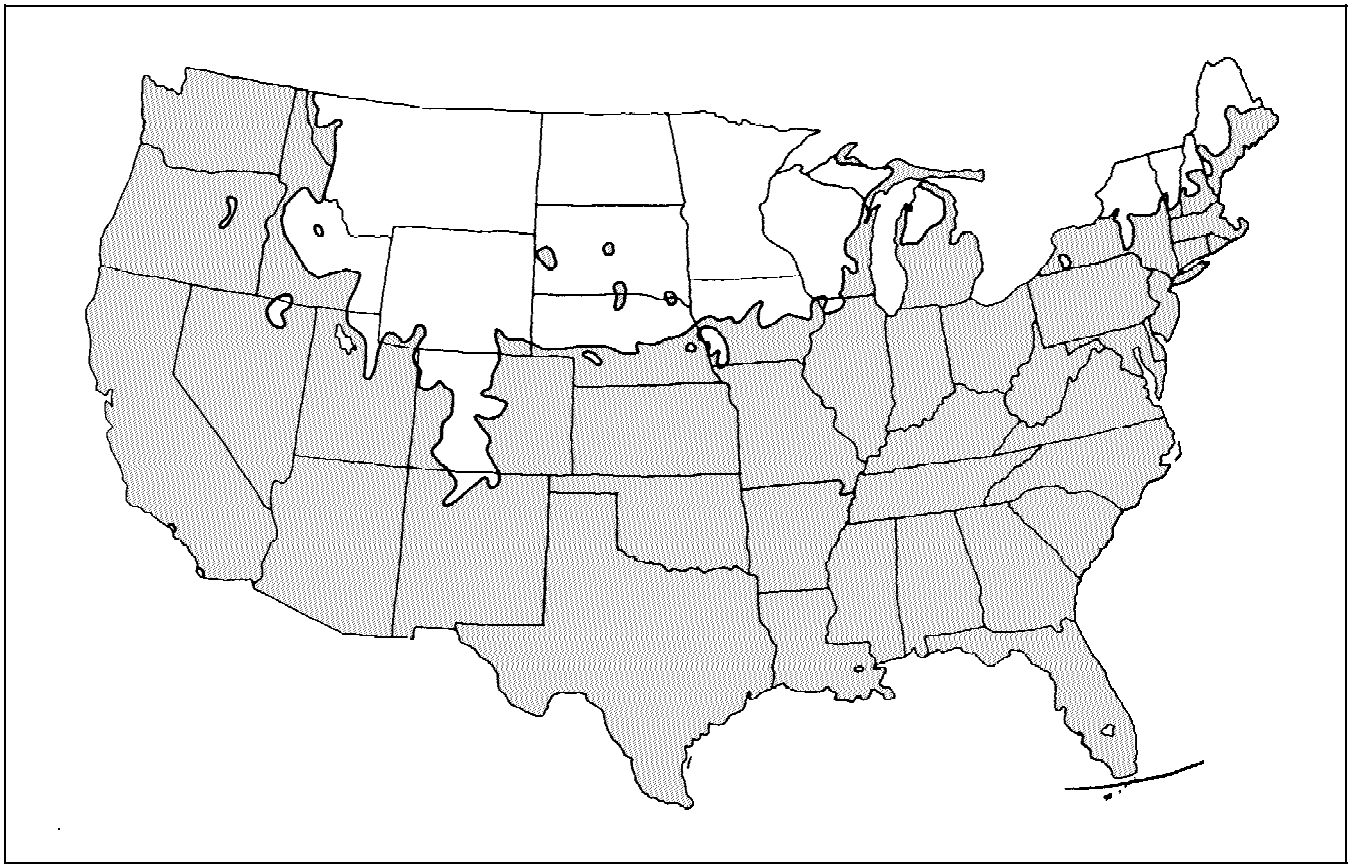


Figure 2. Shaded area represents potential planting range.

Availability: generally available in many areas within its hardiness range

DESCRIPTION

Height: 60 to 80 feet
Spread: 25 to 35 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: pyramidal; upright
Crown density: dense
Growth rate: fast
Texture: fine

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: entire
Leaf shape: lanceolate; linear
Leaf venation: none, or difficult to see
Leaf type and persistence: deciduous
Leaf blade length: less than 2 inches
Leaf color: green
Fall color: copper; yellow
Fall characteristic: showy

Flower

Flower color: brown
Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

Fruit shape: oval; round
Fruit length: 1 to 3 inches; .5 to 1 inch
Fruit covering: dry or hard
Fruit color: brown; green
Fruit characteristics: attracts birds; attracts squirrels and other mammals; inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; showy trunk; should be grown with a single leader; no thorns
Pruning requirement: needs little pruning to develop a strong structure

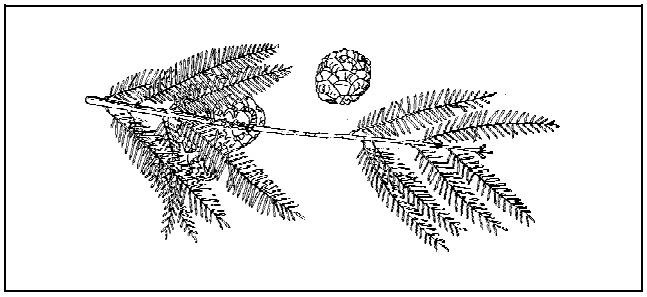


Figure 3. Foliage of Baldcypress.

Breakage: resistant
Current year twig color: green
Current year twig thickness: thin
Wood specific gravity: 0.46

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; slightly alkaline; acidic; extended flooding; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate
Soil salt tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: tree has outstanding ornamental features and could be planted more
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Although often seen at water's edge where it will develop "knees", or root projections, that will extend above the water, Baldcypress can also be grown in dry locations and makes an attractive lawn, street, or shade tree. Cypress knees do not generally form on these drier sites. Cities from Charlotte, NC, Dallas, TX to Tampa, FL currently use it as a street tree and it should be used more extensively throughout its range in urban landscapes. It provides a good vertical accent to the landscape and should be used more often in urban areas. Baldcypress can be clipped into a formal hedge, creating a wonderful soft screen.

Surprisingly, the roots do not appear to lift sidewalks and curbs as readily as some other species. Its delicate, feathery foliage affords light, dappled shade, and the heartwood of Baldcypress is quite resistant to rot. However, most lumber available at lumber yards today is sapwood and is not resistant to rot.

Baldcypress is ideal for wet locations, such as its native habitat of stream banks and mucky soils, but the trees will also grow remarkably well on almost any soil, including heavy, compacted, or poorly-drained muck, except alkaline soils with a pH above 7.5. Locate where the sun will strike the tree on all sides for best symmetrical development. Baldcypress is relatively maintenance-free, requiring pruning only to remove dead wood and unwanted lower branches which persist on the tree. It maintains a desirably straight trunk and a moderately dense canopy and does not form double or multiple leaders as do many other large trees.

The cultivar 'Monarch of Illinois' has a very wide-spreading form and 'Shawnee Brave' has a narrow, pyramidal form, 15 to 20 feet wide. 'Pendens' has drooping branchlets and large cones. *Taxodium distichum* var. *nutans* (*Taxodium ascendens*) is native to wet, boggy areas with standing water, whereas *Taxodium distichum* is more common along streams.

Propagation is by seed.

Pests

Bagworms can defoliate portions of the tree. Mites can be particularly troublesome in dry summers without irrigation, causing early leaf browning and defoliation in mid to late summer.

Diseases

Twig blight is caused by a weak pathogen and is usually present on dead or dying tissue. When the tree is stressed the fungus can kill branch tips. Dead tips can be pruned off. Do not let dead or diseased branches remain on the tree. Keep trees healthy with regular fertilization.

Fact Sheet ST-677
October 1994

Zelkova serrata
Japanese Zelkova[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Zelkova is often listed as a replacement for American Elm since it has roughly the same vase shape and grows 90 to 100 feet tall with a 60 to 80-foot spread (Fig. 1). But no tree will truly match the grace and elegance of the American Elm. Zelkova is massive, with the trunk capable of growing to four feet or more in diameter. It has a moderate growth rate and likes a sunny exposure. Branches are more numerous and smaller in diameter than American Elm. Leaves are 1.5 to 4 inches long, turning a brilliant yellow, orange, or burnt umber in the fall.

GENERAL INFORMATION

Scientific name: *Zelkova serrata*
Pronunciation: zell-KOE-vuh sair-AY-tuh
Common name(s): Japanese Zelkova, Saw-Leaf Zelkova
Family: *Ulmaceae*
USDA hardiness zones: 5 through 8 (Fig. 2)
Origin: not native to North America
Uses: Bonsai; large parking lot islands (> 200 square feet in size); wide tree lawns (>6 feet wide); medium-sized parking lot islands (100-200 square feet in size); medium-sized tree lawns (4-6 feet wide); recommended for buffer strips around parking lots or for median strip plantings in the highway; shade tree; sidewalk cutout (tree pit); residential street tree; tree has been successfully grown in urban areas where air pollution, poor drainage, compacted soil, and/or drought are common
Availability: generally available in many areas within its hardiness range

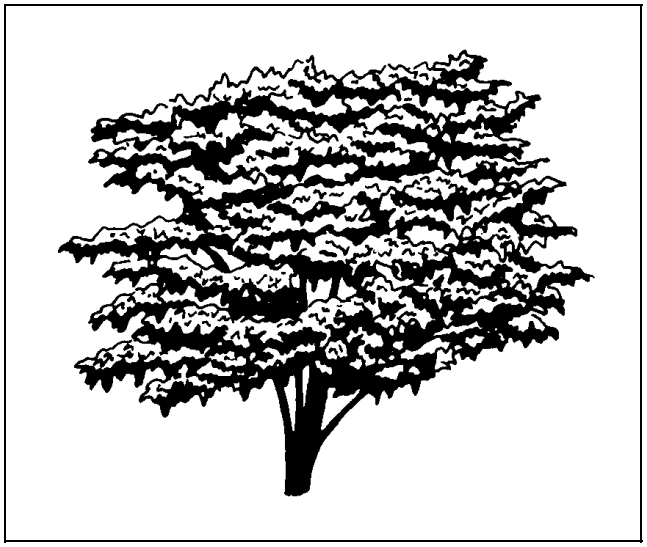


Figure 1. Mature Japanese Zelkova.

DESCRIPTION

Height: 55 to 80 feet
Spread: 50 to 75 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: vase shape
Crown density: moderate
Growth rate: medium
Texture: fine

1. This document is adapted from Fact Sheet ST-677, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

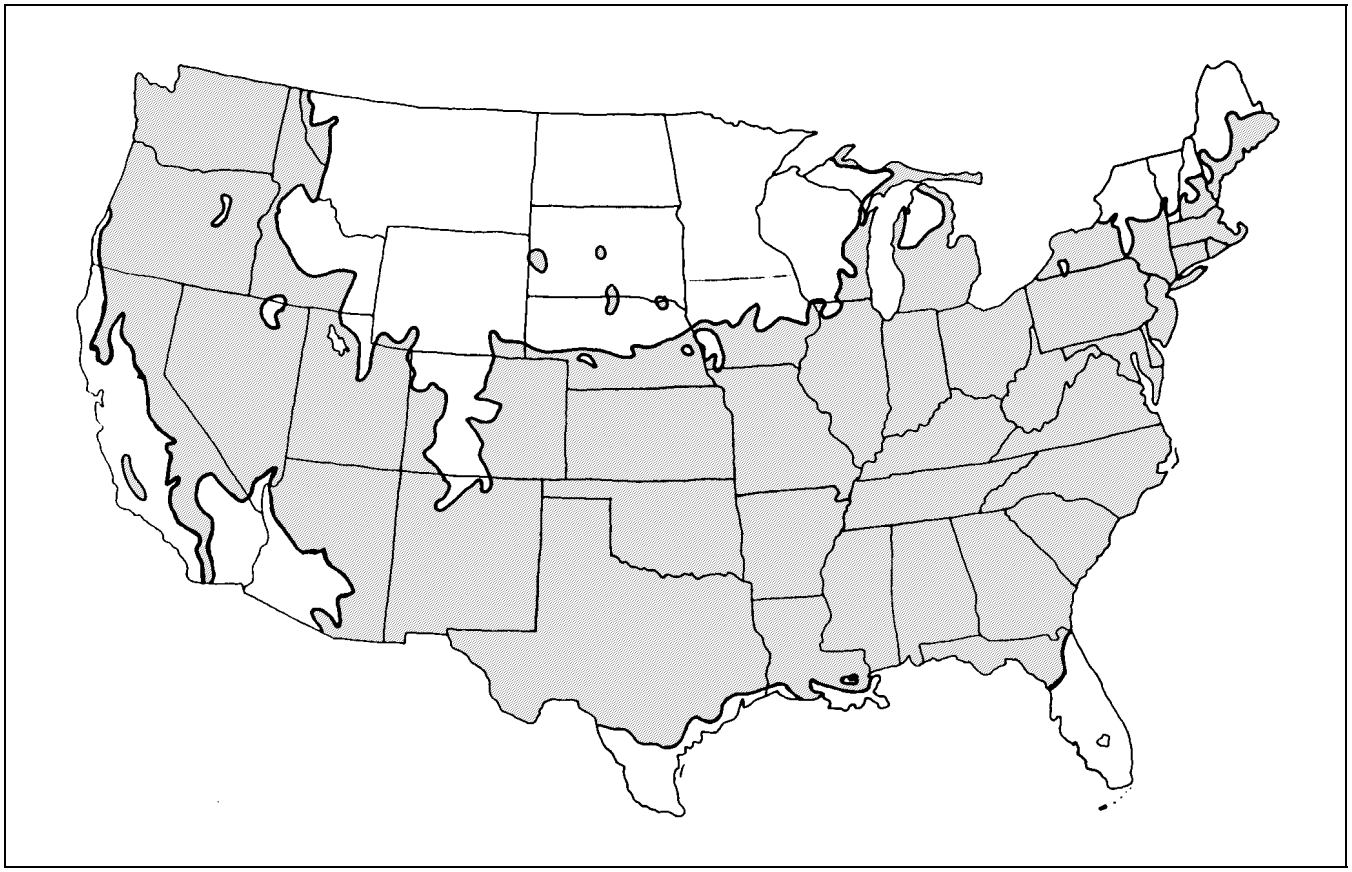


Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate (Fig. 3)
Leaf type: simple
Leaf margin: serrate
Leaf shape: oblong; ovate
Leaf venation: pinnate
Leaf type and persistence: deciduous
Leaf blade length: less than 2 inches
Leaf color: green
Fall color: copper; orange; red; yellow
Fall characteristic: showy

Flower

Flower characteristics: inconspicuous and not showy; spring flowering

Fruit

Fruit shape: oval
Fruit length: < .5 inch
Fruit covering: dry or hard
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: grow mostly upright and will not droop; showy trunk; should be grown with a single leader; no thorns
Pruning requirement: requires pruning to develop strong structure
Breakage: susceptible to breakage either at the crotch due to poor collar formation, or the wood itself is weak and tends to break
Current year twig color: brown
Current year twig thickness: thin

Culture

Light requirement: tree grows in full sun
Soil tolerances: clay; loam; sand; slightly alkaline; acidic; occasionally wet; well-drained
Drought tolerance: high
Aerosol salt tolerance: moderate

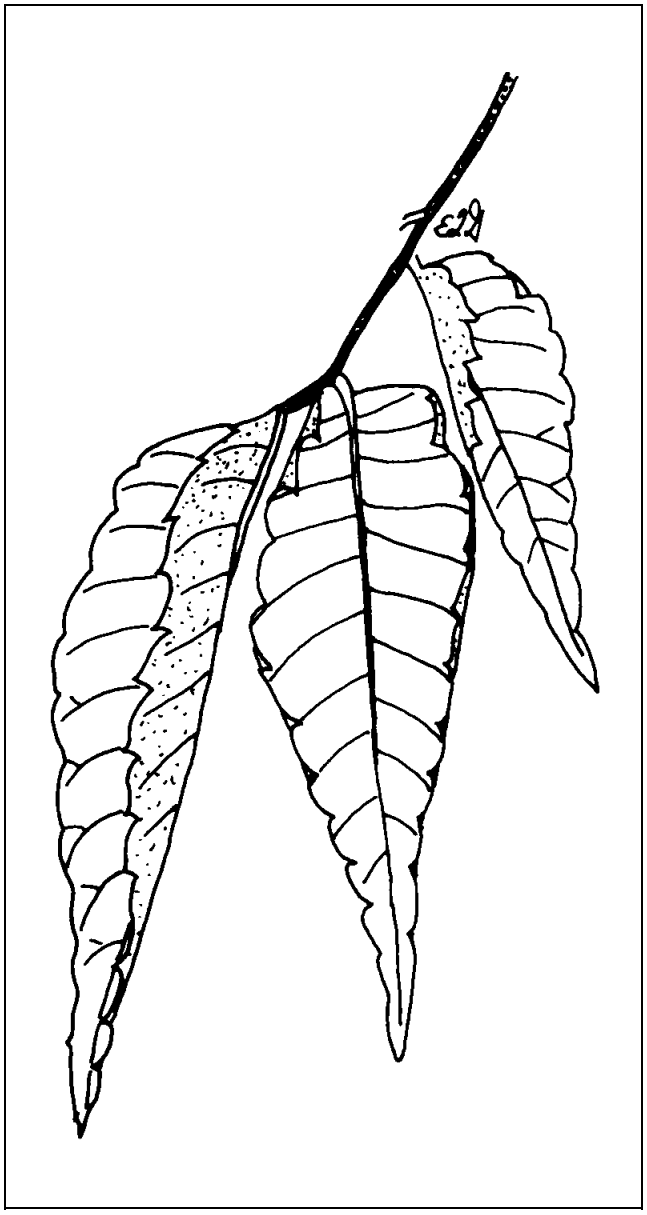


Figure 3. Foliage of Japanese Zelkova.

Other

Roots: surface roots are usually not a problem
Winter interest: no special winter interest
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: sensitive or moderately tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Unfortunately, the branches on Zelkova are often clumped together on the trunk at one point. Double and multiple trunks or leaders with embedded bark are also common. This is not a desirable form for planting in urban areas and needs to be prevented, or corrected, on existing trees. Purchase trees with branches spaced along the trunk so they can develop a secure hold onto the trunk. These will be hard to find but insist on it! Be sure that branches remain less than about half the diameter of the trunk to maintain a strong, durable form. Encourage nurserymen to grow trees with good trunk and branch structure.

The tree will tolerate most soil types, including those with a pH to about 7.5, but prefers a moist deep loam. It is reportedly risky to transplant in the fall. Established trees are fairly drought-tolerant, requiring little irrigation unless located in sandy soil. It makes a wonderful street tree even in restricted-soil tree pits, and is almost pest free. The crowns will eventually grow together if trees are planted on 30-foot-centers, forming a wonderful shaded street. This is a tough, urban tree which is often planted along streets in downtown and residential areas.

Cultivars include: ‘Green Vase’ somewhat resembles the vase shape of American Elms, is more upright in habit and tolerant of pollution, makes a great city street tree and produces a taller and narrower tree than ‘Village Green;’ ‘Village Green’ also resembles the shape of the American Elm and is more winter hardy than ‘Green Vase’, and may have a straighter trunk.

Diseases

Normally disease-free as it resists Dutch Elm disease and Elm leaf beetle.

Zelkova is subject to canker diseases particularly if the trunk is repeatedly wounded. Avoid wounding and maintain tree health.

Presenting the 2007 SMA Tree of the Year

Baldcypress

by Michelle Buckstrup

Once the votes pointed to baldcypress (*Taxodium distichum*) for Tree of the Year 2007, I saw it everywhere here in upstate New York: in front of my dentist's office, at the entrance to my favorite nursery, on the golf course behind my client's house.

I was hyperconscious of baldcypress in Asheville, North Carolina, where thriving young baldcypresses form a U-shape around the historic downtown Grove Arcade. I saw a massive one in the Botanical Gardens at Asheville and a tiny bonsai-grove of them at the North Carolina Arboretum. Bold Spring Nursery sent us a baldcypress for our ceremonial tree planting on the Tuesday of the conference. I stood in awe before a double allée of them at Daniel Stowe Botanical Garden near Charlotte.

Every last tree I saw was in fantastic health. My appreciation for "BC" just grows and grows. I'm not alone, as the testimonials here attest. Thanks to all who contributed, including Ralph Sievert, who is respected as the "Johnny Appleseed" of baldcypresses. (Would that make him "Johnny Cypresscone"?)



Baldcypress fall color



A double allée of baldcypresses guides visitors from the parking lot to the main conservatory at Daniel Stowe Botanical Garden.

Baldcypress Quick Facts

Hardiness Zones: 3 to 11

Mature Height: 70 feet (21 m)

Mature Width: 20 feet (6 m)



BELOW: Baldcypress is considered slow to establish after transplanting, but once established, it's ironclad.

RIGHT: Baldcypresses limbed up for street tree use Photo: Ralph Sievert

BELOW RIGHT: The excurrent (upright central leader) structure of baldcypress helps it resist storm damage.





Baldcypress for Trivia Lovers

- The scientific name, *Taxodium distichum,* is a fusion of Latin and Greek: "Taxodium" means "like taxus," referring to the leaf appearance, and "distichum" means "in two ranks," referring to the leaf arrangement.
- Michael Dirr describes the vast native range of baldcypress as "Delaware to Florida, west to southern Indiana, Illinois, Missouri, Arkansas, Louisiana, and Texas."
- There's a little debate about where the northernmost native stand of baldcypresses resides. Delaware's Trap Pond State Park claims that title for trees growing in its freshwater wetlands, but so does the Nature Conservancy's Battle Creek Cypress Swamp Sanctuary in Calvert County, Maryland. Road trip, anyone?

Baldcypress Trivia Continued…

- In Italian, baldcypress is cipresso delle paludi ("cypress of the wetland"). In Spanish, baldcypress is ciprés de los pantanos ("cypress of the bog"). In French, baldcypress is cyprès chauve ("cypress that is bald").
- Some ethnobotany sites list baldcypress cone-resin as an analgesic for wounds.
- Baldcypress is one of the few conifers that responds well to coppicing (hacking back hard in the spring), if one would, for some odd reason, want to do that.
- Cypress "knees" are known more technically as pneumatophores (Latin for "breathing stuctures"). They are hypothesized to assist the tree in obtaining oxygen during flooded conditions.
- Baldcypress and dawn redwood are in the same taxonomic family, recognized as Cupressaceae by some, but having been changed to Taxodiaceae by the Arnold Arboretum and others. (See "The Names They Are A-Changin'," *City Trees*, March/April 2005).
- Baldcypress is the state tree of Louisiana.
- Baldcypress lovers must see the movie "Ullee's Gold," set in the cypress and tupelo swamps of Florida.
- Baldcypress are conifers, yet shed their needles in the fall. In this regard they are deciduous conifers with the added peculiarity of dropping needle-bearing twigs in fall. This gives the winter cypress a 'bald' appearance. Both needles and twigs are regenerated in the spring.

BOTTOM: Baldcypresses grow naturally in groves, and many urban foresters imitate nature when planting them.

BELOW: Baldcypress leaves are arranged in an alternate, spiraling fashion.





Baldcypress Testimonials

I'm thrilled to see *Taxodium distichum* receive the well-deserved respect and notoriety it will earn as SMA's Tree of the Year. As I've traveled North America (always looking at trees regardless of the purpose of my trip), I've been amazed at the range of this "southern" tree. Baldcypress performs admirably in hot or cold and wet or dry regions, and makes it look easy, thanks to its sturdy structure and rapid growth. I love the fine texture and unusual fall color, and it tolerates tight spaces above or below ground without causing significant infrastructure damage. Finally, when it sheds its needles each autumn, it gives me a chance to educate easily entertained friends and residents about the semantics of trees... evergreen vs. deciduous, conifer vs. pine, etc. That's scintillating party talk! I like baldcypress so much, it's the tree I chose to plant outside my own office window. And don't overlook the cousin to baldcypress, pond cypress (*Taxodium ascendens*). It's a wonderful tree too.

Steve Cothrel
Superintendent of Parks and Forestry
City of Upper Arlington, Ohio

I like baldcypress because you can dress it up or dress it down as needed for each planting situation. What I mean is you can let the lower branches remain on the tree in plantings that are out in open spaces, or you can skirt the branches up for street tree use. As an example, we had to remove a hazardous tree next to a large pond in one of the towns parks. We replaced it with a 20-foot-tall (6-m) baldcypress that was tree-spaded from Maryland. It's fully branched to the ground and looks great next to the water. By contrast, we had a developer plant several baldcypresses as street trees that have been limbed up. I'm looking forward to seeing these mature. We will also be installing baldcypresses in a median as part of a new road construction project.

Jay Banks
Urban Forester
Town of Leesburg, Virginia

A tree that is native to swampland yet survives and thrives on the high plains deserves some recognition in my book. Honestly, "tree of merit" is an understatement with baldcypress given its adaptability, unique structure, and rooting characteristics. What other tree can you group around a small-acreage pond yet also utilize in a windbreak or screening planting along a sandy upland site? I know, you might have a tendency to pick *Ailanthus* or Siberian elm, but baldcypress just might be a better choice.

It has been my experience that structurally, apart from the oaks, this tree has few comparisons given its strong branch attachments, lack of codominance, and very little, if any, decay issues. Spider mites and occasional bagworms are the only insects that come to mind. Iron chlorosis can be a problem, but that is more an issue of tree-to-site selection and not necessarily a limiting factor for the species.

Baldcypress works fine as a street tree or park planting, but the real opportunity is to plant this species in groups and groves–the "G&G" concept we need to use more of in urban and community forestry. Plant baldcypress in a group, water the first couple years, then walk away. No pruning, no insect or disease control, and typically no maintenance needs. What other species can you say that about? The biggest challenge with this species is leaf drop during drought and the phone calls it generates. More than one "dead" tree has been cut down in this situation, I am sure.

Eric Berg
Community Forestry Program Leader
Lincoln, Nebraska

Baldcypress is, without a doubt, one of the most versatile large trees we have added to our cityscape program. While it grows tall over the years and is a fairly fast grower, the wood isn't weak, so breakage and limb pickup is minimal. Planted in open fields and border areas, it provides a wonderful definition to any treeline, and as a specimen tree, it is beyond compare.

It has a grace and style all its own, being an elongated pyramid of bright green fern-like color each spring and mellowing into a solid green hue throughout the summer. Autumn sees it with its characteristic golden needles dropping gently to the turf, leaving nothing to clean up except a few cones, since the delicate texture of the needles disintegrates swiftly and mulches back into the soil easily. Its winter form is stunning as well, with reddish brown fibrous bark over a strong trunk that supports its graceful, horizontal branches.

We have added baldcypress to our city parks in both wet and dry field areas to provide more diversity and to reintroduce native species back into our ecosystems. Not only are they surviving in these settings, they are thriving! We look forward to adding baldcypress to our boulevard zones in the near future, to expand our environmental quality and soften the look of these regions of our fair city.

Kathy Keeney
City Arborist
City of Paducah, Kentucky



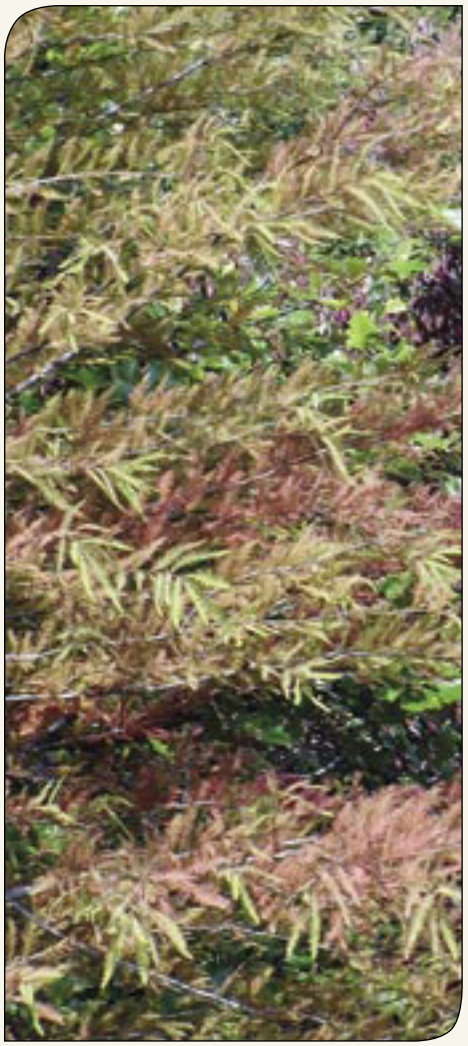
Up until about eight years ago, the use of baldcypress as a street tree in our program was limited to moist roadside areas, pond edges, or residential streets that have permanent lawn irrigation systems. It performed admirably for us under these conditions, but often floundered as a street tree.

However, road design modifications to median and roadside soils that alleviated soil compaction have allowed tree roots to penetrate into a horizon of moist soils. That has increased our ability to use baldcypress in raised, un-irrigated roadway medians. Under these conditions, the tree grows rapidly once established, averaging four to six feet (1.8 m) of growth annually. One-and-a-half inch (3.8-cm) caliper baldcypresses planted in 2001 are now nearly ten inches (25 cm) in diameter.

This species requires relatively small inputs of maintenance compared to other canopy trees in our inventory. Initially there were public reservations about the use of the tree–due, primarily, to its deciduous nature (folks here like leaves on the trees in the winter). However, its annual display of color in the fall lasts well into January, and buds usually break by the first week of March.

Baldcypress provides four seasons of interest, excellent wind resistance, wildlife habitat and food, and is relatively litter- and pest-free. It has, thus far, shown to be fairly benign to hardscape infrastructure compared to other species in similar growing conditions. Given the aforementioned soil remediation, a row of baldcypresses planted on 30-foot (9-m) centers compares favorably to the overused canopy species in our area. That may lead to less reliance on these species in the future by the community.

David Godson
Forester, Sarasota County, Florida Forestry Program





TOP: The fall color of the straight species of baldcypress is a russet-orange-gold.

ABOVE: A bonsai baldcypress grove at the North Carolina Arboretum

My love affair with baldcypress began over 25 years ago in Dover, Ohio. As an urban forester with the Ohio Department of Natural Resources (ODNR), it was my job to consult with municipalities about urban forestry programs. Since I lived in Dover, I served as the voluntary chairman of the Dover Shade Tree Commission. This provided me with a place to experiment and provide examples for other cities to learn from.

At that time, the ODNR would sell seedlings to municipalities. These young trees were ideal for establishing a small nursery. I convinced the local cemetery director to let me have a portion of the city cemetery to set up a nursery. As soon as I could, I promptly filled it with baldcypress.

My interest in baldcypress started when I heard Bob Skiera talk about using them in Milwaukee. After having my awareness raised, I began noticing them all over northeast Ohio. It was not uncommon to see them in front yards, on school grounds, and in municipal cemeteries.

Their success in Wisconsin meant that baldcypress were emphatically cold hardy, but for other reasons, they seem to be the perfect large-maturing urban tree. A central stem with perpendicularly attached branches make for inherent storm resistance and a formal pyramidal shape. They are fast growing and easily pruned. Textbooks describe their natural ability to withstand hurricane-force winds. Their compound leaves are a vibrant green and lend a unique feathery appearance to the tree. While fall color is not a big selling point, I describe it as copper russet.

Just two years after I established my Dover nursery, it was time to use the baldcypresses before they got too large. Being an energetic young fellow, I would spend Saturdays digging the young trees out of the nursery's heavy clay soil. While I tried to keep soil on the roots, they almost always ended up as bare root transplants. After severing a prominent taproot, there wasn't much of a root system left, but amazingly, I don't recall losing one tree that I transplanted.

These young trees were moved to Dover's residential tree lawns, parks, and other city properties. The most noticeable plantings grace East Third Street, one of Dover's older residential thoroughfares. I even managed to get groupings of them planted at the entryway to the city where Interstate 77 and State Route 39

intersect. Today these early plantings are spectacular specimens that lend a unique aesthetic quality to the immediate surroundings.

In the mid-1980s I left the ODNR to become the city forester in Cleveland, Ohio. Working with a modest budget for tree planting, I was able to plant baldcypresses as I saw fit. These were typically B&B trees that were purchased from nearby commercial nurseries, and they were no larger than two-inch (5-cm) caliper.

Like many large cities, Cleveland had many streets that were totally devoid of trees. Those with sufficient space were ideally suited for baldcypress plantings. The earliest plantings were done in 1987 along West 187th Street. Today these trees are among the best examples of a street lined with baldcypress.

When I arrived in Minneapolis as the director of forestry for the Minneapolis Park & Recreation Board, I learned that the palette of trees to choose from was quite limited compared to the choices in Ohio. I assumed baldcypress would not survive this far north; to my surprise, I was wrong. Observing the few established baldcypress trees in Minneapolis prompted us to do several test plantings on park properties. The results of trees planted over five years ago are good. However, the real test will be a typical Minnesota winter where the temperature stays well below zero for weeks at a time. Thus far, this has not happened.

When Dutch Elm Disease hit Minneapolis over 30 years ago, over 90% of all street trees were American Elms. A popular replacement tree was the ash, so much so, that there are about 40,000 ash street trees in Minneapolis. Now, as Emerald Ash Borer threatens us, we are constantly looking for new trees to incorporate into our urban forest. Baldcypress may prove to be one of those new trees. However, for many cities, it has already been tested and approved. If you are in a hardiness zone where baldcypress does well, do not hesitate to use it. I can assure you that you won't be disappointed.

Ralph Sievert
Director of Forestry
Minneapolis Park and Recreation Board





TOP: The ability to withstand periodic standing water is a major asset of baldcypress. Photo: Steve Cothrel

ABOVE: A massive baldcypress trunk, creekside at the University of North Carolina Botanic Gardens in Asheville.

Baldcypress is a species with much to recommend it as SMA's Tree of the Year. Some of the oldest parks in the Vancouver area have truly superb specimens that have developed their knees. Some might consider the odd appearance of the knees a nuisance, but this is easily dealt with through raising mower heights or through fencing of garden areas that contain the older specimens. While this species will survive in poor, compacted soils, and develops the best knees in thinner soil near water, it really performs well in our area in deep fertile soils associated with many of our park gardens.

Baldcypress is often compared to *Metasequoia*; however, I recommend *Taxodium* as a focal point or single specimen in park gardens primarily because it's shorter and more quickly develops a pleasing, rounded crown with soft, feathery foliage. In winter, and especially where they emerge from water, baldcypress trees create a singularly attractive scene.

Douglas Justice,
Associate Director and Curator of Collections
University of British Columbia
Botanical Garden & Centre for Plant Research

For arborists in the humid Deep South, *Taxodium distichum* is a beloved tree that transcends its native swampy ecosystem and thrives in tightly kept urban centers. It has proven to be a strong urban tree that stands tall and proud in the face of drought and flooding, pollution, heat, and humidity. Baldcypress can be seen planted in the small city squares of sleepy southern towns, but I have been especially impressed with its use in Tallahassee, Florida, where the tree is planted in copious numbers. In Tallahassee, baldcypress drips with Spanish moss in shopping mall parking lots, and it has the magic to make strip malls seem like cozy places to take breakfast.

Far out of range of its native habitat, it greets the southerner astray on the streets of Philadelphia. Oh, the delight of seeing the beloved baldcypress planted streetside where it is surrounded by and competing with towering buildings. Here, baldcypress grows without the exotic trappings of Spanish moss, and here the tree surprises by thriving in polluted, cold urban canyons.

Hillary Barber,
Bold Spring Nursery, Monroe, GA

SOIL TEST RESULTS

Davey Resource Group utilized the following procedures for collecting and analyzing soil samples collected from the Jefferson National Expansion Memorial (JNEM) site in St. Louis, Missouri on November 10, 2009.

The purpose of the sampling was to provide background soils information for future recommendations that may be included in reports prepared by Davey, Care of Trees, and AECOM. A thorough vegetation analysis of a site should include background soils information.

Staff on-site to collect soil samples: Skip Kincaid, Senior Consulting Urban Forester
Davey Resource Group
ISA Board Certified Master Arborist (MW-0155BM)

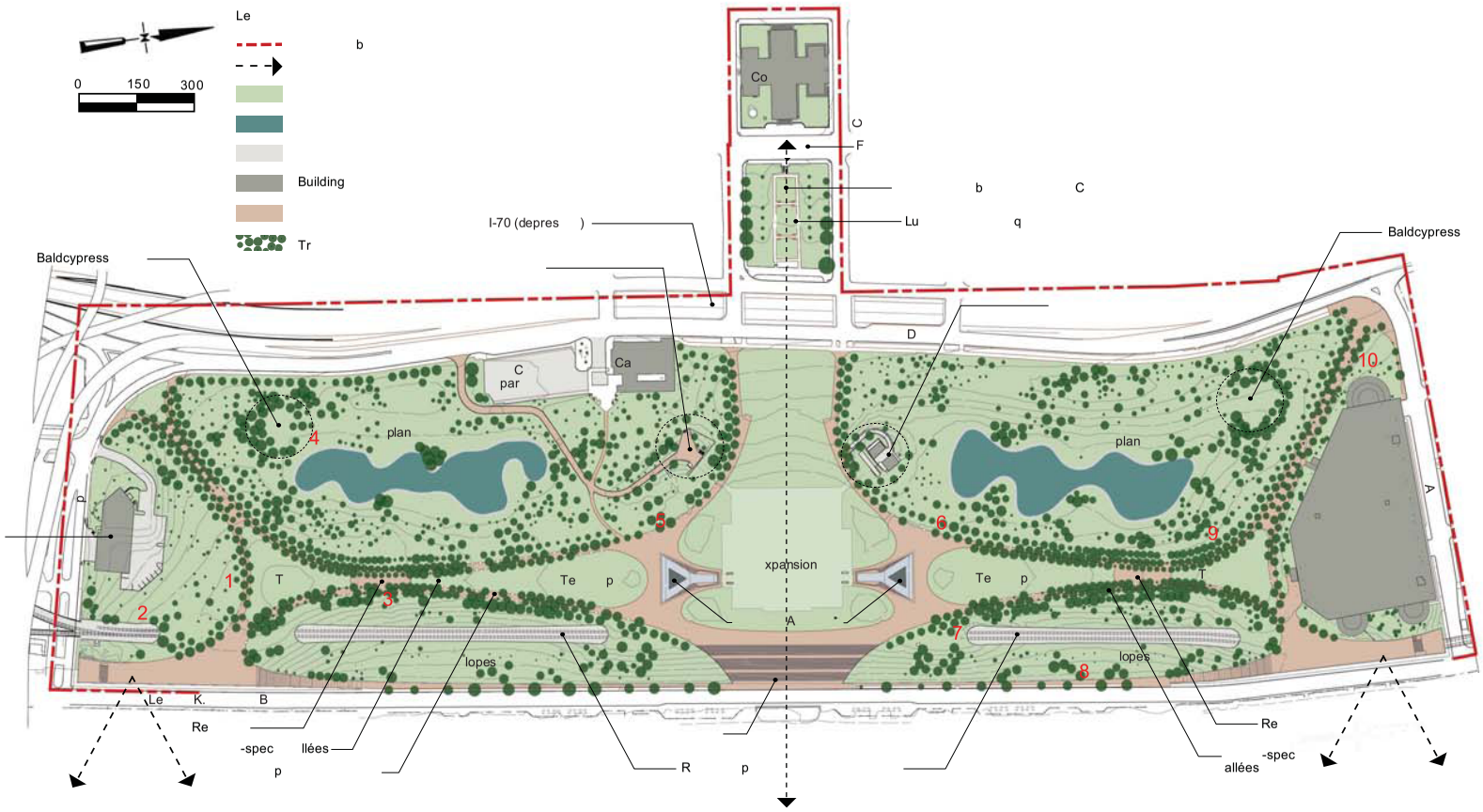
Diane Sparks, Conservation Planner,
The Care of Trees
ISA Certified Arborist (MA-4966A)

Soil sampling procedures

- A "t-bar" type soil probe was used (hole diameter = 1"; sample depth = 10" max)
- Approximately ten samples were taken at each site and a total of ten sites were tested. Total probes in to soil = 100.
- Sampled sites were located so they are not readily visible to park visitors and selected with input and permission from JNEM staff. The intent was to sample enough areas to account for variances in use, vegetation styles, and topography.
- JNEM staff were present during sampling.
- Samples were submitted to the Logan Labs for analysis.

Soil test procedures

- Soil pH_s (1:1 solution:soil suspension). Solution is 0.01M $CaCl_2$
- Organic matter percentage by loss on ignition
- Extractable phosphorus (Bray-1 P)
- Exchangeable potassium (ammonium acetate extraction)
- Exchangeable calcium (ammonium acetate extraction)
- Exchangeable magnesium (ammonium acetate extraction)
- Cation exchange capacity (estimated from exchangeable potassium, calcium, magnesium and neutralizable acidity)
- Extractable zinc (DPTA extraction)
- Extractable sulfur (calcium phosphate in acetic acid extraction)
- Extractable iron, manganese and copper (DPTA extraction)
- Exchangeable sodium (ammonium acetate extraction)
- Hot water extractable boron (0.1 percent $CaCl_2$. H_20)
- Nitrate-nitrogen and ammonium-nitrogen (2 M KCl extraction)
- Soluble salts (electrical conductivity in a 1:1 soil:water saturation extraction)



JEFFERSON N TION L EXP NSION MEMORI L: X T CO D T PLA H CO TR BUT LA DSCA F ATUR 2009

Soil Report

Job Name **National Park Service Arch** Date 11/24/2009

Company Davey Resource Group Submitted By

			Upper	Lower	Upper	Lower	
Sample Location							
Sample ID			1	1	2	2	
Lab Number			131	132	133	134	
Sample Depth in inches			5	7	5	7	
Total Exchange Capacity (M. E.)			16.89	16.13	18.38	25.44	
pH of Soil Sample			7.40	7.60	7.40	7.80	
Organic Matter, Percent			3.71	1.33	4.10	1.59	
ANIONS	**SULFUR:**	p.p.m.	93	212	31	41	
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	184	150	94	86	
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	3828	5117	4165	8074	
		Value Found	4386	5548	4769	10110	
		Deficit					
	MAGNESIUM: lbs / acre	Desired Value	405	541	441	854	
		Value Found	509	879	561	682	
		Deficit				-172	
	POTASSIUM: lbs / acre	Desired Value	439	586	477	926	
		Value Found	209	202	286	298	
		Deficit	-230	-384	-191	-628	
	SODIUM:	lbs / acre	73	143	35	55	
BASE SATURATION %	Calcium (60 to 70%)		77.91	73.72	77.86	85.14	
	Magnesium (10 to 20%)		15.07	19.47	15.26	9.57	
	Potassium (2 to 5%)		1.90	1.38	2.39	1.29	
	Sodium (.5 to 3%)		1.13	1.65	0.49	0.40	
	Other Bases (Variable)		4.00	3.80	4.00	3.60	
	Exchangable Hydrogen (10 to 15%)		0.00	0.00	0.00	0.00	
TRACE ELEMENTS	Boron (p.p.m.)		0.83	0.5	0.67	0.35	
	Iron (p.p.m.)		268	160	134	98	
	Manganese (p.p.m.)		110	131	99	77	
	Copper (p.p.m.)		5.41	2.28	3.86	4.74	
	Zinc (p.p.m.)		19.02	5.19	23.99	23.66	
	Aluminum (p.p.m.)		251	340	142	50	
OTHER							

Logan Labs, LLC

Soil Report

Job Name **National Park Service Arch** Date 11/24/2009

Company Davey Resource Group Submitted By

Sample Location			Upper	Lower	Upper	Lower	
Sample ID			3	3	4	4	
Lab Number			135	136	137	138	
Sample Depth in inches			5	7	5	7	
Total Exchange Capacity (M. E.)			14.32	15.42	11.44	8.83	
pH of Soil Sample			7.20	7.60	7.20	7.40	
Organic Matter, Percent			3.25	2.84	4.80	1.92	
ANIONS	**SULFUR:**	p.p.m.	17	17	29	65	
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	355	700	127	130	
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	3246	4893	2593	2802	
		Value Found	3673	5451	2770	2874	
		Deficit					
	MAGNESIUM: lbs / acre	Desired Value	343	518	274	296	
		Value Found	439	741	454	549	
		Deficit					
	POTASSIUM: lbs / acre	Desired Value	372	561	297	321	
		Value Found	284	391	168	123	
		Deficit	-88	-170	-129	-198	
	SODIUM:	lbs / acre	26	42	48	121	
BASE SATURATION %	Calcium (60 to 70%)		76.93	75.75	72.62	69.73	
	Magnesium (10 to 20%)		15.33	17.16	19.84	22.20	
	Potassium (2 to 5%)		3.05	2.79	2.26	1.53	
	Sodium (.5 to 3%)		0.47	0.51	1.09	2.55	
	Other Bases (Variable)		4.20	3.80	4.20	4.00	
	Exchangable Hydrogen (10 to 15%)		0.00	0.00	0.00	0.00	
TRACE ELEMENTS	Boron (p.p.m.)		0.71	0.63	0.77	0.61	
	Iron (p.p.m.)		251	345	210	241	
	Manganese (p.p.m.)		51	62	35	108	
	Copper (p.p.m.)		8.92	17.66	6.21	2.9	
	Zinc (p.p.m.)		55.56	47.74	30.16	8.95	
	Aluminum (p.p.m.)		202	340	347	383	
OTHER							

Logan Labs, LLC

Soil Report

Job Name **National Park Service Arch** Date 11/24/2009

Company Davey Resource Group Submitted By

Sample Location			Upper	Lower	Upper	Lower	
Sample ID			5	5	6	6	
Lab Number			139	140	141	142	
Sample Depth in inches			5	7	5	7	
Total Exchange Capacity (M. E.)			13.69	16.46	14.96	15.49	
pH of Soil Sample			7.10	7.70	7.20	7.40	
Organic Matter, Percent			4.27	2.43	5.27	3.35	
ANIONS	**SULFUR:**	p.p.m.	29	23	22	32	
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	142	259	265	270	
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	3102	5223	3390	4914	
		Value Found	3231	6046	3707	5583	
		Deficit					
	MAGNESIUM: lbs / acre	Desired Value	328	553	358	520	
		Value Found	573	686	511	656	
		Deficit					
	POTASSIUM: lbs / acre	Desired Value	355	599	388	563	
		Value Found	283	312	366	415	
		Deficit	-72	-287	-22	-148	
	SODIUM:	lbs / acre	40	54	34	56	
BASE SATURATION %	Calcium (60 to 70%)		70.82	78.71	74.35	77.25	
	Magnesium (10 to 20%)		20.93	14.89	17.08	15.13	
	Potassium (2 to 5%)		3.18	2.08	3.76	2.94	
	Sodium (.5 to 3%)		0.77	0.61	0.60	0.68	
	Other Bases (Variable)		4.30	3.70	4.20	4.00	
	Exchangable Hydrogen (10 to 15%)		0.00	0.00	0.00	0.00	
TRACE ELEMENTS	Boron (p.p.m.)		0.69	0.67	0.61	0.7	
	Iron (p.p.m.)		205	225	227	206	
	Manganese (p.p.m.)		66	79	51	79	
	Copper (p.p.m.)		8.57	11.29	6.84	5.29	
	Zinc (p.p.m.)		36.3	27.37	40.44	22.17	
	Aluminum (p.p.m.)		313	211	307	356	
OTHER							

Logan Labs, LLC

Soil Report

Job Name **National Park Service Arch** Date 11/24/2009

Company Davey Resource Group Submitted By

Sample Location			Upper	Lower	Upper	Lower	
Sample ID			7	7	8	8	
Lab Number			143	144	145	146	
Sample Depth in inches			5	7	5	7	
Total Exchange Capacity (M. E.)			13.31	15.01	13.81	10.03	
pH of Soil Sample			7.50	7.80	6.80	7.20	
Organic Matter, Percent			4.70	2.46	4.72	2.39	
ANIONS	**SULFUR:**	p.p.m.	18	67	20	16	
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	214	197	179	124	
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	3015	4762	3130	3182	
		Value Found	3371	5527	3390	3518	
		Deficit					
	MAGNESIUM: lbs / acre	Desired Value	319	504	331	336	
		Value Found	442	605	411	471	
		Deficit					
	POTASSIUM: lbs / acre	Desired Value	345	546	359	365	
		Value Found	240	278	300	273	
		Deficit	-105	-268	-59	-92	
	SODIUM:	lbs / acre	36	84	29	47	
BASE SATURATION %	Calcium (60 to 70%)		76.01	78.92	73.64	75.17	
	Magnesium (10 to 20%)		16.61	14.40	14.88	16.77	
	Potassium (2 to 5%)		2.78	2.04	3.34	2.99	
	Sodium (.5 to 3%)		0.71	1.05	0.56	0.87	
	Other Bases (Variable)		3.90	3.60	4.60	4.20	
	Exchangable Hydrogen (10 to 15%)		0.00	0.00	3.00	0.00	
TRACE ELEMENTS	Boron (p.p.m.)		0.78	0.67	0.77	0.51	
	Iron (p.p.m.)		308	326	237	170	
	Manganese (p.p.m.)		53	68	52	80	
	Copper (p.p.m.)		6.11	6.77	3.84	2.76	
	Zinc (p.p.m.)		36.59	23.39	26.66	9.66	
	Aluminum (p.p.m.)		201	182	235	284	
OTHER							

Logan Labs, LLC

Soil Report

Job Name **National Park Service Arch** Date 11/24/2009

Company Davey Resource Group Submitted By

Sample Location			Upper	Lower	Upper	Lower	
Sample ID			9	9	10	10	
Lab Number			147	148	149	150	
Sample Depth in inches			5	7	5	7	
Total Exchange Capacity (M. E.)			15.02	14.02	13.66	12.73	
pH of Soil Sample			5.30	6.90	7.20	7.60	
Organic Matter, Percent			3.27	1.81	3.24	1.86	
ANIONS	**SULFUR:**	p.p.m.	69	102	58	69	
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	305	187	158	222	
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	3403	4450	3096	4038	
		Value Found	2270	4942	3318	4282	
		Deficit	-1133				
	MAGNESIUM: lbs / acre	Desired Value	360	471	327	427	
		Value Found	239	566	518	723	
		Deficit	-121				
	POTASSIUM: lbs / acre	Desired Value	390	510	355	463	
		Value Found	324	410	247	217	
		Deficit	-66	-100	-108	-246	
	SODIUM:	lbs / acre	33	64	62	131	
BASE SATURATION %	Calcium (60 to 70%)		45.35	75.52	72.86	72.10	
	Magnesium (10 to 20%)		7.96	14.41	18.96	20.29	
	Potassium (2 to 5%)		3.32	3.21	2.78	1.87	
	Sodium (.5 to 3%)		0.56	0.85	1.19	1.92	
	Other Bases (Variable)		6.80	4.50	4.20	3.80	
	Exchangable Hydrogen (10 to 15%)		36.00	1.50	0.00	0.00	
TRACE ELEMENTS	Boron (p.p.m.)		0.45	0.52	0.73	0.55	
	Iron (p.p.m.)		209	183	209	197	
	Manganese (p.p.m.)		79	124	93	130	
	Copper (p.p.m.)		3.17	3.03	3.51	2.5	
	Zinc (p.p.m.)		21.15	10.61	13.74	5.32	
	Aluminum (p.p.m.)		555	442	385	419	
OTHER							

Logan Labs, LLC

"COMPARISON OF ABILITY TO MODIFY SITE CONDITIONS BEFORE AND AFTER PLANTING" IN *ARBORICULTURE, INTEGRATED MANAGEMENT OF LANDSCAPE TREES, SHRUBS, AND VINES* (2004)

TABLE 7-1

Comparison of ability to modify site conditions before and after planting

	Ability to Modify	
Site Characteristics	*Preplant*	*Postplant*
Soil texture		
Increase coarseness	Low	Low
Increase fineness	Low	Low
Replace	Good	Moderate to low
Increase organic content	Good[a]	Low
Soil structure		
Reduce compaction	Moderate[a]	Low
Increase aeration	Moderate[a]	Low
Soil moisture		
Increase water-holding capacity	Moderate[a]	Low
Increase water percolation	Good to moderate	Moderate to low
Increase surface drainage	Good	Good to low
Increase internal drainage	Good to low	Moderate to low
Lower water table	Good to low	Good to low
Soil chemical characteristics		
Raise pH	Good	Moderate
Lower pH in alkali soil	Good to moderate	Moderate to low
Lower pH in calcareous soil	Low	Low
Lower salinity	Good to moderate	Good to moderate
Lower boron	Moderate	Moderate
Reduce herbicide residue	Good to low	Moderate to low
Reduce heavy metals	Low	Low

[a]Effects are usually short term.

"Comparison of treatments tested for improving soil structure and tree growth in compacted soil" in *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*

TABLE 7-4

Comparison of treatments tested for improving soil structure and tree growth in compacted soil

Method	*Treatment*	*Results*	*Citation*
Organic mulch	• Hardwood and softwood chips applied 10 cm (4 in.) deep in 3-m-(10-ft.)-wide pattern around recently planted trees in compacted soil	Trunk diameter after 2 years improved over controls in Callery pear; improved visual appearance	Smiley, 1997
	• 8 cm (3 in.) of fresh wood chips was maintained within the dripline of chlorotic white oaks (*Quercus alba*) growing in turf; ammonium sulfate at 141 g/m^2 (29 lbs/1000 ft^2) was applied to chips each spring for 4 years; control trees were not mulched and the established turf was left undisturbed	Soil bulk density, pH of soil under the mulch were significantly lower than the control; ectomycorrhizae density (mm infected root/cc soil) was significantly greater; foliar color was significantly greener in mulched than in control trees	Himelick and Watson, 1990
Excavate vertical holes and/or vertical mulching	• 5-cm-(2-in.)-diameter holes, 45 cm (18 in.) deep, 60 cm (2 ft) on center throughout root area created by auger and high pressure water jet, with and without backfilling holes, with 1:1 sand:milled fir bark. A fourth treatment was two holes, 10 cm (4 in.) in diameter by 24 cm (18 in.) deep, 1.5 m (4.5 ft) from trunk, lined with perforated pipe and backfilled with gravel. Soil was compacted sandy loam. Trees were established wingnuts *(Pterocarya stenoptera)* that appeared slightly stressed.	Two years after treatment, no significant differences in tree growth (trunk diameter, height, annual shoot growth) among treatments	Pittenger and Stamen, 1990
	• 5-cm-(2-in.)-diameter vertical mulch channels were drilled 45 cm (18 in.) deep, 16 per tree, around 5 sugar maples *(Acer saccarum);* channels backfilled with perlite; soils were calcareous silt loam to silty clay loam	After 3 growing seasons, there was significantly less root mass in vertical mulch channels than in undisturbed soil; no effect on tree growth or water status	Kalisz, Stringer, and Wells, 1994
	• Vertical mulching with peat moss and fertilizer around recently planted *Pyrus Aristocrat*	Resulted in slightly greater but not statistically significant trunk diameter than controls	Smiley, 1997
	• Vertical mulching with sandy loam backfill around Callery pear *(Pyrus calleryana)*	Used sandy loam backfill; improved root and shoot growth of trees over control	Day, Bassuk, and Vanes, 1995
	• Used a lawn core aerator to remove soil plugs to a depth of 8 cm (5.5 in) in compacted clay and clay loam soils at 3 sites and in 4 tree species	No significant increase in tree growth within 3 years of treatment	Smiley, 1994
	• Injected water through a fertilizer injection needle to create holes to 20 cm (8 in.) depth at 3 sites, in 4 tree species, in compacted clay and clay loam soils	No significant increase in tree growth within 3 years of treatment	Smiley, 1994
Soil removal and replacement	• Planted callery pear *(Pyrus calleryana* 'Redspire') in compacted clay loam with radial trenches containing sandy loam soil	After 2 years, significantly greater shoot growth with trench treatment than controls	Day, 1993 in Day & Bassuk, 1994

	• Used high-pressure water jets to remove soil in pits and holes around mature, declining linden *(Tilia tomentoa* and *T. platyphylos)* and London plane *(Platanus* × *acerifolia)* trees; replaced soil with mix of coarse sand, composted organics, and fertilizer	Tree growth increased after treatment, although not to a statistically significant level	Watson, Kelsey, and Woodtli 1996
	• Dug 10-cm-(4-in.)-wide trenches 30 cm (12 in.) deep, 2 m (6 ft) long from the edge of the root ball, 6 per tree, planted 2 years previously in compacted sandy loam soil; mulched with composted yard waste	Increased growth the year following treatment	Smiley, 1997
Fracturing soil with compressed air	• Terralift probe driven into compacted sandy loam and clay loam soils on 1-m (3-ft) grid spacing and compressed air discharged at 0.45- and 0.75-m (1.4- and 2.3-ft) depths; five tree species planted in treated areas	In sandy loam, bulk density decreased; in loam soil bulk density increased; no differences in plant growth between treatment and controls	Rolf, 1994
	• Injected various materials into fractures created by Terralift or Grow Gum around 4 tree species growing poorly in compacted clay loam or clay soils	No consistent or statistically significant increase in tree diameter growth. Oxygen diffusion rate was higher only at the fracture created by equipment. No significant decreases in soil bulk density.	Smiley and others 1990, Smiley, 1994
	• Used a Robin Dagger to inject 2 blasts of compressed air in compacted sandy loam soil at the dripline of semimature birch (*Betula* sp.)	The 3 summers after treatment shoot extension significantly increased	Hodge, 1993
	• Used a Terralift to inject expanded polystyrene balls or seaweed soil conditioner in an average of 10 blasts within dripline of declining, mature, sweet chestnuts *(Castanea sativa)* on compacted clay loam soil	Two years after treatment, no significant differences in soil dry bulk density; foliage of treated trees was more yellow than controls	Hodge, 1993
	Used a Terravent™ at 3 sites having fine sandy loam, sandy clay, and sandy clay loam soils	No significant differences in soil bulk density 15 and 70 cm (6 and 28 in.) from the injection sites between treated and untreated controls	Smiley, 2001
Soil disruption	• Excavated, mixed, and replaced compacted sandy loam subsoils to 1-m (3-ft) depth	Three years after disturbance, soil at 85 to 95 cm (33 to 37 in.) and 24 to 35 cm (10 to 15 in.) had greater air porosity and less soil strength than before treatment	Webster, 1980
	• Excavator (backhoe) used to lift and shake compacted sandy loam and clay loam soils; five tree species planted in treated areas	Significantly reduced soil bulk density; pore volume increased up to 42%; plant growth was significantly greater in sandy loam soil; suitable only prior to planting	Rolf, 1994
	• Rototilled around root ball of trees planted 2 years prior in compacted sandy loam soil, applied mulch and rototilled, then repeated mulch and rototilling	Improved tree growth and plant appearance	Smiley, 1997

COMPARISON OF TREE INVENTORY SOFTWARE

UF UNIVERSITY of FLORIDA
IFAS Extension

FOR226

Comparison of Urban Forest Inventory & Management Software Systems[1]

Michael G. Andreu, Erin M. Brown, Melissa H. Friedman, Robert J. Northrop, and Mary E. Thornhill[2]

Background

In 1997, Olig and Miller published *A Guide to Street Tree Inventory Software*, providing a comparison of software providers, customization options, and data-entry time estimates for each software. After twelve years much of the information is outdated due to the rapid development of new technology and software upgrades. In 2006, the University of Florida held an Urban Forest Inventory Systems Symposium. This meeting brought together a suite of urban forest professionals to share their considerations when selecting tree inventory software systems and how these systems facilitated their management efforts (Andreu et al 2007). During this symposium it became apparent that an updated resource for selecting a tree inventory software system was needed. Coincidentally, in 2007, the US Forest Service published *Tree Inventory and Management Software* (USFS 2007), which provided a brief one-paragraph description of each of the software systems available at the time.

Introduction

This extension publication examines many of the tree inventory software systems available as of 2009. It provides up-to-date information about previously existing tree inventory software systems as well as those recently launched. However, the list of software systems provided here is not comprehensive, as we only included companies that we were able to successfully interview. The information provided in this publication has been reviewed and approved by each inventory system software provider. As a result, this synthesis pulls together more details of tree inventory software systems than previously available in one document.

Ideally the software system will *support* and not *dictate* a user's management objectives and activities.

When selecting a tree inventory software system, it is important to assess the user's needs and objectives so that the proper system can be chosen. Ideally the software system will *support* and not *dictate* a user's management objectives and activities. Below are some factors to consider when selecting a tree inventory software system:

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- What types of questions is the inventory going to answer?
- Who is responsible for managing the urban forest inventory system?
- Are the software and data export files compatible with other software systems that are commonly used?
- How much training time is required and how much does it cost?
- What kind of upgrades and technical support does the software company offer?

For the purposes of comparing the features and capabilities of various tree inventory software systems, we have provided information in four tables. These tables are designed to allow managers to quickly assess which software systems offer the features they desire. Brief summaries, or 'mini spec sheets,' for each inventory system follow to provide additional information, such as typical clients/user types, upcoming upgrades, software costs, technical support, and contact information.

Guide to Tree Inventory Software Comparison Tables

Table 1 provides a comparison of the features and capabilities of each software system. The ***Customizable Data Fields*** and ***Customizable Reports*** features indicate which system allows users to tailor the software system design and data format to meet their data collection or analysis needs. The ***Work Order Generation*** and ***Track Maintenance*** features allow managers to document and manage tree maintenance and field crew schedules. Some systems include a geographic information system or ***GIS Component***, which allows users to view their tree data and create maps. The ***Tree Valuation*** field indicates which systems have a tree valuation component. The ***Photographs, Sketches or Diagrams*** field indicates the ability to attach image files to a tree record in the inventory. The ***Inventory Other Assets*** field indicates which systems can manage other assets beyond trees (e.g. street signs, park benches, utilities). The ***Sync with Field Devices*** field indicates which systems allow users to synchronize their field data collection devices (e.g. personal digital assistant) with their personal computers for data transfer. The ***Web-based Software*** field indicates which software operates via the Internet. And lastly, the ***Network Installation*** field simply indicates that the software can be installed on a network for multiple users.

Table 2 provides a comparison of the various self explanatory data fields that can be customized: ***species list, maintenance recommendations, work areas/neighborhoods,*** and ***appearance.***

Table 3 designates the types of Geographic Information Systems (GIS) components that are utilized by each software system: ***ESRI-Compatible, ESRI GIS System, Non-ESRI Mapping or GIS System***. Additionally, it provides information about which software systems allow tree attribute data to be modified (***Modify Tree Data in GIS Mode***), and which systems allow users to alter the spatial coordinates of trees while in the GIS mode (***Manually Edit Trees in GIS Mode***).

Table 4 illustrates the operating system requirements for each software system: ***Windows 98, Windows 2000, Windows XP, Windows Vista, Mac OS X,*** and ***Linux***. The ***Internet-based*** column indicates which software systems are only accessible via Web browser. This means that the software system cannot be installed on a local hard drive or intranet, and therefore requires an Internet connection.

Table 1. Comparison of software capabilities and features.

Software & Features	Customizable Data Fields [1]	Work Order Generation	Track Maintenance	Customizable Reports	GIS Component [2]	Tree Valuation	Inventory other Assets	Photographs, Sketches or Diagrams	Sync with Field Devices	Web-based Software	Network Installation	COSTS
ArborAccess	●	●	●	●	●	●	●	●		●		**See Spec Sheet**
ArborPro	●	●	●	●	●	●	●	●	●		●	**$5,000 +** [†]
ArborSoftWorx *C**		●	●	●	●	●	●	●	●		●	**$1,000 +**[†]
ArborSoftWorx *M**		●	●	●	●	●	●	●	●		●	**$1,500 +**[†]
ArborVue	●	●	●	●	●	●		●	●		●	**$2,995 +**[†]
Asset Manager	●	●	●	●	●		●	●	●			**$3,300**
i-Tree (*Streets*)	●		●			●	●					**Free**
i-Tree (*Eco*)					●	●						**Free**
PDM-O* **	●	●	●		●	●	●	●	●	●		**$1,000-3,000/year**
Silvibase 5.1	●	●	●	●		●		●	●			**$2,000-3,000**
Tree Keeper 7.6	●	●	●	●	●	●	●	●	●	●	●	**See Spec Sheet**
Trees in the Hood	●	●	●	●	●	●	●	●	●		●	**Free +**[†]
TreeWorks	●	●	●	●	●	●	●		●		●	**See Spec Sheet**
Trims	●	●	●	●					●		●	**$1,495 +**[†]
UFIS **	●	●	●	●	●	●	●		●			**$6,000**

*** ArborSoftWorx *Commercial***

**** ArborSoftWorx *Municipal***

***** Point DataMap-Online**

****** Urban Forest Inventory Systems**

[1] See Table 2 for a further comparison of customizable data fields.

[2] See Table 3 for further comparisons of GIS features.

[†]The + indicates that there is an annual support package or maintenance fee in addition to the base price.

Table 2. Comparison of data field customization.

Customizable Data Fields	ArborAccess	ArborPro	ArborVue	AssetManager	i-Tree (*Street*)	PDM-O *	Silvibase 5.1	TreeKeeper 7.6	Trees in the Hood	TreeWorks	Trims	UFIS **
Species List		●	●	●	●	●	●	●	●	●	●	●
Maintenance Recommendations	●	●	●	●	●	●	●	●	●	●	●	●
Work Areas/Neighborhoods	●	●	●	●	●	●	●	●	●	●	●	●
Appearance (skins)	●	●	●	●		●			●	●		●

*** Point DataMap-Online**

**** Urban Forest Inventory Systems**

Table 3. Comparison of GIS components.

GIS Components	ArborAccess	ArborPro	ArborSoftWorx *C* *	ArborSoftWorx *M* **	ArborVue	AssetManager	i-Tree (*Eco*)	PDM-O ***	TreeKeeper 7.6	Trees in the Hood	TreeWorks	UFIS ****
ESRI Compatible	●	●	●	●	●	●		●	●	●	●	●
ESRI GIS System					●	●			●		●	
Non-ESRI Mapping or GIS System	●	●	●	●			●	●				●
Modify Tree Data in GIS Mode		●			●	●		●	●	●	●	●
Manually Edit Trees in GIS Mode		●			●	●		●	●	●	●	●

*** ArborSoftWorx *Commercial***

**** ArborSoftWorx *Municipal***

***** Point DataMap-Online**

****** Urban Forest Inventory Systems**

Table 4. Comparison of Operating Systems (OS) Compatibility.

Software OS Requirements	Windows 98	Windows 2000	Windows XP	Windows Vista	Mac OS X	Linux	Internet-based
ArborAccess							●
ArborPro	●	●	●	●			
ArborSoftWorx *C**	●	●	●	●		●	
ArborSoftWorx *M***	●	●	●	●		●	
ArborVue			●	●			
Asset Manager	●	●	●	●			
i-Tree (*Street*)		●	●				
i-Tree (*Eco*)		●	●				
PDM-O***							●
Silvibase 5.1		●	●				
Tree Keeper 7.6							●
Trees in the Hood	●	●	●	●	●		
TreeWorks		●	●	●			
Trims		●	●	●			
UFIS ****	●	●	●				

*** ArborSoftWorx *Commercial***
**** ArborSoftWorx *Municipal***
***** Point DataMap-Online**
****** Urban Forest Inventory Systems**

The following pages include
Individual Tree Inventory Software Spec Sheets
For detailed technical specifications, visit vendor Web sites.

ArborAccess©

Introduction to Software
ArborAccess Online is an internet-driven software developed by tree care professionals at West Coast Arborists, Inc. (WCA). It is accessible only to WCA clients, who are primarily municipalities in California. ArborAccess can be customized to the needs of each WCA client. According to West Coast Arborists, it can store an unlimited number of tree records.

Services
- Tree Inventories
- Tracks Maintenance History
- GIS Mapping
- Budget Projections
- Basic Tree Appraisals

Additional Information
An upgraded version of ArborAccess is projected to be available by 2009. This version will be an ArcIMS compatible system. It will allow users to interact with and modify the inventory data through the database and/or the GIS maps via the Internet.

Operating System Requirements
Internet Connection and Web browser (*e.g.* Internet Explorer 5.5 or greater)—ArborAccess does not require additional hardware, memory, or software; as it is stored on WCA's server and functions remotely.

Software Costs
The cost of ArborAccess is included in municipal contracts. Contact WCA for further details.

Technical Support
WCA offers unlimited training and support to their clients. Periodic workshops are offered for larger groups or after software upgrades have occurred. WCA's Area Managers are also available to assist clients on an as-needed basis.

Contact Information
West Coast Arborists, Inc.
2200 East Via Burton Street
Anaheim, CA 92806
Phone: 1-800-521-3714
Fax: 1-714-956-3745
Email: info@wcainc.com
Web site: http://www.wcainc.com

ArborPro

Introduction to Software
ArborPro was developed and is distributed by ArborPro Management Software. ArborPro is a tree management software designed to manage trees, the landscape, and physical assets. It is used by municipalities, parks, campuses, and golf courses. ArborPro has been tested and is able to store over a million tree records.

Services
- Tree Inventories
- Tracks Maintenance History
- GIS Mapping
- Tree Hazard Assessments
- Crew Management Program
- Budgeting

Additional Information
ArborPro has a new measuring tool that allows clients to see the distance between two assets on the map. For example, planting distance between trees, distance from trees to park assets or buildings, and tree canopy spreads can be measured.

Operating System Requirements
Windows 98, Windows 2000, Windows XP, or Windows Vista

Software Costs
The base price for ArborPro is $5,000.

Technical Support
After the initial purchase of ArborPro, 2 eight-hour training sessions are available free of charge: (1) initial training session, (2) focused training session. ArborPro also offers an optional annual support package (includes upgrades) for $1,500.

Contact Information
ArborPro, Inc.
P.O. Box 4096
Newport Beach, CA 92661-4096
Phone: 1-877-844-DATA (3282)
Fax: 1-714-694-1981
Email: info@arborprousa.com
Web site: http://www.arborprousa.com

ArborSoftWorx® *Commercial*

Introduction to Software
ArborSoftWorx was developed and is distributed by Creative Automation Solutions, Inc. ArborSoftWorx *Commercial* is primarily a customer and business management software. It is designed for arbor, landscape, and plant health care companies.

Services
- Customer Relationship Management
- Business Management (accounting, invoicing, and receivables)
- Scheduling, Routing, and Mapping of Field Crews
- Chemical Tracking and Reporting
- Property Inventory
- Company Asset Management
- Personnel Management

Additional Information
ArborSoftWorx can support single office operations and/or multiple branch offices. Data and reports can be exported into all Microsoft, Corel, and Lotus Office suites. Creative Automation Solutions, Inc. also offers data conversions into i-Tree.

Operating System Requirements
Windows 98, Windows 2000, Windows XP, Windows Vista, or Linux

Software Costs
The base price for a single user is $1,000. Additional features are available; the price will vary depending on how many additional features the client requests. Contact a sales associate for network system prices.

Technical Support
On-site installation and training is available. An additional support package that includes upgrades is available to clients but the cost varies depending on the number of computers.

Contact Information
Creative Automation Solutions, Inc.
10500 Old Court Rd.
Woodstock, MD 21163
Phone: 1-800-49-ARBOR (2-7267) or 1-410-461-5858
Fax: 1-410-465-3593
Email: Sales@ArborSoftWorx.com
Web site: http://www.arborsoftworx.com

ArborSoftWorx® *Municipal*

Introduction to Software
ArborSoftWorx was developed by and is distributed by Creative Automation Solutions. ArborSoftWorx *Municipal* is an inventory and asset management software. It is designed for counties, cities, townships, campuses, parks, and estates.

Services
- Tree Inventories
- Track Maintenance History
- Track Service Calls
- Scheduling, Routing, and Mapping of Field Crews
- Tree Risk and Hazard Assessments
- Chemical Tracking and Reporting
- GIS Mapping
- Budgeting

Additional Information
Data and reports can be exported into all Microsoft, Corel, and Lotus Office suites. Creative Automation Solutions, Inc. also offers data conversions into i-Tree.

Operating System Requirements
Windows 98, Windows 2000, Windows XP, Windows Vista, or Linux

Software Costs
The base price for a single user is $1,500. Contact a sales associate for network system prices.

Technical Support
On-site installation and training is available.

Contact Information
Creative Automation Solutions, Inc.
10500 Old Court Rd.
Woodstock, MD 21163
Phone: 1-800-49-ARBOR (2-7267) or 1-410-461-5858
Fax: 1-410-465-3593
Email: Sales@ArborSoftWorx.com
Web site: http://www.arborsoftworx.com

ArborVue

Introduction to Software
ArborVue was developed and is distributed by The Laurus Group. It is a tree inventory management software designed for urban tree managers. According to The Laurus Group, ArborVue can store an unlimited number of tree records.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Budgeting
- Tree Damage Evaluations

Additional Information
ESRI's ArcGIS Engine Runtime and/or ArcPad 7 are included in the ArborVue software package. Therefore, ArborVue clients do not have to purchase additional ESRI products to run this software.

ArborVue's database uses SQL Server/SQL Server Express. SQL Server Express is included with the purchase of ArborVue (supports up to 10 concurrent users) but if more users are needed, SQL Server is available. Database hosting is also available for clients who do not wish to maintain SQL Server/SQL Server Express.

Operating System Requirements
Windows 200, Windows XP, or Windows Vista

Software Costs
The base price for ArborVue is $2,995.

Technical Support
The first year of technical supports and upgrades are included in the base price. Afterwards, it is $495/year for additional support and future upgrades. ArborVue offers multiple upgrades each year.

Contact Information
The Laurus Group, LLC.
4912 Bayshore Drive
Seneca, SC 29672
Phone: 1-864-654-8733
Fax: 1-864-654-8889
Email: arborvueinfo@arborvue.com
Web site: http://www.arborvue.com

Asset Manager

Introduction to Software
Asset Manager was developed and is distributed by Davey Resource Group. Asset Manager is a map-based management software designed to help municipalities, golf courses, college campuses, and even amusement parks to manage a variety of assets. Some of these assets include: trees, planting areas, turf areas, greens, fairways, drains, irrigation lines, hydrants, and valves.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Budgeting

Additional Information
Asset Manager stores data in ESRI shape files. Data can also be exported to a comma delimited text file, which can then be imported to spreadsheet and database applications.

Operating System Requirements
Windows 98, Windows 2000, Windows XP, or Windows Vista

Software Costs
The base price for Asset Manager is $3,300.

Technical Support
There are two options for technical support: 1) a one day on-site training is available for $1,300, or 2) one year of unlimited support is available for $1,000.

Contact Information
Davey Resource Group
1500 N. Mantua St.
PO Box 5193
Kent, OH 44240-5193
Phone: 1-800-828-8312
Fax: 1-330-673-0860
Email: gis@davey.com
Web site: http://www.davey.com/software

i-Tree

Introduction to Software
i-Tree was developed by the USDA Forest Service, Davey Tree Expert Co., National Arbor Day Foundation, Society of Municipal Arborists, and the International Society of Arboriculture. In the public domain and freely accessible, i-Tree is a software suite that allows managers to analyze and assess the environmental and aesthetic benefits of their urban and community forests. The suite contains two urban forest analysis tools: *Eco* (formerly *UFORE*) for ecosystem level assessments of the entire urban forest; and *Street* (formerly *STRATUM*) for municipal street tree assessments alone.

Services
- Tree Inventories
- Track Maintenance History
- Tree Hazard and Risk Assessments
- Budgeting
- Insect and Disease Assessments
- Environmental and Aesthetic Benefit Assessments
- Ice/Wind Storm Assessments

Additional Information
Street is designed for analyzing street tree populations, not the entire urban forest. *Street* quantifies the annual environmental and aesthetic benefits, as well as the property value increase from street trees. It can be used to compare canopy cover for different neighborhoods, species diversity, tree conflicts and maintenance needs, as well as species performance. New or existing inventories can be formatted for *Street* compatibility.

Eco is designed for analyzing the entire urban forest at the ecosystem level. *Eco* calculates urban forest structure, function, and value using area-based field sampling combined with local air quality and weather information. The urban forest can be examined at any scale and can be stratified (e.g. land-use types).

i-Tree is on a continuous development cycle. In spring of 2009, i-Tree 3.0 was released, enhancing functionality, uniformity, and integration for improved utility.

Operating System Requirements
Windows XP or Windows Vista

Software Costs
i-Tree is a public domain software, distributed at no cost.

Technical Support
i-Tree offers support online, on the phone, or through a user forum. The i-Tree User Forum is a moderated discussion forum that allows users to seek solutions to technical questions, communicate their experiences, and/or view frequently asked questions (FAQs).

Contact Information
i-Tree
1500 N. Mantua St.
Kent, OH 44240
Phone: 1-877-574-8733
Email: info@itreetools.org
Web site: http://www.itreetools.org

PDM-O™ – Point DataMap Online

Introduction to Software
PDM-O was developed and is distributed by StrataPoint, Inc. PDM-O is an internet-driven grounds and tree management software developed for municipalities, golf courses, and campuses. Since it is a web-based technology it can accommodate multiple concurrent users. According to StrataPoint, PDM-O can also store an unlimited number of tree records.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Tree Risk Assessment
- Tree Crown/Shade Profiling
- Chemical Tracking
- Irrigation Management

Additional Information
PDM-O facilitates turfgrass management by providing managers with a profile of each tree's crown and its shade profile.

Operating System Requirements
Internet connection and Web browser (Internet-based software)

Software Costs
Clients can subscribe to PDM-O for $1,000–$3,000 per year. Contact a sales associate for more information.

Technical Support
Free online and phone technical support is available to subscribers.

Contact Information
Phone: 1-651-322-4000
Fax: 1-651-322-5747
Email: sales@stratapointinc.com or info@stratapointinc.com
Web site: http://www.stratapointinc.com

Silvibase 5.1

Introduction to Software
Silvibase 5.1 was developed and is distributed by Natural Resource Planning Services, Inc. Silvibase 5.1 operates on a run-time version of Microsoft Access and is intended for small municipalities that do not need additional capabilities, such as GIS.

Services
- Tree Inventories
- Maintenance Plans
- Production Monitoring

Additional Information
Tree data can be directly exported into ArcView. Note: Silvibase 5.1 does not have a built-in mapping component. Additionally, it is not necessary to purchase Microsoft Access, since Silvibase 5.1 operates on a run-time version of Microsoft Access. Silvibase 5.1 also works with Windows CE and ArcPad on portable field devices.

Operating System Requirements
Windows 2000 or Windows XP

Software Costs
The base price for Silvibase 5.1 ranges from $2,000–$3,000, which includes the initial training and set-up.

Technical Support
Available via phone and email, free of charge.

Contact Information
Natural Resource Planning Services, Inc.
5700 SW 34th St. Suite 324
Gainesville, FL 32608
Phone: 1-352-378-8966
Fax: 1-352-336-4877
Email: DaveF@nrpsforesters.com
Web site: http://www.nrpsforesters.com

TreeKeeper® 7.6

Introduction to Software
TreeKeeper 7.6 was developed and is distributed by Davey Resource Group. TreeKeeper 7.6 is an internet-driven tree management software intended for municipalities. It is a web-based technology and can be accessed from home, offices, and anywhere with internet capabilities.

Services
- Tree Inventories
- Tracks Maintenance History
- Tracks Service Calls
- GIS Mapping
- Tree Hazard Assessments and Valuations

Additional Information
Davey Resource Group offers clients an unlimited amount of data field customization, as well as a wide range of report customization. TreeKeeper 7.7 is projected to be released by the time this document has been published. A fully functioning demonstration of TreeKeeper 7.6 is available at *treekeeperonline.com*

Operating System Requirements
Internet connection and Web browser (Internet-based software)

Software Costs (3 options for deployment)
1. *Standalone* – TreeKeeper® 7.6 is installed locally on a PC and can only be accessed on this computer. There is a one time cost of $4,600 for small cities (pop. < 30,000), and $7,700 for larger cities (pop. > 30,000). Note: There is not a concurrent user option with this method and clients are responsible for their data. Upgrades range in cost.
2. *Network* – TreeKeeper® 7.6 is deployed on the client's server, accessed via the internet or intranet. There is a one time cost of $12,000. Note: This option allows for concurrent users and in the long-term (more than 6 years) it is less expensive than the subscription. Clients are responsible for their data and upgrades range in cost.
3. *Subscription* – TreeKeeper® 7.6 is accessed through Davey Resource Group's Web server. In the short-term this is the least expensive option, costing $2100 for a year subscription. There is a 3-year subscription available for $5,250. With the subscription method, data is backed up every night by Davey Resource Group and upgrades are free.

Technical Support
There are two options for technical support: 1) a one-day on-site training is available for $1,300, and 2) one year of unlimited support is available for $1,000.

Contact Information
Davey Resource Group
1500 N. Mantua St.
PO Box 5193
Kent, OH 44240-5193
Phone: 1-800-828-8312
Fax: 1-330-673-0860
Email: gis@davey.com
Web site: http://www.davey.com/software

Trees in the Hood™

Introduction to Software
Trees in the Hood was developed and is distributed by Natural-Path Urban Forestry Consultants. It is a free shareware designed to assist small communities, parks, golf courses, and campuses manage their trees. Trees in the Hood is based in Microsoft Access. According to Natural-Path Urban Forestry Consultants, it can manage an unlimited number of tree records.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Production Monitoring
- Tracks Field Crews

Additional Information
The data fields for Trees in the Hood are set up to match *Street* (part of the i-Tree suite). Trees in the Hood offers tree analysis by family, genus, and species. Trunk formula appraisals are based on individual chapter parameters from the Council of Tree and Landscape Appraisers (CTLA).

Operating System Requirements
Windows 98, Windows 2000, Windows XP, Windows Vista, or Mac OS X

Software Costs
The software is free shareware. However, there is a set-up cost that varies depending on the client's needs. Contact the owner, Mark Duntemann, for more information.

Technical Support
Technical support is free for two years; subsequently there is a non-mandatory charge of $250 per year.

Contact Information
Natural Path Urban Forestry
PO Box 1753
Oak Park, IL 60304
Phone: 1-773-699-7284
Email: natpath@earthlink.net
Web site: http://www.naturalpathforestry.com

TreeWorks™

Introduction to Software
TreeWorks was developed and is distributed by The Kenerson Group. TreeWorks is a tree management software developed by a collaboration of GIS specialists and arborists. It is an extension to ArcGIS 9.x Desktop and ArcPad. TreeWorks is commonly used by municipalities, campuses and military bases. It has been shown to store over 500,000 tree records.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Tree Risk and Hazard Assessment
- Tree Valuations
- Track Service Calls
- Production Monitoring

Additional Information
TreeWorks is an extension (toolbar) that operates inside of ArcGIS, therefore clients can use all of the ArcGIS functions and base layers to perform complex analysis. A check-in/check-out function allows clients to transfer their entire or select dataset(s) to their field devices. Furthermore, TreeWorks is fully customizable software—all data fields and reports can be modified to meet the client's needs.

Operating System & Special Requirements
Compatible with Windows 2000, Windows XP, or Windows Vista; ArcGIS is required.

Software Costs
The base price of TreeWorks is determined on a case by case basis depending on the customer's needs, contact a sales associate for more information. The base price includes free updates for the first year. Afterwards there is an annual maintenance fee of $600. This maintenance fee includes technical support

and the cost of upgrades. TreeWorks provides clients with at least two upgrades each year.

Technical Support
On-site training is available, as well as online and phone technical support.

Contact Information
The Kenerson Group
2342 Main Street
Athol, MA 01331
Phone: 1-978-249-6495
Fax: 1-978-249-4784
Email: info@kenersongroup.com
Web site: http://www.kenersongroup.com

TRIMS Tree Inventory

Introduction to Software
TRIMS Tree Inventory was developed and is distributed by TRIMS Software International, Inc. It is a tree inventory software developed for municipalities, golf courses, parks, businesses, and campuses. According to TRIMS Software International, it can store an unlimited number of tree records.

Services
- Tree Inventories
- Track Maintenance History
- Production Monitoring
- Scheduling Field Crews

Additional Information
TRIMS Tree Inventory provides two different tree inventory systems: 1) *Municipal Street Tree Inventory* – trees are identified by the street address, and 2) *Golf Course & Park Tree Inventory* – trees are identified by a grid location or map. TRIMS Tree Inventory also comes with a 32-bit Open Database Connectivity allowing tree data files to be exported into Microsoft Excel, Access, and Word. TRIMS releases at least one upgrade per year to incorporate new technological and industry advances.

Operating System Requirements
Windows 2000, Windows XP, or Windows Vista

Software Costs
TRIMS Tree Inventory standard version comes as a 2-User Network System, priced at $1,495. There is an annual fee of $345 after the first year. Individual or multiple user and site licenses are available. Contact a sales associate for more information.

Technical Support
Step-by-step installation instructions are provided for standalone systems, network workstations, and servers. The purchase of TRIMS Tree Inventory includes the first year of technical support, customer service and upgrades. After the first year, there is a $345 annual fee to continue technical support and upgrades for the standard 2-user network systems and a $445 fee for multi-user and network license systems.

Contact Information
TRIMS Software International, Inc.
8987 W. Olive, #117, PMB 68
Peoria, AZ 85345
Phone: 1-800-608-7467 or 1-623-266-1943
Fax: 1-602-266-1945
Email: info@trims.com
Web site: http://www.trims.com

Urban Forest Inventory System (UFIS)

Introduction to Software
The UFIS was developed by Natural Resource Consulting, Inc. and is now distributed by its sister company, Natural Resource Technologies, LLC. According to Natural Resource Consulting, Inc. it can store an unlimited number of tree sites.

Services
- Tree Inventories
- Track Maintenance History
- GIS Mapping
- Production Monitoring

Additional Information
UFIS mapping features operate on a MapInfo platform. Existing maps can be imported from AutoCAD, ArcView, and other popular formats. Data can be exported into the i-Tree suite for further analysis.

Operating System Requirements
Windows 98, Windows 2000, or Windows Vista

Software Costs
The base price for UFIS is $6,000. The cost for upgrades varies depending on the product and client's needs. Contact a sales representative for more information.

Technical Support
Technical support is available by phone or email at support@nrtech.com.

Contact Information
Natural Resource Technologies, L.L.C.
PO Box 780603
Tallassee, Alabama 36078
Phone: 1-888-848-2146 or 1-334-252-0744
Fax: 1-334-252-0654
Email: info@nrtech.com or sales@nrtech.com
Web site: http://www.nrtech.com

Acknowledgements

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BACTERIAL LEAF SCORCH INFORMATION

From: http://www.usna.usda.gov/Research/BacterialLeafScorch.html

BACTERIAL LEAF SCORCH OF SHADE TREES

Jo-Ann Bentz, Qi Huang & Ramon Jordan
Floral Nursery Plants Research Unit, US National Arboretum,
Beltsville, MD 20705

What is bacterial leaf scorch?

Bacterial leaf scorch (BLS) is an infectious chronic disease caused by the fastidious, gram-negative, xylem-limited bacterium *Xylella fastidiosa*. This bacterium, which is transmitted by xylem-feeding insects, colonizes and physically "clogs" the tree's water conducting tissues or xylem. Water transport becomes disrupted in roots, branches, and leaves due to large amounts of multiplying bacteria and their by-products. The presence of the bacteria also triggers a reaction in the tree that plugs the xylem, further impeding water transport and eventually killing the tree.

Bacterial leaf spreads systemically and causes slow decline and death of a tree. BLS is not new but is appearing more frequently in landscape trees in various parts of the country. It has been found in coastal US states from New York to Texas, in Washington, DC, as well as in California, Indiana, Kentucky, Nebraska and Ohio. This may simply be because more people recognize the symptoms.



"Leaf scorching" symptom



Leafhopper vector

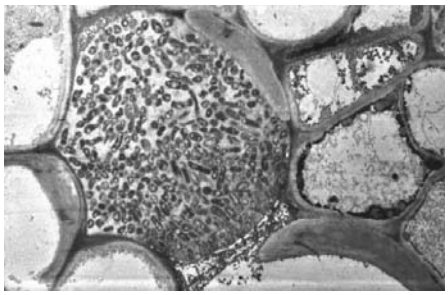


Photo showing bacteria in the vessel element of an elm leaf vein

{You can click on any image on this page to see a larger version in a pop-up window}

What are the symptoms?

Trees infected with *Xylella fastidiosa* exhibit marginal leaf necrosis, or browning, bordered by a pale halo band separating the dead or scorched tissue from the green tissue. Leaf discoloration begins at the leaf margin and moves toward the midrib. Symptoms recur each year and spread over the tree's crown, thus, reduction in growth and dieback are common in affected trees.



Scorching symptom in Elm



Scorching symptom in Oak



Scorching symptom in Sycamore

What are the hosts?

Reported hosts include sycamore, mulberry, red maple, sugar maple, sweetgum, American elm, and a number of oaks such as bur, pin, scarlet, red, laurel, water, turkey, bluejack, and shingle oak. *Xylella fastidiosa* has a very wide host plant range with over 30 families of plants reported as either natural or experimantal hosts, including many asymptomatic herbaceous and woody species such as goldenrod, blackberry, alfalfa, clover, and some grasses.

We have recently discovered, for the first time to our knowledge, the presence of *Xylella fastidiosa* in a Japanese beech bonsai plant exhibiting leaf scorch symptoms.



Scorching symptom in newly discovered *Xylella fastidiosa* infection in a Japanese beech bonsai plant

What is the problem?

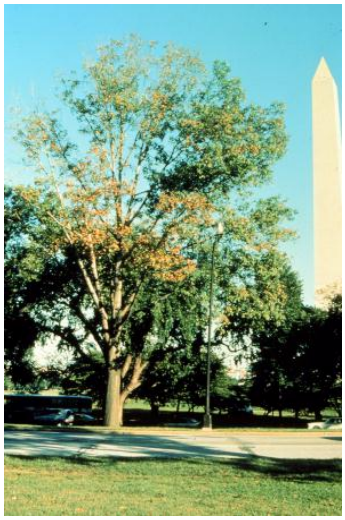
Many high value specimen trees and extensive landscape plantings are being severely affected by *Xylella fastidiosa*, particularly in the mid-Atlantic and southeastern United States. Infected trees often become unsightly or unsafe, necessitating early removal. No cure or therapy for infected trees nor a strategy for preventing infection is presently available.



Scorching symptom in landscape trees



Scorching symptom in Oak



Scorched trees on the Mall in Washington, DC

How are trees infected?

Xylella fastidiosa is transmitted through grafting or, most commonly, by insects of the families Cercopidae (spittlebugs) and Cicadellidae (leafhoppers). Because this bacterium occurs in the xylem of plants, it is not surprising that all currently known vectors are xylem-sap feeding insects. A recent finding has been the identification of treehoppers (Membracidae) as potential vectors.

What is known about insect transmission?

Insects are able to acquire and transmit the bacterium during the immature and adult stages of their development. Immature insects retain their ability to transmit until they molt. This is because insects shed the foregut during molting and this is the site from which the bacteria are introduced by the feeding vector into the plant. After molting, the insect has to feed from an infected plant to acquire the bacterium again. Fewer than 100 bacteria in the vector can transmit the disease. Acquisition and inoculation of bacteria can be accomplished very quickly, thus, no latent period is required.

Which are the insect vectors?

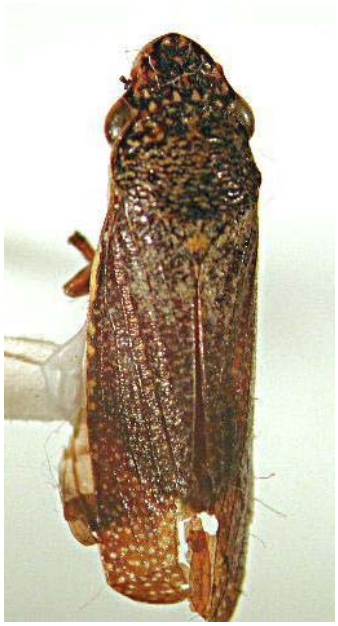
Several leafhopper species have been identified as vectors of this bacterium. However, vectors vary in their efficiencies in acquiring and transmitting the different strains of *X. fastidiosa*. Vector efficiency may be related to some extent to host affinities or feeding habits.



Graphocephala versuta



Graphocephala coccinea



Aulacizes irrorata



Oncometopia undata

Are there any Disease Management Strategies?

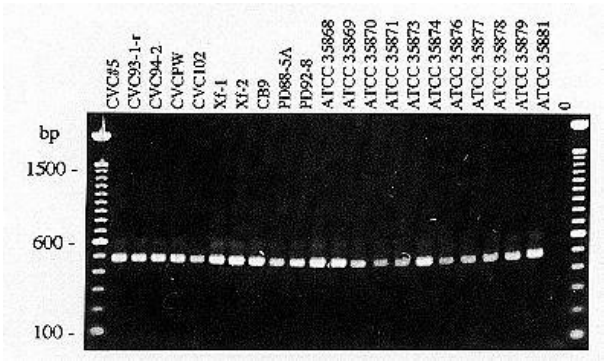
There is no effective preventative treatment or cure for bacterial leaf scorch, so one should expect diseased trees to be gradually lost over the years. The eventual best remedy for bacterial leaf scorch is tree replacement. However, in the meantime, infected trees can be made to look somewhat presentable for a few more years if the dead wood is pruned out. Careful scouting combined with judicious pruning can help to rid the tree of symptomatic branches especially since there are no chemicals registered for treatment.

- Leafhoppers, which spread the disease, are active most of the growing season making it impractical to control this disease by insecticidal treatments. Transmission of this disease is so unpredictable that efforts to prevent it by preventing vector feeding are likely to be futile.
- Trunk injections with antibiotics have been shown to suppress symptoms. Treatments must be made annually in late May or early June. The antibiotic oxytetracycline has been tested as a treatment, but it only caused the remission of symptoms; it did not provide a cure.
- Pruning has been another possible treatment; however with only limited success in delay of scorch development. Pruning has been devoted to public safety in trees that have shown some natural resistance to the disease.
- Mulching and irrigating during periods of little rainfall will reduce moisture stress and possibly delay scorch development.
- The effects of fertilization are still unclear with this disease. Fertilizing should be performed when a soil or leaf analysis shows a nutrient deficiency.
- Removing trees has been necessary to maintain safety and is considered when trees no longer add to the landscape.

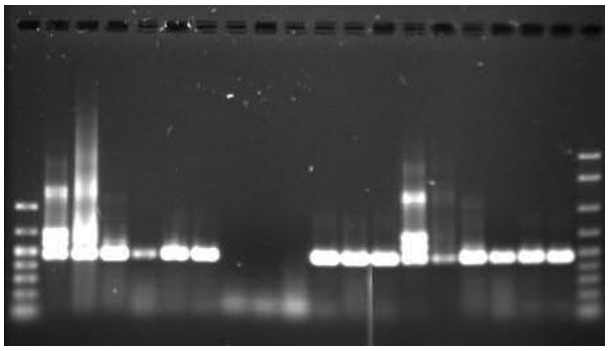
How does one know their trees are really infected?

The challenge is that the symptoms can be easily mistaken for physiological leaf scorch or early fall color. However, since a number of other diseases, as well as cultural problems, can mimic bacterial leaf scorch symptoms, it has been recommended that suspected infections be confirmed by sending samples to a diagnostic clinic before concluding the tree is infected with the bacterium. Bacterial leaf scorch can (should) be confirmed by one or more of the two common tests currently used to detect BLS infection. Samples should be taken from symptomatic branches (leaves and twigs included) for testing by:

1. ELISA - Enzyme linked immuno-sorbent assay - which can detect around 10^4 bacteria/ml; and/or
2. PCR - Polymerase chain reaction test - which is more senstive (can generally detect 10^2 bacteria/ml) but is much more expensive and labor intensive.



Picture of *Xylella*-specific PCR fragments generated from various strains and separated by agarose gel electrophoresis



Picture of *Xylella*-specific PCR fragments generated from leafhoppers carrying *Xylella*

Suggested further reading:

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PPFS-OR-W-12

UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

Plant Pathology Fact Sheet

Bacterial Leaf Scorch

by John Hartman

Introduction

Bacterial leaf scorch has devastated many landscape and shade trees in Kentucky's urban forests in recent years. Especially hard hit have been the mature pin oaks lining many urban streets. First diagnosed in the U.S. in the early 1980s, this epidemic shows no signs of abating.

Symptoms

Bacterial leaf scorch is a chronic, eventually fatal disease that is most noticeable in the early fall. Symptoms include premature leaf browning, marginal necrosis (FIGURE 1) and defoliation. Infected trees leaf-out normally the following year; however leaves on a few more branches turn prematurely brown in late summer. These events repeat themselves over a period of several years until the entire tree turns prematurely brown (FIGURE 2). Trees gradually decline over the years as twigs, branches, and limbs die from continual defoliation (FIGURE 3). Because symptoms of this disease can sometimes be confused with other abiotic, stress-related problems, it is advisable to have the diagnosis confirmed with a special laboratory test.



FIGURE 1. KENTUCKY OAKS WITH BACTERIAL LEAF SCORCH CAN INCLUDE (L TO R FROM TOP) RED, SHINGLE, BUR, WHITE AND PIN OAK.

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin.



FIGURE 2. BACTERIAL LEAF SCORCH CAUSES PREMATURE BROWNING OF PIN OAK (L) COMPARED TO UNAFFECTED TREE (R).

Leaf tissue can be tested for the presence of the bacterium at the University of Kentucky Plant Disease Diagnostic Laboratory.

Cause and Spread

Bacterial leaf scorch is caused by the bacterium *Xylella fastidiosa*. This bacterium is spread by leafhoppers and treehopper insects, although it does not appear to be spread from tree to tree very rapidly. Nevertheless, in some neighborhoods where the disease has been present for many years, a high proportion of mature oaks may show symptoms of bacterial leaf scorch (FIGURE 4). Little is known about which of these leafhopper vectors are active in Kentucky. There is some evidence that *X. fastidiosa* is present in symptomless shrubs, grasses and weeds in the landscape. Thus, leafhoppers may not necessarily pass the disease from tree to tree, but may be acquiring the bacterium from other hosts.



FIGURE 3. PIN OAK WITH BRANCH DIEBACK RESULTING FROM CHRONIC BACTERIAL LEAF SCORCH DISEASE.

The pathogen infects the xylem where it partially blocks the flow of water to the leaves, resulting in leaf scorch symptoms. Some researchers working with this disease suggest that leaf scorch symptoms are more severe during times when other stresses are placed on the tree. Timing of symptom development in mid- to late summer in urban trees is often associated with various moisture and heat stresses occurring that season.

Host Range and Location

Bacterial leaf scorch is found throughout much of the eastern and southern U.S. In Kentucky, it is present in landscape trees in many urban areas, including Paducah, Madisonville, Owensboro, Bowling Green, Somerset, Louisville, and Lexington. This disease has not been detected in Kentucky's forest trees.



FIGURE 4. STREET TREE PIN OAKS BEGIN TO SHOW DECLINE DUE TO BACTERIAL LEAF SCORCH (L), WITH COMPLETE LOSSES OCCURING A FEW YEARS LATER (R).

Bacterial leaf scorch has been commonly observed in oaks, especially pin oak and red oak, and in sycamore in Kentucky. It is also occasionally found here in red maple, sugar maple, silver maple, London plane, hackberry, mulberry, elm, and sweetgum. Refer to TABLE 1 for a list of known hosts, and FIGURES 1, 5 and 6 for typical symptoms.

Disease Management

There is no cure for bacterial leaf scorch, so one should expect diseased trees to



Figure 5. Symptoms of Bacterial Leaf Scorch on Silver Maple (above) and Sugar Maple (L). Red Maples and Boxelders are also susceptible.

be gradually lost over the years. Because infected trees decline gradually, it may be 5 to 10 years before there are many dead limbs and branches present. In the meantime, tree owners can provide good growing conditions for the trees to prolong their survival and to enhance their aesthetic value.

• Pruning. Newly infected trees can be made to look somewhat presentable for a few more years if the dead wood is pruned out.

• Watering trees. Kentucky summer weather can sometimes be hot and accentuated by periods of drought lasting anywhere from a week to several months. A study conducted by the University of Maryland demonstrated a possible correlation between bacterial leaf scorch and water stress. Based on their results, Kentucky tree owners and landscape managers may be able to prolong the lives of their scorch-infected trees by applying supplemental water during the hot, dry parts of the growing season.

• Tree–injections. There are commercial tree-injection products containing the antibiotic oxytetracyclene which are sold and used for the management of bacterial leaf scorch disease. Injections, which are made into the root flare at the base of the tree, may provide temporary remission of the symptoms. To be effective, however, the antibiotic would need to be re-injected, perhaps annually or more often. In Kentucky, we have observed symptoms in pin oaks and red oaks treated with antibiotic injections can be delayed by several weeks. These treatments do not cure infected trees, but they may prolong the life of the tree. Researchers with the National Park Service who are combating this disease in elms on the Mall in Washington, D.C. have not found injections to be an effective long-term solution.

Research has also shown that injections by themselves can cause long-term problems for trees since the injection holes may become ports of entry for wood rotting organisms. Even when decay organisms do not invade, areas of the wood behind the injection point are rendered discolored and non-functional. If frequent re-treatment is required, injections are likely to cause considerable damage over the life of a tree.

In summary, while treatments may prolong tree life, long term research results are not available and injections inherently damage trees. Thus, the choice to use of antibiotic injections for bacterial leaf scorch would vary with the wishes and objectives of the tree owner.

• Tree replacement. The best remedy for bacterial leaf scorch is tree replacement. Begin planting non-susceptible replacement trees early so that they will attain a reasonable size before the diseased ones are removed. When replanting, it is not necessary to use large transplants. Often, smaller nursery stock becomes established more quickly than larger nursery stock so that after 10 years, their relative sizes might not be much different. During the several years following tree planting, make provisions for watering the trees regularly, applying mulch periodically,

and pruning trees correctly so that good, strong, branch structure is established when the trees are young.

To maintain species diversity and to prevent catastrophic tree losses due to diseases or insects, avoid planting all the same tree species in a neighborhood, or a community. Select trees that do well in Kentucky, such as those included in the University of Kentucky materials listed in Additional Resources.



Figure 6. Other trees susceptible to Bacterial Leaf Scorch include (top to bottom) Sycamore, Gingko and Sweetgum

Refer to Table 2 for a list of large-sized trees that have not yet been affected by bacterial leaf scorch. These trees might make suitable replacements for trees lost along streets, in parks and in yards. Some may have other drawbacks. Readers are urged to learn more about the habits of these trees before purchasing plants. If a selection will be used as a street tree, it should first be determined if that species is permitted by the local municipal arborist or tree authorities.

Additional Resources

The following University of Kentucky resources can be helpful in selecting appropriate replacement trees.

Available at County Extension Offices (publications)

- *Large Trees, the Giants of Kentucky's Landscape* by Fountain, W. M., Witt, M. L., and Swintosky, J. S. (1996). 45 p.

- *Medium-Sized Trees for Kentucky Landscapes* by Witt, M. L., Fountain, W. M., and Swintosky, J. S. (1995). 42 p.

- *Small Trees for Urban Spaces in Kentucky* by Witt, M. L., Nash, L. J., Fountain, W. M., and Crankshaw, N. (1995). 40 p.

Available for use at County Extension Offices (compact disks)

- *Large Trees for Kentucky Landscapes* by Robert Geneve and Christy Cassady

- *Small and Medium Trees for Kentucky Landscapes* by Robert Geneve and Christy Cassady

Available on the Web

- Native Trees of Kentucky (Department of Horticulture)
http://www.uky.edu/Ag/Horticulture/kytreewebsite/treeprofiles/treelist.htm

(Issued July 2007)

Table 1. Tree species known to be susceptible to bacterial leaf scorch.

Family or group	Common name	Scientific name
Dogwood	Flowering dogwood	*Cornus florida*
	Oriental dogwood**	*C. kousa*
Elm	American elm*	*Ulmus americana*
Gingko (Figure 6)	Maidenhair tree**	*Gingko biloba*
Hackberry	Common hackberry*	*Celtis occidentalis*
Maple (Figure 5)	Box elder*	*Acer negundo*
	Red maple*	*A. rubrum*
	Silver maple*	*A. saccharinum*
	Sugar maple*	*A. saccharum*
Mulberry	White mulberry*	*Morus alba*
Oak (Figure 1)	Black oak	*Quercus velutina*
	Bluejack oak	*Q. incana*
	Bur oak*	*Q. prinus*
	Chestnut oak	*Q. macrocarpa*
	English oak**	*Q. robur*
	Laurel oak	*Q. laurifolia*
	Live oak	*Q. virginiana*
	Northern red oak*	*Q. rubra*
	Pin oak*	*Q. palustris*
	Post oak	*Q. stellat*
	Scarlet oak*	*Q. coccinea*
	Shingle oak*	*Q. imbricaria*
	Shumard oak	*Q. shumardii*
	Southern red oak	*Q. falcate*
	Swamp chestnut oak**	*Q. michauxii*
	Swamp white oak	*Q. bicolor*
	Turkey oak	*Q. laevis*
	Water oak	*Q. nigra*
	White oak*	*Q. alba*
	Willow oak*	*Q. phellos*
Sweetgum (Figure 6)	American sweetgum*	*Liquidambar styraciflua*
Sycamore (Figure 6)	American sycamore*	*Platanus occidentalis*
	London plane*	*P. x acerifolia*

* Bacterial leaf scorch is present in Kentucky on these trees.
** Bacterial leaf scorch is present in Kentucky, but not in other states, on these trees.

Table 2. Tree species that have not yet been affected by bacterial leaf scorch

Family or group	Common name	Scientific name
Alder	European black alder	*Alnus glutinosa*, and cultivars
Ash	Blue Ash	*Fraxinus quadrangulata*
	White ash	*F. americana* and cultivars
	Green ash	*F. pennsylvanica* and cultivars [1]
Black gum	Tupelo	*Nyssa sylvatica*
Buckeye	Yellow buckeye	*Aesculus flava*
Beech	European beech	*Fagus sylvatica* and cultivars
Catalpa	Northern catalpa	*Catalpa speciosa*
Coffeetree	Kentucky Coffeetree	*Gymnocladus dioicus* and fruitless male cultivars
Cork tree	Amur cork tree	*Phellodendron amurense* and fruitless male cultivars
Elm	Lacebark or Chinese elm	*Ulmus parvifolia* [2]
Hackberry	Sugar hackberry	*Celtis laevigata* [3]
Hickory	Shagbark hickory	*Carya ovata*
	Shellbark hickory	*C. laciniosa*
	Pignut hickory	*C. glabra*
Katsura	Katsuratree	*Cercidophyllum japonicum*
Linden	American linden	*Tilia americana*
	Littleleaf linden	*T. cordata*
Magnolia	Cucumbertree	*Magnolia acuminata*
Maple	Black maple	*Acer saccharum* subsp. *nigrum* [4]
Oak	Chinkapin oak	*Quercus muehlenbergii* [5]
	Sawtooth oak	*Q. acutissima*
Osage-Orange	Hedge-apple	*Maclura pomifera* and fruitless male cultivars
Sassafras	Common sassafras	*Sassafras albidum*
Tulip poplar	Tuliptree	*Liriodendron tulipifera*
Zelkova	Japanese zelkova	*Zelkova serrata* and cultivars

[1] Ash might not be a good choice due to the impending invasion of the emerald ash borer.

[2] Although bacterial leaf scorch is a serious problem of American elm, its effect on Chinese elm is not known.

[3] Sugar hackberry may be a risky choice since the disease is present on common hackberry.

[4] Although the disease has not been detected on black maple, the fact that it occurs on four other maples in Kentucky makes this a risky choice.

[5] These oak species have not been observed with bacterial leaf scorch. However, the fact that it occurs on most other oaks makes them risky choices.

EAB TREATMENT GUIDE

Emerald Ash Borer: Homeowner Guide to Insecticide Selection, Use, and Environmental Protection



Before Using an Insecticide Consider the Following

✓ Identify if EAB is Near

Start insecticide treatments only when your property is within 15 miles of an EAB infestation, or if you are within a county that is quarantined for EAB. Check MDA's Interactive EAB Survey Map for current infestations in Minnesota.

✓ Remove and Replace Ash Trees on Your Property

It may be more cost effective to replace a small or struggling ash tree than to pay the cost of ongoing treatments. In addition, trees in poor health are not likely to respond well to treatments. Do not treat trees showing more than 50 percent canopy decline; these ash trees are unlikely to recover even if treated.

✓ Treatment Requires a Long-Term Commitment

Once EAB arrives in an area, it will remain a constant threat to ash trees. It is likely that protective insecticide treatments will be needed for the rest of the tree's life at a potentially significant cost.

✓ Check Your Calendar – Timing is Everything

To ensure the insecticide is in the leaves by the time adults emerge to feed in early June, products are most effective when applied mid-April until the end of June.

RECOMMENDED TREATMENT DATES ARE SHADED

APRIL

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	21					

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

✓ Contact a Certified Arborist or City Forester to Evaluate Treatment Options

When contacting a professional, consider the following:

- Your city or township may have requirements or prohibitions related to the treatment of EAB, especially for ash trees located on city property, which may include trees planted on or near boulevards or sidewalks. Check with your city's park and recreation or forestry departments.
- Many effective products are best administered by professionals. If hiring a professional, check to make sure that they are licensed in Minnesota as a Commercial Pesticide Applicator for category "E: Turf and Ornamentals."

✓ Have a Professional Treat Large Ash Trees

There are homeowner treatment options for small ash trees, though these require careful application to avoid unintended environmental impacts. Homeowners wishing to protect trees larger than 48 inches in circumference (as measured 4½ feet above ground level) should have their trees professionally treated.

Insecticide Treatment Options

Professionals have access to some products that are not available to homeowners.
This document does not endorse the listed insecticide products over other options.



Products Marketed to Professionals and Arborists

Insecticide Active Ingredient	Examples of Products	Treatment Frequency	Application Methods	Environmental Profile
Emamectin benzoate	• TREE-age Restricted Use Pesticide *Any person using this product is required to be a licensed or certified pesticide applicator.*	Every 2 years	Trunk injection	• Persistent in tree tissue, relatively immobile in the environment.
Azadirachtin, (neem tree seed oil)	• TreeAzin	Once per year	Trunk injection	• Classified as a biopesticide, minimal or no exposure or risk to non-target organisms, habitats or water.
Dinotefuran	• Safari • Transtect	Once per year (bark spray) 1 – 2 times per year (other methods)	Bark spray, soil injection, soil-applied drench	• Strong potential to leach to shallow groundwater. • Potential exposure to adjacent water bodies through spray drift and runoff events.
Imidacloprid	• Merit products • Xytect 2F • Ima-jet	1 - 2 times per year	Trunk injection, soil injection, soil-applied drench	• Highly toxic to aquatic life. • Potential to leach to shallow groundwater or be transported in runoff when using soil injection or drench.

Products Marketed to Homeowners

Insecticide Active Ingredient	Examples of Products	Treatment Frequency	Application Methods	Environmental Profile
Dinotefuran	• Green Light Tree and Shrub Insect Control with Safari	Once per year	Granular soil-applied product	• Strong potential to leach to shallow groundwater. • Potential exposure to adjacent water bodies through runoff events.
Imidacloprid	• Bayer Advanced Tree and Shrub Insect Control • Bonide Tree and Shrub Insect Control • Ferti-lome Systemic Insect Drench • Ortho Max Tree and Shrub Insect Control	Once per year [1]	Soil-applied drench	• Highly toxic to aquatic life. • Potential to leach to shallow groundwater or be transported in runoff.
Imidacloprid	• Bonide Systemic Insect Spray	Check with an arborist, may not be practical for trees > 20-25 ft. in height [2]	Insecticide spray to tree canopy or bark	• Highly toxic to aquatic life. • Tree canopy (foliar) sprays can lead to drift, posing risks to surface water, children, pets and nearby flowering plants (with potentially toxic affects to bees and other pollinators).

1. Recommended only for trees less than 48 inches in circumference (as measured 4½ feet above ground level)
2. Due to the chances of insecticide drift to other areas during a canopy or bark spray, they are best applied by professionals. Additionally, there is little research to support the efficacy of canopy spray products.

Follow These Recommendations to Protect Water Quality

Generally, professionally applied tree injections have significantly fewer concerns for water quality.

For soil-applied products, bark sprays or sprays applied to tree canopies, the following considerations are important:

- Do not use within 25 feet of water bodies; such as, streams, lakes, ponds, wetlands or conduits to surface water or groundwater such as street curbs, storm drains, sumps, or well heads.
- Do not apply when heavy rainfall is expected within 24 hours of the planned treatment.
- Do not allow sprays to drift. Avoid spraying trees when there is wind. These sprays pose exposure risks to surface water, children, pets and nearby flowering plants (with potentially toxic affects to bees and other pollinators).

Avoid situations that could cause insecticides to wash away or leach, potentially contaminating water resources

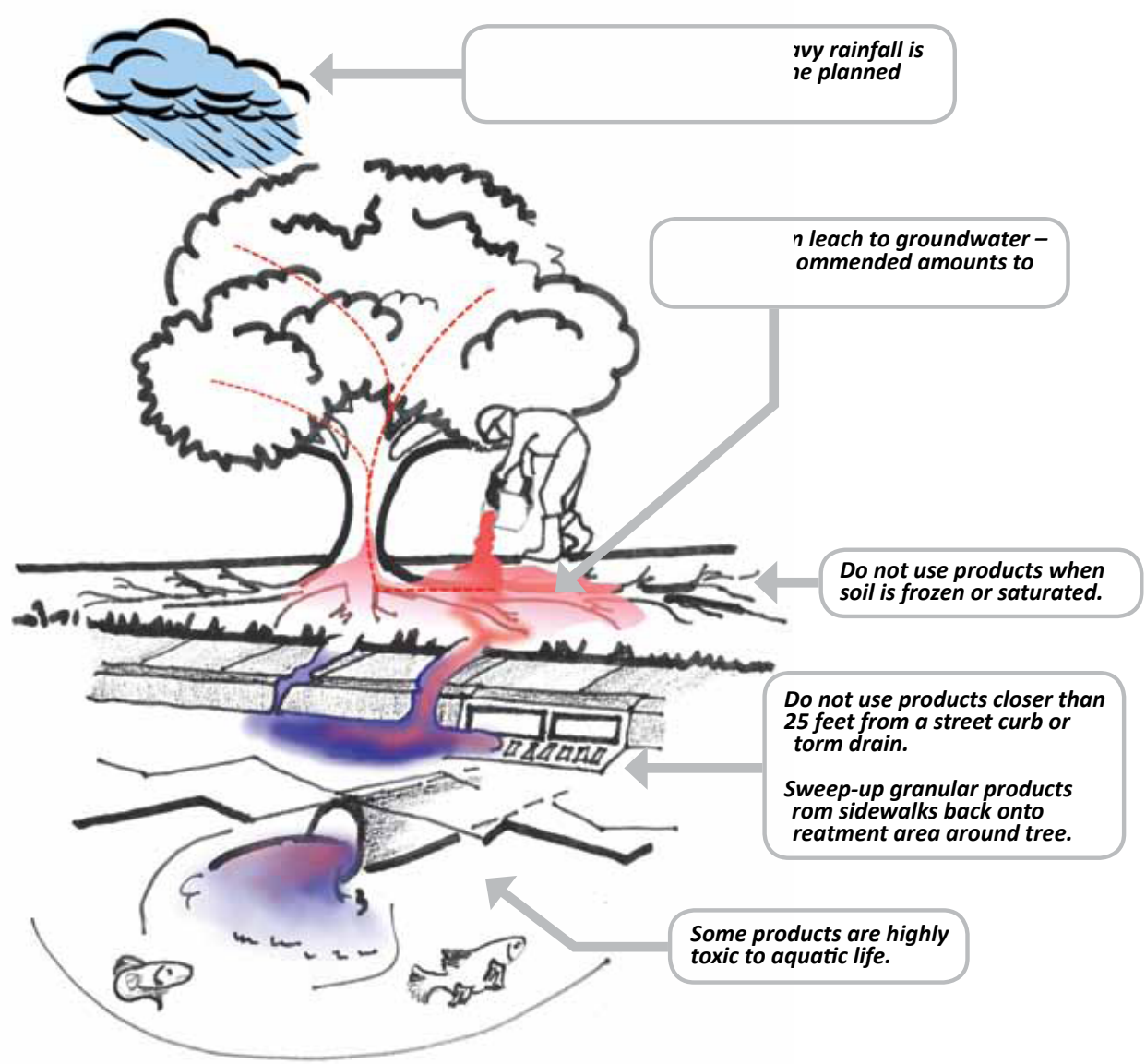


Illustration adapted from Dreistadt, S H , J K Clark, M L Flint 2004 Pests of Landscape Trees and Shrubs, An Integrated Pest Management Guide Publ 3359 Page 13 ; and, Flint, M L 2009 Lawn and Residential Landscape Pest Control, A Guide for Maintenance Gardeners- Workbook Publ 3510 Page 44

Making Sense of EAB Insecticide Labels

Read the Label! It is your legal responsibility to read, clearly understand, and follow all current label directions for the specific insecticide product being used.

Selecting an Insecticide:

- Look for products marketed to control emerald ash borer (see table in this guide).
- Read the *Environmental Hazard Statements* on the insecticide label. Products applied as a canopy spray are likely to result in a considerable amount of insecticide drift, even when conditions are ideal.

Using an Insecticide:

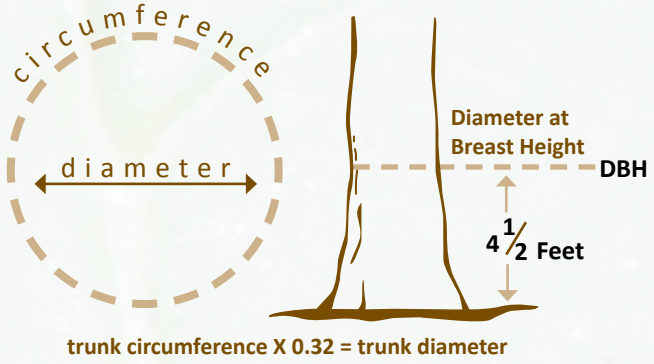
- To facilitate uptake, soil-applied insecticides should be applied when the soil is moist but not saturated or excessively dry.
- For soil drenches remove or rake any mulch or dead leaves, then pour the insecticide solution directly onto soil.
- Do not allow children and pets to re-enter treatment area until sprays or drenches have dried.
- Store insecticides where children cannot reach them.
- Many homeowner products only allow one soil drench application per year.

Disposing an Insecticide:

- When using the last of a liquid insecticide container, triple-rinse before disposal, then apply the rinse water as you would apply the insecticide.
- Unusable and unwanted insecticides must be disposed of according to the label directions, or at a county household hazardous waste disposal event.
- It is illegal to bury or burn a insecticide.

Measure your Ash Trees

Soil-applied insecticide treatments available to the general public are most effective on smaller trees, less than 48 inches in circumference.



trunk circumference X 0.32 = trunk diameter

CONVERSION TABLE
Tree Measurements at 4½ Feet Above Ground Level

Circumference – Inches	Diameter at Breast Height (DBH) – Inches
15	5
20	6
25	8
30	9.5
35	11
40	13
45	14
> 48 inches STOP	> 15 inches STOP

Large trees should be treated by a professional

Additional Resources

For more information on this publication, contact the "Arrest the Pest" Hotline at 651-201-6684 or 888-545-6684.

Pesticide Disposal

For more information about disposing of unusable or unwanted pesticides, visit MDA online at www.mda.state.mn.us/chemicals/spills/wastepesticides/schedule.aspx or 651-201-6562.

Reporting and Investigating Pesticide Spills and Misuse

Complaints can be reported to the Minnesota Duty Officer at 800-422-0798.
MDA staff will evaluate the information provided and if a pesticide misuse is suspected, an MDA inspector will be assigned.
More information is available online at www.mda.state.mn.us/chemicals/pesticides/complaints.aspx

Emerald Ash Borer Online Resources

- Minnesota Department of Agriculture – http://www.mda.state.mn.us/eab
- University of Minnesota Extension – www.extension.umn.edu/issues/eab
- USDA-APHIS – www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b
- Minnesota Department of Natural Resources – www.dnr.state.mn.us/invasives/terrestrialanimals/eab
- City of St. Paul – www.stpaul.gov/index.aspx?NID=2495
- Minneapolis Park and Recreation Board – www.minneapolisparks.org/default.asp?PageID=1059
- EAB Multi-State Site – www.emeraldashborer.info

TREE INVENTORY TABLE

TREE INVENTORY TABLE

The table includes the following information:

Complete Tree Number: Each tree is identified with a unique number. Many of the Memorial's trees have a plastic tag engraved with their 8-character tree ID number. The first 2 characters are the same as the inventory zone number; the next 2 characters are alphabetic abbreviations that assist with tree species identification. The last 4 characters are the tree's unique identifier within each zone. All of the characters are utilized to create a unique complete tree number.

2009 Update Information: In November 2009, Memorial staff provided access to a hard copy map that contained updated information about trees that have been removed, replaced, or are currently in decline.

Inventory Zone: The landscape is divided into 11 management zones. The zone designations are used to identify general tree locations and groups. While there are some similarities between "feature" designations created for this LPMP, and "zone" numbers created by NPS staff, there is no direct correlation. Consider assigning a numerical designation to "features" and creating a new set of unique tree ID numbers that include the new "feature" code.

Tag Status: Indicates whether the plastic tree tag is missing. NPS staff should determine the usefulness of the tags and determine if replacing missing tags is worthwhile.

Feature Name: Indicates the feature name as defined in the CLR and listed in Table A, Features and Conditions.

Species: Common name with two letter abbreviation used in tree ID number.

Species Factor: This rating is used in tree value calculation. Some species are more desirable horticulturally, and have higher ratings, while others are less desirable and have lower ratings (for example, most oaks are typically rated at 90-100% in Missouri, while Japanese Black Pine are rated at 50%). This is a horticultural value that is not based on the value of the species specific to the Memorial's historic designed landscape, but is rather an industry standard measure.

Diameter: Tree diameter in inches measured at 4.5 feet above ground. Also commonly referred to as DBH (diameter at breast height).

Condition Factor: This numeric condition rating is used in the appraisal formula, which provides a quick indication of a tree's condition. A rating of zero (0%) is a dead tree, while a 90% is a tree in excellent condition. The rating takes into account tree form, presence of dead limbs, and overall vitality.

Location Factor: Also used in the appraisa*l formula,* this rating provides a numeric indication of the tree's location value. Ash trees within the allées along the walkways were assigned a location rating of 90% while most other trees were rated at 70%.

Requirements: Identifies specific maintenance re*quirements* for each tree (including pruning, crown lifting, crown cleaning, corrective pruning, hazard limb pruning, tree removal, hazard tree removal, etc.).

Comments: Includes general comments that do not fit into other fields, such as notes on condition issues (e.g. girdling roots, mower damage, etc.)

Hazard Rating: Used to prioritize actions to deal with trees that pose higher levels of risk. Each tree is assigned ratings for failure potential, size of the part, and target ratings. The combined value of each rating provides guidance in developing a risk reduction program.

Value: Each tree's monetary replacement value is calculated using a modified tree appraisal formula based on one referenced in the "Guide to Plant Appraisal" published by the International Society of Arboriculture (ISA). The process is described in the "What Are Those Plants Worth" publication in Appendix A. The appraisal was performed by an ISA Board Certified Master Arborist, Skip Kincaid, of Davey Resource Group (ISA #0155BM). The valuation methodology utilizes the factors of tree size (diameter), species, condition rating, and location rating.

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
1	Single-species allees	01RH0001	01RH0001					1		Ash, 'Rosehill' (RH)	70	15	70	90	Crown Lifting											$2,493 80
1	Single-species allees		01RH0002					2	Missing	Ash, 'Rosehill' (RH)	70	18	65	90	Crown Lifting		Girdling Root									$3,334 57
1	Single-species allees	01RH0003	01RH0003			X		3		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		Mower Damage									$2,315 67
1	Single-species allees	01RH0004	01RH0004					4		Ash, 'Rosehill' (RH)	70	18	70	90	Grate Lift	Crown Lifting										$3,591 07
1	Single-species allees		01RH0005					5	Missing	Ash, 'Rosehill' (RH)	70	4	70	90												$280.00
1	Single-species allees		01RH0006					6	Missing	Ash, 'Rosehill' (RH)	70	11	60	90	Crown Clean High											$1,149 52
1	Single-species allees		01RH0007					7	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
1	Single-species allees		01RH0008					8	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
1	Single-species allees	01RH0009	01RH0009					9		Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High		Trunk Wound									$1,706 87
1	Single-species allees	01RH0010	01RH0010					10		Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High		Forked									$1,706 87
1	Single-species allees	01RH0011	01RH0011					11		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Mower Damage									$2,137 54
1	Single-species allees	01RH0012	01RH0012				X	12		Ash, 'Rosehill' (RH)	70	15.5	50	90	Crown Clean High	Grate Lift										$1,902 02
1	Single-species allees		01RH0013	X				13	Missing	Ash, 'Rosehill' (RH)	70	14	50	90	Crown Clean High		Trunk Wound									$1,551.70
1	Single-species allees	01RH0014	01RH0014				X	14		Ash, 'Rosehill' (RH)	70	16	55	90	Crown Clean High	Grate Lift										$2,229 38
1	Single-species allees	01RH0015	01RH0015				X	15		Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
1	Single-species allees	01RH0016	01RH0016				X	16		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
1	Single-species allees	01RH0017	01RH0017					17		Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High											$2,432 05
1	Single-species allees		01RH0018					18	Missing	Ash, 'Rosehill' (RH)	70	14	50	90	Crown Clean High											$1,551.70
1	Single-species allees	01RH0019	01RH0019					19		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
1	Single-species allees		01RH0020					20	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High											$1,706 87
1	Single-species allees	01RH0021	01RH0021					21		Ash, 'Rosehill' (RH)	70	12	50	90	Crown Clean High		Girdling Root									$1,140 02
1	Single-species allees		01RH0022					22	Missing	Ash, 'Rosehill' (RH)	70	12	55	90	Crown Clean High		Trunk Wound									$1,254 03
1	Single-species allees		01RH0023					23	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High		Girdling Root									$2,837 39
1	Single-species allees		01RH0024					24	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High	Grate Lift	Trunk Wound									$2,017 21
1	Single-species allees	01RH0025	01RH0025					25		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
1	Single-species allees	01RH0026	01RH0026					26		Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High											$1,368 03
1	Single-species allees		01RH0027					27	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High		Girdling Root									$1,959.42
1	Single-species allees	01RH0028	01RH0028					28		Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High	Grate Lift										$2,017 21
1	Single-species allees	01RH0029	01RH0029					29		Ash, 'Rosehill' (RH)	70	15	65	90			Girdling Root	Forked								$2,315 67
1	Single-species allees	01RH0030	01RH0030					30		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High	Grate Lift										$2,172 38
1	Single-species allees	01RH0031	01RH0031					31		Ash, 'Rosehill' (RH)	70	10	35	90	Hazard Tree		Trunk Wound		2=Medium	2	2=7-18"	2	2=Intermediate	2	6	
1	Single-species allees		01RH0032					32	Missing	Ash, 'Rosehill' (RH)	70	4	75	90												$300.00
1	Single-species allees	01RH0033	01RH0033					33		Ash, 'Rosehill' (RH)	70	13	65	90			Forked									$1,739 33
1	Single-species allees	01RH0034	01RH0034					34		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High		No Grate									$2,172 38
1	Single-species allees	01RH0035	01RH0035					35		Ash, 'Rosehill' (RH)	70	12	35	90	Hazard Tree		Trunk Wound		1=Low	1	2=7-18"	2	2=Intermediate	2	5	
1	Single-species allees		01RH0036					36	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High											$2,837 39
1	Single-species allees	01RH0037	01RH0037					37		Ash, 'Rosehill' (RH)	70	13	80	90												$2,140.71
1	Single-species allees	01RH0038	01RH0038					38		Ash, 'Rosehill' (RH)	70	13	60	90			Forked									$1,605 53
1	Single-species allees	01RH0039	01RH0039					39		Ash, 'Rosehill' (RH)	70	12	80	90												$1,824 04
1	Single-species allees	01RH0040	01RH0040					40		Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
1	Single-species allees	01RH0041	01RH0041					41		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High		Girdling Root									$2,172 38
1	Single-species allees	01RH0042	01RH0042					42		Ash, 'Rosehill' (RH)	70	14	70	90												$2,172 38
1	Single-species allees	01RH0043	01RH0043					43		Ash, 'Rosehill' (RH)	70	10	35	90	Hazard Tree		Trunk Wound		2=Medium	2	2=7-18"	2	2=Intermediate	2	6	
1	Single-species allees	01RH0044	01RH0044					44		Ash, 'Rosehill' (RH)	70	15	75	90			Forked									$2,671 93
1	Single-species allees		01RH0045					45	Missing	Ash, 'Rosehill' (RH)	70	11	75	90												$1,436 91
1	Single-species allees	01RH0046	01RH0046					46		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
1	Single-species allees	01RH0047	01RH0047					47		Ash, 'Rosehill' (RH)	70	14	70	90			Girdling Root	Forked								$2,172 38
1	Single-species allees		01RH0048					48	Missing	Ash, 'Rosehill' (RH)	70	15.5	75	90	Crown Clean High	Grate Lift										$2,853 03
1	Single-species allees		01RH0049					49	Missing	Ash, 'Rosehill' (RH)	70	10	80	90												$1,266 69
1	Single-species allees	01RH0050	01RH0050	X				50		Ash, 'Rosehill' (RH)	70	15.5	70	90	Grate Lift											$2,662 83

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
1	Single-species allees	01RH0051	01RH0051			X		51		Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High											$3,203.15
1	Single-species allees	01RH0052	01RH0052				X	52		Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High											$1,471.74
1	Single-species allees		01RH0053					53	Missing	Ash, 'Rosehill' (RH)	70	4	70	90												$280.00
1	Single-species allees	01RH0054	01RH0054				X	54		Ash, 'Rosehill' (RH)	70	18	65	90	Grate Lift	Crown Clean High	Trunk Wound									$3,334 57
1	Single-species allees		01RH0055					55	Missing	Ash, 'Rosehill' (RH)	70	7	75	90												$581.89
1	Single-species allees		01RH0056					56	Missing	Ash, 'Rosehill' (RH)	70	18	70	90	Crown Clean High											$3,591 07
1	Single-species allees	01RH0057	01RH0057					57	Defective	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
1	Single-species allees	01RH0058	01RH0058					58		Ash, 'Rosehill' (RH)	70	18	70	90	Crown Lifting	Grate Lift										$3,591 07
1	Single-species allees	01RH0059	01RH0059					59		Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High		Mower Damage	Trunk Wound								$1,368 03
1	Single-species allees		01RH0060					60	Missing	Ash, 'Rosehill' (RH)	70	4	75	90	Corrective Prune											$300.00
1	Single-species allees	01RH0061	01RH0061					61		Ash, 'Rosehill' (RH)	70	22	65	90			Forked	Mower Damage								$4,981 27
1	Single-species allees	01RH0062	01RH0062	X				62		Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High		Forked									$2,493 80
1	Single-species allees		01RH0063	X				63	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Lifting											$2,837 39
1	Single-species allees		01RH0064					64	Missing	Ash, 'Rosehill' (RH)	70	22	65	90	Crown Clean High											$4,981 27
1	Single-species allees		01RH0065					65	Missing	Ash, 'Rosehill' (RH)	70	8	75	90			Forked									$760.02
1	Maintenance Facility		01BC0001					1	Missing	Baldcypress (BC)	100	3	75	70												$225.00
1	Maintenance Facility		01BC0014					14	Missing	Baldcypress (BC)	100	2.5	75	70												$187.50
1	Maintenance Facility		01BC0205					205	Missing	Baldcypress (BC)	100	1.5	65	70												$97 50
1	Maintenance Facility		01BC0206					206	Missing	Baldcypress (BC)	100	1.5	70	70												$105.00
1	Maintenance Facility		01BC0207					207	Missing	Baldcypress (BC)	100	2	70	70												$140.00
1	Maintenance Facility		01BC0208					208	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0209					209	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0210					210	Missing	Baldcypress (BC)	100	1.5	65	70												$97 50
1	Maintenance Facility		01BC0213					213	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0214					214	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0215					215	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0226					226	Missing	Baldcypress (BC)	100	2	75	70												$150.00
1	Maintenance Facility		01BC0234					234	Missing	Baldcypress (BC)	100	3	75	70												$225.00
1	Maintenance Facility		01BC0236					236	Missing	Baldcypress (BC)	100	3	75	70												$225.00
1	Maintenance Facility		01BN0004					4	Missing	Birch, River (BN)	80	1.5	70	70			Multi-stem									$105.00
1	Maintenance Facility		01BN0233					233	Missing	Birch, River (BN)	80	2	75	70			Multi-Stem									$150.00
1	Maintenance Facility		01CR0237					237	Missing	Crabapple, Robinson (CR)	70	2	70	70												$140.00
1	Maintenance Facility		01CR0238					238	Missing	Crabapple, Robinson (CR)	70	3	70	70												$210.00
1	Maintenance Facility		01CR0239					239	Missing	Crabapple, Robinson (CR)	70	3	70	70												$210.00
1	Maintenance Facility	01SD033	01SD0033					33		Crabapple, Snowdrift (SD)	70	6.5	60	70			Sapsuckers	Mower Damage								$312.19
1	Maintenance Facility		01GB0049					49	Missing	Ginkgo (GB)	90	4	75	70												$300.00
1	Maintenance Facility	01SH153	01SH0153					153		Hackberry, Sugar (SH)	80	10	55	70	Crown Lifting											$774.09
1	Maintenance Facility		01WK0211	X				211	Missing	Hawthorn, Winter King (WK)	60	2	65	70	Crown Repair											$130.00
1	Maintenance Facility		01WK0227					227	Missing	Hawthorn, Winter King (WK)	60	2	70	70												$140.00
1	Maintenance Facility		01WK0235					235	Missing	Hawthorn, Winter King (WK)	60	2	75	70												$150.00
1	Maintenance Facility		01HL0057					57	Missing	Honeylocust (HL)	75	3.5	30	70	Rec Remove		Trunk Wound									$105.00
1	Maintenance Facility		01HL0058					58	Missing	Honeylocust (HL)	75	4	70	70												$280.00
1	Maintenance Facility		01HL0059					59	Missing	Honeylocust (HL)	75	4	45	70			Trunk Wound									$180.00
1	Maintenance Facility		01HL0056			X		56	Missing	Honeylocust, Shademaster (HL)	75	15	60	70	Crown Clean High											$1,781 29
1	Maintenance Facility		01GL0003			X		3	Missing	Linden, Greenspire (GL)	80	11	50	70	Crown Lifting		Girdling Root									$851.50
1	Maintenance Facility		01GL0065					65	Missing	Linden, Greenspire (GL)	80	14	50	70	Hazard Limb Low		Girdling Root		4=severe	4	1=0-6"	1	1=Occassional	1	6	$1,379 29
1	Maintenance Facility		01GL0066					66	Missing	Linden, Greenspire (GL)	80	15	75	70												$2,375 05
1	Maintenance Facility		01GL0068					68	Missing	Linden, Greenspire (GL)	80	16	75	70												$2,702 28
1	Maintenance Facility	01GL069	01GL0069					69		Linden, Greenspire (GL)	80	16	70	70												$2,522.13
1	Maintenance Facility	01GL113	01GL0113					113		Linden, Greenspire (GL)	80	16	70	70	Crown Clean High											$2,522.13
1	Maintenance Facility		01GL0115					115	Missing	Linden, Greenspire (GL)	80	18	70	70	Crown Clean High											$3,192 07
1	Maintenance Facility		01GL0118					118	Missing	Linden, Greenspire (GL)	80	14	65	70												$1,793 07
1	Maintenance Facility	01GL0122	01GL0122					122		Linden, Greenspire (GL)	80	18	70	70	Crown Lifting		Mower Damage									$3,192 07
1	Maintenance Facility		01GL0123					123	Missing	Linden, Greenspire (GL)	80	18	65	70												$2,964 06
1	Maintenance Facility		NEW							Magnolia, Sweetbay (MV)							adj to missing 01BO212	planted 9/09								
1	Maintenance Facility	01RM045	01RM0045					45		Maple, Red (RM)	90	14	25	70	Hazard Tree		Trunk Wound	Root Damage	3=High	3	2=7-18"	2	1=Occassional	1	6	
1	Maintenance Facility		01RM0046					46	Missing	Maple, Red (RM)	90	14	25	70	Hazard Tree		Trunk Wound	Root Damage	3=High	3	2=7-18"	2	1=Occassional	1	6	
1	Maintenance Facility		01RM0048					48	Missing	Maple, Red (RM)	90	6	35	70			Girdling Root	Trunk Wound								$199.50
1	Maintenance Facility		01RM0055					55	Missing	Maple, Red (RM)	90	5	60	70			Girdling Root	Trunk Wound								$237.50
1	Maintenance Facility		01RM0219					219	Missing	Maple, Red (RM)	90	8	65	70	Crown Clean Low		Girdling Root									$658.68
1	Maintenance Facility		01RM0228					228	Missing	Maple, Red (RM)	90	2.5	70	70	Corrective Prune											$175.00
1	Maintenance Facility		01RM0231					231	Missing	Maple, Red (RM)	90	2.5	60	70	Corrective Prune		Trunk Wound									$150.00
1	Maintenance Facility		01SM0042					42	Missing	Maple, Sugar (SM)	100	6	75	70												$475.01
1	Maintenance Facility		01BO0010					10	Missing	Oak, Bur (BO)	100	20	70	70	Crown Clean High		Mower Damage									$4,926 03
1	Maintenance Facility		01BO0012	X				12	Missing	Oak, Bur (BO)	100	16	70	70	Crown Clean High		Mower Damage									$3,152 66
1	Maintenance Facility		01BO0013					13	Missing	Oak, Bur (BO)	100	20	65	70	Crown Clean High											$4,574.17
1	Maintenance Facility		01BO0212					212	Missing	Oak, Bur (BO)	100	2.5	70	70												$175.00
1	Maintenance Facility		01BO0229					229	Missing	Oak, Bur (BO)	100	2.5	70	70	Corrective Prune											$175.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
1	Maintenance Facility		01RO0043					43	Missing	Oak, Red (RO)	100	5	75	70	Corrective Prune											$329.87
1	Maintenance Facility		01RO0044					44	Missing	Oak, Red (RO)	100	8	75	70	Crown Lifting											$844.46
1	Maintenance Facility	01SW005	01SW0005					5		Oak, Swamp White (SW)	100	12	80	70	Crown Lifting											$2,026.71
1	Maintenance Facility	01SW007	01SW0007					7		Oak, Swamp White (SW)	100	15	80	70	Crown Lifting											$3,166.73
1	Maintenance Facility		01SW0008				X	8	Missing	Oak, Swamp White (SW)	100	10	80	70	Crown Lifting											$1,407.44
1	Maintenance Facility		01JP0061					61	Missing	Pagodatree, Japanese (JP)	70	15	60	70	Crown Clean High		Girdling Root									$1,662 53
1	Maintenance Facility		01JP0063					63	Missing	Pagodatree, Japanese (JP)	70	22	45	70	Crown Clean High		Insect/disease/stress									$2,682 22
1	Maintenance Facility		01JP0064					64	Missing	Pagodatree, Japanese (JP)	70	16	60	70	Crown Clean High											$1,891 60
1	Maintenance Facility		01JB0120					120	Missing	Pine, Japanese Black (JB)	50	10	50	70	Crown Clean Low		Insect/disease/stress									$439.82
1	Maintenance Facility		01JB0121					121	Missing	Pine, Japanese Black (JB)	50	11	50	70	Crown Clean Low		Insect/disease/stress	Vines								$532.19
1	Maintenance Facility		01RB0006					6	Missing	Redbud, Eastern (RB)	80			70			replanted 12/08									$0.00
1	Maintenance Facility		01RB0009					9	Missing	Redbud, Eastern (RB)	80	8	65	70	Crown Clean Low		Mower Damage									$585.49
1	Maintenance Facility		01RB0034					34	Missing	Redbud, Eastern (RB)	80	6.5	75	70			Sapsuckers	Mower Damage								$445.98
1	Maintenance Facility		01RB0036					36	Missing	Redbud, Eastern (RB)	80	7	45	70			Ganaderma at Base	Trunk Wound								$310.34
1	Maintenance Facility	01RB038	01RB0038					38		Redbud, Eastern (RB)	80	8.5	45	70			Girdling Root	Tag Defective								$457.59
1	Maintenance Facility		01RB0203					203	Missing	Redbud, Eastern (RB)	80	1.5	50	70	Crown Clean Low											$75 00
1	Maintenance Facility		01RB0216					216	Missing	Redbud, Eastern (RB)	80	2	70	70	Crown Clean Low		Staked									$140.00
1	Maintenance Facility		01RB0217					217	Missing	Redbud, Eastern (RB)	80	2	70	70	Crown Clean Low		Staked									$140.00
1	Maintenance Facility		01RB0218					218	Missing	Redbud, Eastern (RB)	80	2	75	70			Staked									$150.00
1	Maintenance Facility		01RB0230	X				230	Missing	Redbud, Eastern (RB)	80	1.5	40	70	Crown Clean Low											$60 00
1	Maintenance Facility		01RB0232					232	Missing	Redbud, Eastern (RB)	80	2	70	70												$140.00
1	Maintenance Facility		01RB0240					240	Missing	Redbud, Eastern (RB)	80	2	75	70												$150.00
2	Single-species allees		02RH0191	X				191	Missing	Ash, 'Rosehill' (RH)	70	18	55	70	Crown Clean High		Leaning									$2,194 55
2	Single-species allees	01RH0192	02RH0192					192	Defective	Ash, 'Rosehill' (RH)	70	15	65	90			Girdling Root									$2,315 67
2	Single-species allees		02RH0193					193	Missing	Ash, 'Rosehill' (RH)	70	19	65	90	Grate Lift											$3,715 37
2	Single-species allees		02RH0194				X	194	Missing	Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High		Girdling Root	Trunk Wound								$3,334 57
2	Single-species allees		02RH0195				X	195	Missing	Ash, 'Rosehill' (RH)	70	12	60	90												$1,368 03
2	Single-species allees	01RH0197	02RH0197	X				197	Defective	Ash, 'Rosehill' (RH)	70	9	65	90			Leaning									$833.64
2	Single-species allees	01RH0198	02RH0198	X				198	Defective	Ash, 'Rosehill' (RH)	70	22	70	90	Crown Clean High											$5,364.45
2	Single-species allees		02RH0199					199	Missing	Ash, 'Rosehill' (RH)	70	5	75	90												$296.88
2	Single-species allees	01RH0201	02RH0201					201	Defective	Ash, 'Rosehill' (RH)	70	5	70	90	Corrective Prune											$277.09
2	Single-species allees		02RH0202					202	In-effective	Ash, 'Rosehill' (RH)	70	20	60	90	Crown Clean High		Trunk Wound									$3,800 08
2	Single-species allees	01RH203	02RH0203					203	Defective	Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High											$2,671 93
2	Single-species allees		02RH0204					204	Missing	Ash, 'Rosehill' (RH)	70	20	60	90	Crown Clean High											$3,800 08
2	Single-species allees		02RH0205					205	Missing	Ash, 'Rosehill' (RH)	70	5	75	90	Corrective Prune											$296.88
2	Single-species allees		02RH0206					206	Defective	Ash, 'Rosehill' (RH)	70	19	60	90	Crown Clean High		Girdling Root									$3,429 57
2	Single-species allees		02RH0207					207	Missing	Ash, 'Rosehill' (RH)	70	15	60	90			Trunk Wound									$2,137 54
2	Single-species allees		02RH0208	X				208	Missing	Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High		Girdling Root									$3,203.15
2	Single-species allees	01RH0209	02RH0209					209	Defective	Ash, 'Rosehill' (RH)	70	14	75	90												$2,327 55
2	Single-species allees		02RH0210	X				210	Missing	Ash, 'Rosehill' (RH)	70	20	45	90	Hazard Limb High				4=severe	4	2=7-18"	2	2=Intermediate	2	8	$2,850 06
2	Single-species allees		02RH0211				X	211	Missing	Ash, 'Rosehill' (RH)	70	6	70	90	Corrective Prune											$399.01
2	Single-species allees		02RH0212					212	Missing	Ash, 'Rosehill' (RH)	70	3	70	90			Trunk Wound									$210.00
2	Single-species allees		02RH0213			X		213	Missing	Ash, 'Rosehill' (RH)	70	6	75	90												$427.51
2	Single-species allees		02RH0214				X	214	Missing	Ash, 'Rosehill' (RH)	70	21	50	90	Hazard Limb High	Crown Clean High	Storm Damage		4=severe	4	2=7-18"	2	1=Occassional	1	7	$3,491 32
2	Single-species allees		02RH0215					215	In-effective	Ash, 'Rosehill' (RH)	70	15	80	90												$2,850 06
2	Single-species allees		02RH0216	X				216	Missing	Ash, 'Rosehill' (RH)	70	19	70	90	Crown Clean High											$4,001.17
2	Single-species allees		02RH0217					217	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
2	Single-species allees		02RH0218					218	Missing	Ash, 'Rosehill' (RH)	70	3	70	90			Mower Damage									$210.00
2	Single-species allees	01RH0219	02RH0219					219	Defective	Ash, 'Rosehill' (RH)	70	13	75	90			Mower Damage									$2,006 92
2	Single-species allees		02RH0220	X				220	Defective	Ash, 'Rosehill' (RH)	70	19	70	90			Tag reads 01RH0168	Trunk Wound								$4,001.17
2	Single-species allees	01RH0221	02RH0221				X	221	Defective	Ash, 'Rosehill' (RH)	70	7	75	90												$581.89
2	Single-species allees	01RH0222	02RH0222					222	Defective	Ash, 'Rosehill' (RH)	70	14	70	90												$2,172 38
2	Single-species allees		02RH0223	X				223	Missing	Ash, 'Rosehill' (RH)	70	7	75	90	Corrective Prune											$581.89
2	Single-species allees		02RH0224					224	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High											$2,745 56
2	Single-species allees		02RH0225	X				225	Missing	Ash, 'Rosehill' (RH)	70	6	80	90												$456.01
2	Single-species allees		02RH0226					226	Missing	Ash, 'Rosehill' (RH)	70	18	50	90	Hazard Limb High	Crown Clean High	Insect/disease/stress	Girdling Root	4=severe	4	1=0-6"	1	2=Intermediate	2	7	$2,565 05
2	Single-species allees	01RH0227	02RH0227					227	Defective	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
2	Single-species allees	01RH0228	02RH0228			X		228	Defective	Ash, 'Rosehill' (RH)	70	14	75	90			Girdling Root									$2,327 55
2	Single-species allees	01RH0229	02RH0229					229	Defective	Ash, 'Rosehill' (RH)	70	6	70	90	Corrective Prune		Trunk Wound									$399.01
2	Single-species allees		02RH0230					230	Missing	Ash, 'Rosehill' (RH)	70	2	85	90	Corrective Prune											$170.00
2	Single-species allees		02RH0231					231	Missing	Ash, 'Rosehill' (RH)	70	20	80	90												$5,066.77
2	Single-species allees		02RH0232	X				232	Missing	Ash, 'Rosehill' (RH)	70	10	70	90	Corrective Prune											$1,108 36
2	Single-species allees	01RH0233	02RH0233					233	Defective	Ash, 'Rosehill' (RH)	70	12	60	90												$1,368 03
2	Single-species allees		02RH0234	X				234	Missing	Ash, 'Rosehill' (RH)	70	19	30	90	Hazard Tree		Trunk Wound	Girdling Root	2=Medium	2	3=19-32"	3	2=Intermediate	2	7	

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
2	Single-species allees	01RH0235	02RH0235					235	Defective	Ash, 'Rosehill' (RH)	70	8	70	90	Grate Lift	Crown Clean High										$709.35
2	Single-species allees		02RH0236	X				236	Missing	Ash, 'Rosehill' (RH)	70	2	25	90	Rec Remove		Trunk Wound	Insect/Disease/Stress								$50 00
2	Single-species allees	01RH0237	02RH0237					237	Defective	Ash, 'Rosehill' (RH)	70	19	70	90	Crown Clean High	Grate Lift										$4,001.17
2	Single-species allees		02RH0238			X	X	238	Missing	Ash, 'Rosehill' (RH)	70	11	70	90			Mower Damage									$1,341.11
2	Single-species allees		02RH0239	X				239	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High											$2,315 67
2	Single-species allees		02RH0240	X				240	Missing	Ash, 'Rosehill' (RH)	70	3	70	90												$210.00
2	Single-species allees		02RH0241					241	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Crown Clean High		No Grate									$1,596 03
2	Single-species allees		02RH0242	X				242	Missing	Ash, 'Rosehill' (RH)	70	16	50	90	Hazard Limb High	Crown Clean High			4=severe	4	1=0-6"	1	2=Intermediate	2	7	$2,026.71
2	Single-species allees		02RH0243					243	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Grate Lift	Crown Clean High										$1,862 04
2	Single-species allees	01RH0244	02RH0244	X				244	Defective	Ash, 'Rosehill' (RH)	70	20	75	90			Mower Damage									$4,750.10
2	Single-species allees		02RH0245					245	In-effective	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High	Grate Lift										$1,862 04
2	Single-species allees	01RH0246	02RH0246					246	Defective	Ash, 'Rosehill' (RH)	70	18	70	90	Crown Clean High		Girdling Root									$3,591 07
2	Single-species allees		02RH0247					247	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Hazard Limb High	Crown Clean High			4=severe	4	1=0-6"	1	2=Intermediate	2	7	$2,137 54
2	Single-species allees		02RH0248	X				248	Missing	Ash, 'Rosehill' (RH)	70	22	20	90	Hazard Tree	Hazard Limb High	Ganaderma on trunk	Trunk Wound	4=severe	4	3=19-32"	3	3=Frequent	3	10	
2	Single-species allees		02RH0249					249	In-effective	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
2	Single-species allees		02RH0250	X				250	Missing	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
2	Single-species allees		02RH0251					251	Missing	Ash, 'Rosehill' (RH)	70	13	80	90												$2,140.71
2	Single-species allees	01RH0252	02RH0252	X				252	Defective	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
2	Single-species allees	01RH0253	02RH0253					253	Defective	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High		Girdling Root									$1,337 94
2	Single-species allees		02RH0254	X				254	In-effective	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Trunk Wound									$2,432 05
2	Single-species allees		02RH0255					255	Missing	Ash, 'Rosehill' (RH)	70	12	65	90												$1,482 03
2	Single-species allees		02RH0256	X				256	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High		Mower Damage									$2,837 39
2	Single-species allees		02RH0257	X				257	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
2	Single-species allees		02RH0258					258	In-effective	Ash, 'Rosehill' (RH)	70	18	70	90												$3,591 07
2	Single-species allees		02RH0259					259	Missing	Ash, 'Rosehill' (RH)	70	19	50	90			Trunk Wound									$2,857 98
2	Single-species allees		02RH0260					260	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Trunk Wound									$2,432 05
2	Single-species allees		02RH0261					261	Missing	Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High											$3,203.15
2	Single-species allees		02RH0262					262	In-effective	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High											$2,837 39
2	Single-species allees		02RH0263	X				263	Missing	Ash, 'Rosehill' (RH)	70	18	75	90												$3,847 58
2	Single-species allees	RH0264	02RH0264					264	Defective	Ash, 'Rosehill' (RH)	70	22	75	90												$5,747 62
2	Single-species allees		02RH0265					265	Missing	Ash, 'Rosehill' (RH)	70	5	65	90			Forked									$257.30
2	Single-species allees		02RH0266			X		266	Missing	Ash, 'Rosehill' (RH)	70	19	70	90	Hazard 11/09		Trunk Wound									$4,001.17
2	Single-species allees		02RH0267					267	Missing	Ash, 'Rosehill' (RH)	70	14	75	90	Crown Clean High											$2,327 55
2	Single-species allees		02RH0268					268	Missing	Ash, 'Rosehill' (RH)	70	22	55	90	Crown Clean High		Trunk Wound									$4,214 92
2	Single-species allees		02RH0269	X				269	Missing	Ash, 'Rosehill' (RH)	70	2.5	70	90	Corrective Prune											$175.00
2	Single-species allees		02RH0270					270	Missing	Ash, 'Rosehill' (RH)	70	19	75	90	Crown Clean High											$4,286 96
2	Single-species allees		02RH0271					271	Missing	Ash, 'Rosehill' (RH)	70	11	65	90	Crown Clean High	Grate Lift										$1,245 32
2	Single-species allees		02RH0272					272	Missing	Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High		Girdling Root									$1,368 03
2	Single-species allees		02RH0273					273	Missing	Ash, 'Rosehill' (RH)	70	16	80	90	Crown Clean High											$3,242.73
2	Single-species allees		02RH0274					274	In-effective	Ash, 'Rosehill' (RH)	70	17	55	90	Crown Clean High		Girdling Root									$2,516.76
2	Single-species allees		02RH0275					275	Missing	Ash, 'Rosehill' (RH)	70	15	70	90			No Grate									$2,493 80
2	Single-species allees		02RH0276					276	Missing	Ash, 'Rosehill' (RH)	70	22	75	90												$5,747 62
2	Single-species allees		02RH0277					277	Missing	Ash, 'Rosehill' (RH)	70	20	60	90	Grate Lift	Crown Clean High										$3,800 08
2	Single-species allees		02RH0278					278	Missing	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High		Trunk Wound									$1,337 94
2	Single-species allees		02RH0279					279	In-effective	Ash, 'Rosehill' (RH)	70	12	65	90	Grate Lift	Crown Clean High										$1,482 03
2	Single-species allees	02RH0280	02RH0280					280		Ash, 'Rosehill' (RH)	70	22	75	90	Crown Clean High											$5,747 62
2	Single-species allees		02RH0281					281	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
2	Single-species allees	02RH0282	02RH0282					282		Ash, 'Rosehill' (RH)	70	14	75	90	Crown Lifting											$2,327 55

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
2	Single-species allees	02RH0283	02RH0283					283		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		No Grate									$1,862 04
2	Single-species allees	02RH0284	02RH0284					284		Ash, 'Rosehill' (RH)	70	16	65	90												$2,634.72
2	Single-species allees		02RH0285	X				285	In-effective	Ash, 'Rosehill' (RH)	70	20	70	90	Crown Clean High		No Grate									$4,433.43
2	Single-species allees		02RH0286					286	Missing	Ash, 'Rosehill' (RH)	70	18	65	90												$3,334 57
2	Single-species allees	02RH0287	02RH0287					287		Ash, 'Rosehill' (RH)	70	19	65	90	Crown Clean High	Crown Lifting										$3,715 37
2	Single-species allees	02RH0289	02RH0289					289		Ash, 'Rosehill' (RH)	70	18	70	90			No Grate	Mower Damage								$3,591 07
2	Single-species allees	02RH0290	02RH0290					290		Ash, 'Rosehill' (RH)	70	19	65	90	Crown Clean High		Vines									$3,715 37
2	Single-species allees	02RH0291	02RH0291	X				291		Ash, 'Rosehill' (RH)	70	21	75	90			No Grate									$5,236 98
2	Single-species allees		02RH0292					292	Missing	Ash, 'Rosehill' (RH)	70	16	75	90			Vines									$3,040 06
2	Single-species allees		02RH0293					293	Missing	Ash, 'Rosehill' (RH)	70	20	70	90	Grate Lift											$4,433.43
2	Single-species allees		02RH0294					294	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Vines									$2,137 54
2	Single-species allees		02RH0295					295	Missing	Ash, 'Rosehill' (RH)	70	16	80	90			Vines									$3,242.73
2	Single-species allees		02RH0296					296	Missing	Ash, 'Rosehill' (RH)	70	18	80	90			Vines									$4,104 09
2	Single-species allees	2RH297	02RH0297					297		Ash, 'Rosehill' (RH)	70	18	80	90			Vines									$4,104 09
2	Single-species allees		02RH0298					298	Missing	Ash, 'Rosehill' (RH)	70	20	80	90			Mower Damage									$5,066.77
2	Single-species allees		02RH0299	X				299	Missing	Ash, 'Rosehill' (RH)	70	16	30	70	Hazard Limb High		Insect/disease/stress		4=severe	4	2=7-18"	2	1=Occassional	1	7	$945.80
2	Single-species allees	02RH0300	02RH0300	X				300		Ash, 'Rosehill' (RH)	70	16	55	70	Crown Clean Low		Forked									$1,733 96
2	Single-species allees		02RH0303	X				303	Missing	Ash, 'Rosehill' (RH)	70	25	70	70	Crown Clean High		Mower Damage									$5,387 84
2	Single-species allees		02RH0304	X				304	Missing	Ash, 'Rosehill' (RH)	70	16	60	70			Forked									$1,891 60
2	Single-species allees		02RH0306	X				306	Missing	Ash, 'Rosehill' (RH)	70	25	55	70	Crown Clean High		Forked									$4,233 31
2	Single-species allees	02RH0307	02RH0307	X				307		Ash, 'Rosehill' (RH)	70	16	50	70	Crown Clean High		Forked									$1,576 33
2	Single-species allees		02RH0965					965	Missing	Ash, 'Rosehill' (RH)	70	19	35	70	Crown Repair		Storm Damage	Mower Damage								$1,556 01
2	Single-species allees		02RH0966					966	Missing	Ash, 'Rosehill' (RH)	70	22	70	70	Crown Clean High											$4,172 35
2	Single-species allees		02RH0967					967	Missing	Ash, 'Rosehill' (RH)	70	20	65	70	Crown Clean High											$3,201 92
2	Single-species allees		02RH0968					968	Missing	Ash, 'Rosehill' (RH)	70	18	65	70	Crown Clean High		Trunk Wound	Mower Damage								$2,593 55
2	Single-species allees		02RH0971					971	Missing	Ash, 'Rosehill' (RH)	70	20	60	70			Mower Damage									$2,955 62
2	Single-species allees	2RH972	02RH0972					972		Ash, 'Rosehill' (RH)	70	22	60	70			Mower Damage	Trunk Wound								$3,576 30
2	Single-species allees		02RH0973					973	Missing	Ash, 'Rosehill' (RH)	70	10	60	70			Forked									$738.90
2	Single-species allees		02RH0974					974	Missing	Ash, 'Rosehill' (RH)	70	16	55	70	Crown Clean High		Vines									$1,733 96
2	Single-species allees		02RH0975					975	Missing	Ash, 'Rosehill' (RH)	70	14	65	70	Crown Clean Low	Crown Lifting	Vines									$1,568 94
2	Single-species allees		02RH0976					976	Missing	Ash, 'Rosehill' (RH)	70	19	65	70	Crown Clean High		Mower Damage									$2,889.73
2	Single-species allees	2RH977	02RH0977	X				977		Ash, 'Rosehill' (RH)	70	20	30	70	Hazard Tree		Trunk Wound		3=High	3	3=19-32"	3	1=Occassional	1	7	
2	Single-species allees		02RH0978					978	Missing	Ash, 'Rosehill' (RH)	70	20	55	70	Crown Clean High		Vines									$2,709 32
2	Single-species allees	2RH979	02RH0979					979		Ash, 'Rosehill' (RH)	70	20	65	70	Crown Clean High		Mower Damage	Girdling Root								$3,201 92
2	Single-species allees		02RH0981				X	981	Missing	Ash, 'Rosehill' (RH)	70	11	70	70												$1,043 09
2	Single-species allees		02RH0984					984	Missing	Ash, 'Rosehill' (RH)	70	12	60	70			Mower Damage									$1,064 02
2	Single-species allees		02RH0985					985	Missing	Ash, 'Rosehill' (RH)	70	13	70	70			Mower Damage									$1,456 87
2	Single-species allees		02RH0989	X				989	Missing	Ash, 'Rosehill' (RH)	70	6	65	70	Corrective Prune		Forked									$288.17
2	Single-species allees		02RH0990					990	Missing	Ash, 'Rosehill' (RH)	70	4	75	70												$300.00
2	Single-species allees		02RH0991					991	Missing	Ash, 'Rosehill' (RH)	70	6	60	70	Corrective Prune		Mower Damage									$266.01
2	Single-species allees		02RH0992					992	Missing	Ash, 'Rosehill' (RH)	70	6	75	70												$332.51
2	Single-species allees		02RH0993	X				993	Missing	Ash, 'Rosehill' (RH)	70	4	20	70	Rec Remove		Insect/disease/stress	Top Broken								$80 00
2	Single-species allees		02RH0994					994	Missing	Ash, 'Rosehill' (RH)	70	4	80	70												$320.00
2	Single-species allees		02RH0995					995	Missing	Ash, 'Rosehill' (RH)	70	5	80	70	Crown Lifting											$246.30
2	Single-species allees		02RH0996					996	Missing	Ash, 'Rosehill' (RH)	70	4	80	70												$320.00
2	Single-species allees		02RH0997					997	Missing	Ash, 'Rosehill' (RH)	70	5	80	70	Crown Lifting											$246.30
2	Single-species allees		02RH0998					998	Missing	Ash, 'Rosehill' (RH)	70	6	80	70												$354.67
2	Single-species allees		02RH0999					999	Missing	Ash, 'Rosehill' (RH)	70	4	75	70			Staked									$300.00
2	Single-species allees		02RH1000	X				1000	Missing	Ash, 'Rosehill' (RH)	70	4	70	70	Corrective Prune											$280.00
2	Single-species allees		02RH1001					1001	Defective	Ash, 'Rosehill' (RH)	70	4	70	70			Tag reads (4SD317)									$280.00
2	Single-species allees		02RH1002					1002	Missing	Ash, 'Rosehill' (RH)	70	5	70	70	Corrective Prune											$215.51
2	South Pond Baldcypress Circle		02BC0001					1	Missing	Baldcypress (BC)	100	24	60	70												$6,080.13
2	South Pond Baldcypress Circle		02BC0002					2	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
2	South Pond Baldcypress Circle		02BC0003					3	Missing	Baldcypress (BC)	100	22	70	70												$5,960.49
2	South Pond Baldcypress Circle		02BC0020					20	Missing	Baldcypress (BC)	100	18	70	70	Crown Lifting											$3,990 08
2	South Pond Baldcypress Circle		02BC0023					23	Missing	Baldcypress (BC)	100	26	75	70												$8,919 63
2	South Pond Baldcypress Circle	2BC024	02BC0024					24		Baldcypress (BC)	100	12	75	70												$1,900 04
2	South Pond Baldcypress Circle		02BC0030					30	Missing	Baldcypress (BC)	100	14	55	70												$1,896 52

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
2	South Pond Baldcypress Circle	2BC31	02BC0031					31		Baldcypress (BC)	100	18	45	70	Crown Clean High											$2,565 05
2	South Pond Baldcypress Circle	02BC0032	02BC0032					32		Baldcypress (BC)	100	16	85	70												$3,828 23
2	South Pond Baldcypress Circle		02BC0033					33	Missing	Baldcypress (BC)	100	14	80	70												$2,758 58
2	South Pond Baldcypress Circle		02BC0035					35	Missing	Baldcypress (BC)	100	26	75	70												$8,919 63
2	South Pond Baldcypress Circle	02BC0043	02BC0043					43		Baldcypress (BC)	100	18	85	70												$4,845.10
2	South Pond Baldcypress Circle	02BC0044	02BC0044					44		Baldcypress (BC)	100	26	75	70												$8,919 63
2	South Pond Baldcypress Circle		02BC0045					45	Missing	Baldcypress (BC)	100	16	70	70	Crown Clean High											$3,152 66
2	South Pond Baldcypress Circle		02BC0046					46	Missing	Baldcypress (BC)	100	20	75	70												$5,277 89
2	South Pond Baldcypress Circle	02BC0047	02BC0047					47		Baldcypress (BC)	100	20	80	70												$5,629.75
2	South Pond Baldcypress Circle		02BC0056					56	Missing	Baldcypress (BC)	100	16	80	70												$3,603 04
2	South Pond Baldcypress Circle		02BC0057					57	Missing	Baldcypress (BC)	100	18	85	70												$4,845.10
2	South Pond Baldcypress Circle		02BC0058					58	Missing	Baldcypress (BC)	100	24	75	70	Crown Lifting											$7,600.16
2	South Pond Baldcypress Circle		02BC0059					59	Missing	Baldcypress (BC)	100	15	70	70												$2,770 89
2	South Pond Baldcypress Circle		02BC0073					73	Missing	Baldcypress (BC)	100	16	55	70			Forked									$2,477 09
2	South Pond Baldcypress Circle	02BC0074	02BC0074					74		Baldcypress (BC)	100	22	75	70												$6,386 24
2	South Pond Baldcypress Circle		02BC0075					75	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
2	South Pond Baldcypress Circle		02BC0076					76	Missing	Baldcypress (BC)	100	19	80	70												$5,080 85
2	South Pond Area Plantings		02BN0034		X			34	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0036		X			36	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0049		X			49	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0051		X			51	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0066		X			66	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0067		X			67	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0068		X			68	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02BN0080		X			80	Missing	Birch, River (BN)	80	2		70			REPLANTED 01/09									$0.00
2	South Pond Area Plantings		02SD0317					317	Missing	Birch, River (BN)	80	12	70	70			Forked									$1,418.70
2	South Pond Area Plantings		02BG0037					37	Missing	Blackgum (BG)	100	3	65	70			Mower Damage	Trunk Wound								$195.00
2	South Pond Area Plantings		02BG0062					62	Missing	Blackgum (BG)	100	3	75	70	Crown Lifting											$225.00
2	South Pond Area Plantings		01BG0078					78	Missing	Blackgum (BG)	100	4	65	70			Trunk Wound									$260.00
2	South East Side Slopes		02RC0164			X		164	Missing	Crabapple, Radiant (RC)	70	10	50	70	Crown Lifting		Vines	Forked								$615.75
2	South East Side Slopes		02SD0086					86	Missing	Crabapple, Snowdrift (SD)	70	8	70	70												$551.72
2	South East Side Slopes		02SD0314	X				314	Missing	Crabapple, Snowdrift (SD)	70	12	70	70												$1,241 36
2	South East Side Slopes		02MS0342					342	Defective	Magnolia, Saucer (MS)	80	4	70	70			Tag Defective (wrong D)	Multi-stem								$280.00
2	South East Side Slopes		02MV0048					48	Missing	Magnolia, Sweetbay (MV)	90	2	50	70												$100.00
2	South East Side Slopes		02MV0081					81	Missing	Magnolia, Sweetbay (MV)	90	4	70	70												$280.00
2	South East Side Slopes		02MV0310					310	Missing	Magnolia, Sweetbay (MV)	90	4	60	70			Vines									$240.00
2	South East Side Slopes		02MV0311					311	Missing	Magnolia, Sweetbay (MV)	90	4	55	70			Trunk Wound									$220.00
2	South East Side Slopes		02SW0042					42	Missing	Oak, Swamp White (SW)	100	8	80	70												$900.76
2	South East Side Slopes		02SW0060					60	Missing	Oak, Swamp White (SW)	100	10	85	70			Mower Damage									$1,495.40
2	South East Side Slopes	02JB0071	02JB0071					71		Pine, Japanese Black (JB)	50	8	75	70												$422.23
2	South East Side Slopes		02JB0091					91	Missing	Pine, Japanese Black (JB)	50	12	50	70			Leaning									$633.35
2	South East Side Slopes	02JB0132	02JB0132					132		Pine, Japanese Black (JB)	50	6	20	70	Rec Remove		Trunk Wound	Insect/Disease/Stress								$63 33
2	South East Side Slopes		02JB0145			X		145	Missing	Pine, Japanese Black (JB)	50	8	35	70			Insect/disease/stress	Leaning								$197.04
2	South East Side Slopes		02JB0157	X				157	Missing	Pine, Japanese Black (JB)	50	13	70	70			Leaning									$1,040 62
2	South East Side Slopes	02JB0169	02JB0169					169		Pine, Japanese Black (JB)	50	10	35	70	Rec Remove		Trunk Wound	Insect/Disease/Stress								$307.88
2	South East Side Slopes	02RP313	02RP313	X				313		Pine, Red (RP)	70	4	40	70			Over Topped									$160.00
2	South East Side Slopes		02RB0022					22	Missing	Redbud, Eastern (RB)	80	8	70	70			Mower Damage									$630.53
2	South East Side Slopes	2RB25	02RB0025					25		Redbud, Eastern (RB)	80	13	40	70	Crown Clean Low		Vines	Storm Damage								$951.43
2	South East Side Slopes	02RB0165	02RB0165			X		165		Redbud, Eastern (RB)	80	4	45	70			Trunk Wound									$180.00
2	South East Side Slopes	02RB312	02RB312					312	Defective	Redbud, Eastern (RB)	80	2		70			REPLANTED 5/09									$0.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
2	South East Side Slopes		02RB0318		X			318	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 5/09	moved to near BN317								$0.00
2	South East Side Slopes	2RB319	02RB0319					319		Redbud, Eastern (RB)	80	8	60	70			Mower Damage									$540.46
2	South East Side Slopes		02RB0324					324	Missing	Redbud, Eastern (RB)	80	10	55	70	Crown Lifting		Forked	Trunk Wound								$774.09
2	South East Side Slopes		02RB0328					328	Missing	Redbud, Eastern (RB)	80	11	75	70	Crown Clean Low											$1,277 25
2	South East Side Slopes	2RB330	02RB0330	X				330		Redbud, Eastern (RB)	80	10	70	70	Crown Clean Low											$985.21
2	South East Side Slopes		02RB0332	X				332	Missing	Redbud, Eastern (RB)	80	10	80	70	Crown Clean Low		Mower Damage									$1,125 95
2	South East Side Slopes		02RB0338	X				338	Missing	Redbud, Eastern (RB)	80	8	60	70	Crown Lifting											$540.46
2	South East Side Slopes		02RB0343					343	Missing	Redbud, Eastern (RB)	80	2.5	70	70												$175.00
2	South East Side Slopes		02RB0344					344	Missing	Redbud, Eastern (RB)	80	1.5	70	70	Corrective Prune											$105.00
3	Single-species allees		03RH0066					66	Missing	Ash, 'Rosehill' (RH)	70	4	60	90												$240.00
3	Single-species allees		03RH0066					66	Missing	Ash, 'Rosehill' (RH)	70	4	60	90												$240.00
3	Single-species allees		03RH0067					67	Missing	Ash, 'Rosehill' (RH)	70	18	70	90			No Grate									$3,591 07
3	Single-species allees		03RH0068					68	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
3	Single-species allees		03RH0069				X	69	Missing	Ash, 'Rosehill' (RH)	70	8	55	90	Crown Clean High		Trunk Wound									$557.34
3	Single-species allees		03RH0070	X				70	Missing	Ash, 'Rosehill' (RH)	70	12	60	90	Crown Lifting	Crown Clean High										$1,368 03
3	Single-species allees		03RH0071					71	Missing	Ash, 'Rosehill' (RH)	70	11	60	90	Crown Lifting	Crown Clean High										$1,149 52
3	Single-species allees		03RH0072					72	Missing	Ash, 'Rosehill' (RH)	70	9	50	90	Crown Clean High											$641.26
3	Single-species allees		03RH0073					73	Missing	Ash, 'Rosehill' (RH)	70	9	60	90	Crown Clean High		Trunk Wound									$769.52
3	Single-species allees		03RH0074					74	Missing	Ash, 'Rosehill' (RH)	70	4	65	90			Trunk Wound									$260.00
3	Single-species allees		03RH0075					75	Missing	Ash, 'Rosehill' (RH)	70	4	70	90												$280.00
3	Single-species allees		03RH0076					76	Missing	Ash, 'Rosehill' (RH)	70	4	75	90												$300.00
3	Single-species allees	03RH0077	03RH0077					77		Ash, 'Rosehill' (RH)	70	8	60	90	Safety Prune											$608.01
3	Single-species allees		03RH0078					78	Missing	Ash, 'Rosehill' (RH)	70	4	65	90			Trunk Wound									$260.00
3	Single-species allees		03RH0079					79	Missing	Ash, 'Rosehill' (RH)	70	12	75	90			No Grate									$1,710 04
3	Single-species allees		03RH0080					80	Missing	Ash, 'Rosehill' (RH)	70	17	70	90												$3,203.15
3	Single-species allees	03RH0081	03RH0081					81	Defective	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
3	Single-species allees	03RH0082	03RH0082					82	Defective	Ash, 'Rosehill' (RH)	70	16	60	90			Trunk Wound									$2,432 05
3	Single-species allees		03RH0083					83	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High											$2,837 39
3	Single-species allees		03RH0084					84	Defective	Ash, 'Rosehill' (RH)	70	15	65	90												$2,315 67
3	Single-species allees		03RH0085					85	Missing	Ash, 'Rosehill' (RH)	70	15	70	90												$2,493 80
3	Single-species allees		03RH0086					86	Missing	Ash, 'Rosehill' (RH)	70	13	65	90			Trunk Wound									$1,739 33
3	Single-species allees		03RH0087					87	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Grate Lift	Crown Clean High	Trunk Wound									$1,959.42
3	Single-species allees		03RH0088					88	Missing	Ash, 'Rosehill' (RH)	70	10	50	90	Grate Lift	Crown Clean High										$791.68
3	Single-species allees		03RH0089					89	Missing	Ash, 'Rosehill' (RH)	70	14	70	90												$2,172 38
3	Single-species allees		03RH0090					90	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High		No Grate									$2,837 39
3	Single-species allees		03RH0091					91	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High	Grate Lift										$1,862 04
3	Single-species allees		03RH0092	X				92	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High	Grate Lift	Trunk Wound									$2,137 54
3	Single-species allees		03RH0093					93	Missing	Ash, 'Rosehill' (RH)	70	10	55	90	Crown Clean High											$870.85
3	Single-species allees	03RH0094	03RH0094					94	Defective	Ash, 'Rosehill' (RH)	70	10	30	90	Hazard Tree		Trunk Wound		3=High	3	2=7-18"	2	3=Frequent	3	8	
3	Single-species allees		03RH0095					95	Missing	Ash, 'Rosehill' (RH)	70	9	30	90	Hazard Tree		Trunk Wound		3=High	3	2=7-18"	2	3=Frequent	3	8	
3	Single-species allees	03RH0096	03RH0096					96	Defective	Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
3	Single-species allees		03RH0097					97	Missing	Ash, 'Rosehill' (RH)	70	3	65	90	Corrective Prune											$195.00
3	Single-species allees		03RH0098					98	Missing	Ash, 'Rosehill' (RH)	70	5	60	90	Corrective Prune		Trunk Wound									$237.50
3	Single-species allees		03RH0099					99	Missing	Ash, 'Rosehill' (RH)	70	3	70	90			Staked									$210.00
3	Single-species allees		03RH0100					100	Missing	Ash, 'Rosehill' (RH)	70	8	65	90			Trunk Wound									$658.68
3	Single-species allees		03RH0101					101	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Lifting		Girdling Root									$1,873.12
3	Single-species allees		03RH0102					102	Missing	Ash, 'Rosehill' (RH)	70	13	75	90			No Grate									$2,006 92
3	Single-species allees		03RH0103					103	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift											$2,172 38
3	Single-species allees		03RH0104					104	Missing	Ash, 'Rosehill' (RH)	70	14	75	90												$2,327 55
3	Single-species allees		03RH0105					105	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		No Grate	Girdling Root								$2,315 67
3	Single-species allees		03RH0106					106	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Grate Lift											$1,873.12
3	Single-species allees		03RH0107					107	Missing	Ash, 'Rosehill' (RH)	70	13	70	90												$1,873.12
3	Single-species allees		03RH0108					108	Missing	Ash, 'Rosehill' (RH)	70	12	60	90	Grate Lift	Crown Clean High	Trunk Wound									$1,368 03
3	Single-species allees		03RH0109					109	Missing	Ash, 'Rosehill' (RH)	70	3	60	90	Corrective Prune		Staked									$180.00
3	Single-species allees		03RH0110					110	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Grate Lift											$1,596 03
3	Single-species allees		03RH0111					111	Missing	Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High	Grate Lift	Trunk Wound									$1,471.74
3	Single-species allees		03RH0112					112	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Crown Clean High											$1,596 03
3	Single-species allees		03RH0113					113	Missing	Ash, 'Rosehill' (RH)	70	12	75	90	Grate Lift											$1,710 04
3	Single-species allees		03RH0114					114	Missing	Ash, 'Rosehill' (RH)	70	7	75	90												$581.89
3	Single-species allees		03RH0115					115	Missing	Ash, 'Rosehill' (RH)	70	8	75	90	Grate Lift											$760.02
3	Single-species allees		03RH0116					116	Missing	Ash, 'Rosehill' (RH)	70	8	75	90												$760.02
3	Single-species allees		03RH0117					117	Missing	Ash, 'Rosehill' (RH)	70	8	75	90												$760.02

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
3	Single-species allees		03RH0118	X				118		Ash, 'Rosehill' (RH)	70	8	55	90			Trunk Wound									$557.34
3	Single-species allees		03RH0119					119		Ash, 'Rosehill' (RH)	70	8	75	90												$760.02
3	Single-species allees		03RH0120					120		Ash, 'Rosehill' (RH)	70	6	70	90												$399.01
3	Single-species allees		03RH0121					121	Missing	Ash, 'Rosehill' (RH)	70	13	70	90												$1,873.12
3	Single-species allees		03RH0122					122	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High	Grate Lift										$1,482 03
3	Single-species allees		03RH0123					123	Missing	Ash, 'Rosehill' (RH)	70	20	65	90	Crown Clean High		No Grate									$4,116.75
3	Single-species allees		03RH0124					124	Missing	Ash, 'Rosehill' (RH)	70	3	80	90			Staked									$240.00
3	Single-species allees		03RH0125					125		Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High											$2,634.72
3	Single-species allees		03RH0126					126	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
3	Single-species allees		03RH0127					127	Missing	Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High		No Grate									$3,203.15
3	Single-species allees		03RH0128					128	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
3	Single-species allees		03RH0129					129	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
3	Single-species allees		03RH0130	X				130	Missing	Ash, 'Rosehill' (RH)	70	18	75	90	Crown Clean High		No Grate									$3,847 58
3	Single-species allees		03RH0131	X				131		Ash, 'Rosehill' (RH)	70	18	70	90	Grate Lift	Crown Clean High										$3,591 07
3	Single-species allees		03RH0132					132		Ash, 'Rosehill' (RH)	70	18	70	90	Grate Lift											$3,591 07
3	Single-species allees		03RH0133					133		Ash, 'Rosehill' (RH)	70	20	70	90	Grate Lift											$4,433.43
3	Single-species allees		03RH0134					134	Missing	Ash, 'Rosehill' (RH)	70	18	70	90			No Grate									$3,591 07
3	Single-species allees		03RH0135					135	Missing	Ash, 'Rosehill' (RH)	70	10	65	90												$1,029.19
3	Single-species allees		03RH0136					136		Ash, 'Rosehill' (RH)	70	14	75	90	Crown Clean High											$2,327 55
3	Single-species allees		03RH0137					137	Missing	Ash, 'Rosehill' (RH)	70	18	80	90	Crown Clean High		No Grate									$4,104 09
3	Single-species allees		03RH0138					138	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High		Trunk Wound									$2,017 21
3	Single-species allees		03RH0139					139	Missing	Ash, 'Rosehill' (RH)	70	3	75	90	Corrective Prune		Staked									$225.00
3	Single-species allees		03RH0140	X				140	Missing	Ash, 'Rosehill' (RH)	70	14	45	90	Grate Lift		Poor Branch Form									$1,396 53
3	Single-species allees		03RH0141	X				141		Ash, 'Rosehill' (RH)	70	14	65	90												$2,017 21
3	Single-species allees		03RH0142	X				142		Ash, 'Rosehill' (RH)	70	15	55	90			Girdling Root									$1,959.42
3	Single-species allees		03RH0143	X				143	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Grate Lift	Crown Lifting	Girdling Root									$1,706 87
3	Single-species allees		03RH0144	X				144	Missing	Ash, 'Rosehill' (RH)	70	4	65	90	Corrective Prune	Grate Lift	Staked									$260.00
3	Single-species allees		03RH0145					145	Missing	Ash, 'Rosehill' (RH)	70	4	70	90	Corrective Prune	Crown Clean Low	Staked									$280.00
3	Single-species allees		03RH0146					146	Missing	Ash, 'Rosehill' (RH)	70	22	70	90												$5,364.45
3	Single-species allees		03RH0147					147	Missing	Ash, 'Rosehill' (RH)	70	22	75	90												$5,747 62
3	Single-species allees	01RH0148	03RH0148				X	148	Defective	Ash, 'Rosehill' (RH)	70	7	80	90												$620.68
3	Single-species allees		03RH0149				X	149	Defective	Ash, 'Rosehill' (RH)	70	21	70	90	Grate Lift	Crown Clean High										$4,887 85
3	Single-species allees		03RH0150				X	150	Missing	Ash, 'Rosehill' (RH)	70	15	75	90			Trunk Wound									$2,671 93
3	Single-species allees	01RH0151	03RH0151			X		151	Defective	Ash, 'Rosehill' (RH)	70	13	75	90	Grate Lift											$2,006 92
3	Single-species allees	01RH0152	03RH0152					152	Defective	Ash, 'Rosehill' (RH)	70	15	80	90			No Grate									$2,850 06
3	Single-species allees		03RH0153					153	Missing	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
3	Single-species allees	01RH0154	03RH0154					154	Defective	Ash, 'Rosehill' (RH)	70	4	80	90	Corrective Prune											$320.00
3	Single-species allees		03RH0155					155	In-effective	Ash, 'Rosehill' (RH)	70	20	75	90												$4,750.10
3	Single-species allees		03RH0156					156	Missing	Ash, 'Rosehill' (RH)	70	7	50	90			Trunk Wound									$387.92
3	Single-species allees		03RH0157					157	Missing	Ash, 'Rosehill' (RH)	70	8	80	90												$810.68
3	Single-species allees		03RH0158					158	Missing	Ash, 'Rosehill' (RH)	70	16	80	90												$3,242.73
3	Single-species allees		03RH0159					159	Missing	Ash, 'Rosehill' (RH)	70	2	60	90	Corrective Prune											$120.00
3	Single-species allees		03RH0160					160	Missing	Ash, 'Rosehill' (RH)	70	13	75	90												$2,006 92
3	Single-species allees	01RH0161	03RH0161					161	Defective	Ash, 'Rosehill' (RH)	70	13	75	90												$2,006 92
3	Single-species allees		03RH0162					162	Missing	Ash, 'Rosehill' (RH)	70	3	45	90			Forked	Trunk Wound								$135.00
3	Single-species allees	01RH0163	03RH0163					163	Defective	Ash, 'Rosehill' (RH)	70	13	80	90												$2,140.71
3	Single-species allees		03RH0164					164	In-effective	Ash, 'Rosehill' (RH)	70	10	70	90			Trunk Wound									$1,108 36
3	Single-species allees		03RH0165					165	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune		Staked									$210.00
3	Single-species allees		03RH0166					166	Missing	Ash, 'Rosehill' (RH)	70	14	75	90												$2,327 55
3	Single-species allees	01RH0167	03RH0167					167	Defective	Ash, 'Rosehill' (RH)	70	10	60	90	Crown Clean High											$950.02
3	Single-species allees		03RH0168					168	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
3	Single-species allees		03RH0169					169	Missing	Ash, 'Rosehill' (RH)	70	10	60	90	Crown Clean High	Grate Lift										$950.02
3	Single-species allees		03RH0170					170	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
3	Single-species allees		03RH0171	X				171	Missing	Ash, 'Rosehill' (RH)	70	19	55	90	Crown Clean High		Girdling Root									$3,143.77
3	Single-species allees		03RH0172					172	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
3	Single-species allees	01RH0173	03RH0173					173	Defective	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High	Grate Lift										$1,873.12
3	Single-species allees		03RH0174					174	Missing	Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
3	Single-species allees	01RH0175	03RH0175	X				175	Defective	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
3	Single-species allees		03RH0176					176	Missing	Ash, 'Rosehill' (RH)	70	4	70	90	Corrective Prune											$280.00
3	Single-species allees	01RH0177	03RH0177	X				177	Defective	Ash, 'Rosehill' (RH)	70	5	75	90												$296.88

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
3	Single-species allees		03RH0178					178	Missing	Ash, 'Rosehill' (RH)	70	6	80	90												$456.01
3	Single-species allees		03RH0179	X				179	Missing	Ash, 'Rosehill' (RH)	70	22	60	90	Crown Clean High											$4,598.10
3	Single-species allees	01RH0180	03RH0180					180	Defective	Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High											$2,671 93
3	Single-species allees		03RH0181					181	Missing	Ash, 'Rosehill' (RH)	70	17	75	90	Crown Clean High	Grate Lift										$3,431 95
3	Single-species allees		03RH0182					182	In-effective	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High	Grate Lift										$2,837 39
3	Single-species allees	01RH0183	03RH0183					183	Defective	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High	Grate Lift										$2,017 21
3	Single-species allees	01RH0184	03RH0184					184	Defective	Ash, 'Rosehill' (RH)	70	19	70	90	Crown Clean High	Grate Lift										$4,001.17
3	Single-species allees		03RH0185					185	Missing	Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High	Grate Lift										$2,671 93
3	Single-species allees		03RH0186					186	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High	Grate Lift	Storm Damage									$2,432 05
3	Single-species allees	01RH0187	03RH0187					187	Defective	Ash, 'Rosehill' (RH)	70	17	75	90	Crown Clean High	Grate Lift										$3,431 95
3	Single-species allees		03RH0188	X				188	Missing	Ash, 'Rosehill' (RH)	70	24	70	90	Crown Clean High	Grate Lift										$6,384.13
4	Single-species allees		04RH0352					352	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Grate Lift											$1,596 03
4	Single-species allees		04RH0353					353	Missing	Ash, 'Rosehill' (RH)	70	12	75	90			Mower Damage									$1,710 04
4	Single-species allees		04RH0354					354	Missing	Ash, 'Rosehill' (RH)	70	3	80	90			Stake wire still attatched									$240.00
4	Single-species allees		04RH0355					355	Missing	Ash, 'Rosehill' (RH)	70	12	75	90			Mower Damage									$1,710 04
4	Single-species allees		04RH0356					356	Missing	Ash, 'Rosehill' (RH)	70	3	65	90			Trunk Wound									$195.00
4	Single-species allees		04RH0357					357	Missing	Ash, 'Rosehill' (RH)	70	14	80	90			Girdling Root									$2,482.72
4	Single-species allees		04RH0358					358	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
4	Single-species allees		04RH0359					359		Ash, 'Rosehill' (RH)	70	10	80	90			Mower Damage									$1,266 69
4	Single-species allees		04RH0360					360	Missing	Ash, 'Rosehill' (RH)	70	20	70	90	Crown Clean High											$4,433.43
4	Single-species allees		04RH0361					361		Ash, 'Rosehill' (RH)	70	6	70	90			Mower Damage									$399.01
4	Single-species allees		04RH0362					362	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Grate Lift	Crown Clean High	Hanging Trap									$1,596 03
4	Single-species allees		04RH0363					363		Ash, 'Rosehill' (RH)	70	9	75	90												$961.90
4	Single-species allees		04RH0364					364	Missing	Ash, 'Rosehill' (RH)	70	22	60	90	Crown Clean High		No Grate									$4,598.10
4	Single-species allees		04RH0365			X		365	Missing	Ash, 'Rosehill' (RH)	70	8	40	90	Crown Clean High		Mower Damage	Borers								$405.34
4	Single-species allees		04RH0366					366	Missing	Ash, 'Rosehill' (RH)	70	14	70	90												$2,172 38
4	Single-species allees		04RH0367					367	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
4	Single-species allees		04RH0368					368	Missing	Ash, 'Rosehill' (RH)	70	10	65	90			No Grate	Forked								$1,029.19
4	Single-species allees		04RH0369					369		Ash, 'Rosehill' (RH)	70	11	70	90												$1,341.11
4	Single-species allees		04RH0370	X				370	Missing	Ash, 'Rosehill' (RH)	70	18	70	90			No Grate									$3,591 07
4	Single-species allees		04RH0371					371	Missing	Ash, 'Rosehill' (RH)	70	17	75	90			Girdling Root									$3,431 95
4	Single-species allees		04RH0372					372	Missing	Ash, 'Rosehill' (RH)	70	12	75	90			No Grate									$1,710 04
4	Single-species allees		04RH0373					373		Ash, 'Rosehill' (RH)	70	18	50	90			Trunk Wound									$2,565 05
4	Single-species allees		04RH0374					374	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High		No Grate									$2,172 38
4	Single-species allees		04RH0375					375	Missing	Ash, 'Rosehill' (RH)	70	12	75	90												$1,710 04
4	Single-species allees		04RH0376					376	Missing	Ash, 'Rosehill' (RH)	70	13	45	90	Crown Clean High	Grate Lift										$1,204.15
4	Single-species allees		04RH0377					377	Missing	Ash, 'Rosehill' (RH)	70	11	75	90												$1,436 91
4	Single-species allees		04RH0378					378	Missing	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High	Grate Lift	Trunk Wound									$1,337 94
4	Single-species allees		04RH0379					379	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High		Forked									$2,172 38
4	Single-species allees		04RH0381	X				381	Missing	Ash, 'Rosehill' (RH)	70	15	35	90	Crown Clean Low											$1,246 90
4	Single-species allees		04RH0382	X				382	Missing	Ash, 'Rosehill' (RH)	70	16	55	90	Crown Clean High		No Grate									$2,229 38
4	Single-species allees		04RH0383					383	Missing	Ash, 'Rosehill' (RH)	70	10	65	90	Crown Clean Low											$1,029.19
4	Single-species allees		04RH0384					384	Missing	Ash, 'Rosehill' (RH)	70	11	75	90			No Grate									$1,436 91
4	Single-species allees	04RH0385	04RH0385					385		Ash, 'Rosehill' (RH)	70	11	60	90	Crown Clean High											$1,149 52
4	Single-species allees		04RH0386					386	Missing	Ash, 'Rosehill' (RH)	70	20	60	90	Grate Lift	Crown Clean High	Mower Damage									$3,800 08
4	Single-species allees		04RH0387					387	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Girdling Root									$1,862 04
4	Single-species allees		04RH0388					388		Ash, 'Rosehill' (RH)	70	8	70	90			Tag says Zone 4									$709.35
4	Single-species allees		04RH0389					389	Missing	Ash, 'Rosehill' (RH)	70	12	70	90												$1,596 03
4	Single-species allees		04RH0390					390	Missing	Ash, 'Rosehill' (RH)	70	13	45	90	Crown Clean High		No Grate	Insect/Disease/Stress								$1,204.15
4	Single-species allees		04RH0391					391	Missing	Ash, 'Rosehill' (RH)	70	9	65	90												$833.64
4	Single-species allees		04RH0392					392	Missing	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High		Insect/disease/stress	Missing half a grate								$1,337 94
4	Single-species allees		04RH0393					393	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
4	Single-species allees		04RH0394					394	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High		Trunk Wound									$1,605 53

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	Single-species allees		04RH0395					395	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
4	Single-species allees		04RH0396					396	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High		No Grate	Girdling Root								$1,605 53
4	Single-species allees		04RH0397					397	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Girdling Root									$2,432 05
4	Single-species allees		04RH0398					398	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
4	Single-species allees	04RH0399	04RH0399					399		Ash, 'Rosehill' (RH)	70	9	70	90												$897.77
4	Single-species allees		04RH0400					400	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
4	Single-species allees	04RH0401	04RH0401					401		Ash, 'Rosehill' (RH)	70	12	75	90			Mower Damage									$1,710 04
4	Single-species allees		04RH0402					402	Missing	Ash, 'Rosehill' (RH)	70	14	75	90	Grate Lift											$2,327 55
4	Single-species allees		04RH0403					403	Missing	Ash, 'Rosehill' (RH)	70	10	75	90												$1,187 52
4	Single-species allees		04RH0404					404	Missing	Ash, 'Rosehill' (RH)	70	10	75	90												$1,187 52
4	Single-species allees		04RH0405					405	Missing	Ash, 'Rosehill' (RH)	70	9	70	90	Crown Clean Low											$897.77
4	Single-species allees		04RH0406					406	Missing	Ash, 'Rosehill' (RH)	70	12	75	90	Grate Lift											$1,710 04
4	Single-species allees		04RH0407					407	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Repair											$1,873.12
4	Single-species allees		04RH0408					408	Missing	Ash, 'Rosehill' (RH)	70	10	70	90	Grate Lift											$1,108 36
4	Single-species allees		04RH0409					409	Missing	Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High											$2,671 93
4	Single-species allees		04RH0410	X				410	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High	Grate Lift										$1,739 33
4	Single-species allees	04RH0411	04RH0411					411		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
4	Single-species allees		04RH0412					412	Missing	Ash, 'Rosehill' (RH)	70	13	70	90												$1,873.12
4	Single-species allees	04RH0413	04RH0413					413		Ash, 'Rosehill' (RH)	70	10	65	90	Crown Clean High											$1,029.19
4	Single-species allees		04RH0414					414	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
4	Single-species allees		04RH0415					415	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
4	Single-species allees		04RH0416					416	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
4	Single-species allees		04RH0417					417	Missing	Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
4	Single-species allees		04RH0418					418	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Crown Clean High											$1,596 03
4	Single-species allees		04RH0419					419	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High		Girdling Root									$2,017 21
4	Single-species allees		04RH0420					420	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift											$2,172 38
4	Single-species allees		04RH0421					421	Missing	Ash, 'Rosehill' (RH)	70	12	70	90	Crown Clean High											$1,596 03
4	Single-species allees		04RH0422					422	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High	Grate Lift										$1,862 04
4	Single-species allees		04RH0423					423	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High											$2,315 67
4	Single-species allees		04RH0424					424	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High	Grate Lift										$1,739 33
4	Single-species allees		04RH0425					425	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
4	Single-species allees		04RH0426					426		Ash, 'Rosehill' (RH)	70	14	75	90	Crown Clean High		Tag says Zone 3									$2,327 55
4	Single-species allees		04RH0427					427	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
4	Single-species allees		04RH0428					428	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
4	Single-species allees		04RH0429					429	Missing	Ash, 'Rosehill' (RH)	70	15	75	90			Mower Damage									$2,671 93
4	Single-species allees		04RH0430					430	Ineffective	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High		Tag too high to read									$1,482 03
4	Single-species allees		04RH0431					431	Missing	Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High		Mower Damage									$2,671 93
4	Single-species allees		04RH0432					432	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High	Grate Lift										$2,315 67
4	Single-species allees		04RH0433					433	Missing	Ash, 'Rosehill' (RH)	70	13	75	90												$2,006 92
4	Single-species allees		04RH0434					434	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Grate Lift											$1,706 87
4	Single-species allees	04RH0435	04RH0435					435		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		Mower Damage									$2,315 67
4	Single-species allees		04RH0436					436	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High		No Grate									$1,873.12
4	Single-species allees	04RH0437	04RH0437					437		Ash, 'Rosehill' (RH)	70	15	35	90	Hazard Limb High	Crown Clean High	Storm Damage		4=severe	4	2=7-18"	2	1=Occassional	1	7	$1,246 90
4	Single-species allees		04RH0438					438	Missing	Ash, 'Rosehill' (RH)	70	14	50	90	Grate Lift	Crown Clean High	Trunk Wound									$1,551.70
4	Single-species allees	04RH0439	04RH0439					439		Ash, 'Rosehill' (RH)	70	14	75	90	Crown Clean High											$2,327 55
4	Single-species allees		04RH0440					440		Ash, 'Rosehill' (RH)	70	12	70	90	Grate Lift		Tag says Zone 3									$1,596 03
4	Single-species allees	04RH0441	04RH0441					441		Ash, 'Rosehill' (RH)	70	15	80	90												$2,850 06
4	Single-species allees		04RH0442					442	Defective	Ash, 'Rosehill' (RH)	70	12	70	90			Tag says Zone 2									$1,596 03
4	Single-species allees		04RH0443					443	Defective	Ash, 'Rosehill' (RH)	70	13	75	90			Tag says Zone 2									$2,006 92
4	Single-species allees		04RH0444					444		Ash, 'Rosehill' (RH)	70	3.5	65	90	Corrective Prune		Staked									$227.50

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	Single-species allees	04RH0445	04RH0445					445		Ash, 'Rosehill' (RH)	70	17	65	90	Crown Clean High		Trunk Wound	Mower Damage								$2,974 35
4	Single-species allees		04RH0446	X				446	Missing	Ash, 'Rosehill' (RH)	70	6	70	90			Forked									$399.01
4	Single-species allees		04RH0447					447	Missing	Ash, 'Rosehill' (RH)	70	18	80	90												$4,104 09
4	Single-species allees		04RH0448					448	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
4	Single-species allees	04RH0449	04RH0449					449		Ash, 'Rosehill' (RH)	70	19	75	90	Crown Clean High											$4,286 96
4	Single-species allees		04RH0450					450	Missing	Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High		No Grate									$1,368 03
4	Single-species allees		04RH0451					451	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Girdling Root									$2,432 05
4	Single-species allees		04RH0452					452	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
4	Single-species allees		04RH0453					453	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		Girdling Root									$2,315 67
4	Single-species allees		04RH0454					454	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High	Grate Lift										$2,017 21
4	Single-species allees		04RH0455					455		Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High		Tag says Zone 2									$1,471.74
4	Single-species allees		04RH0456				X	456	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
4	Single-species allees		04RH0457					457	Missing	Ash, 'Rosehill' (RH)	70	3	75	90												$225.00
4	Single-species allees		04RH0458					458	Defective	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
4	Single-species allees		04RH0459					459	Defective	Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High		Girdling Root									$3,334 57
4	Single-species allees		04RH0460					460	Defective	Ash, 'Rosehill' (RH)	70	14	50	90	Hazard Limb High	Grate Lift			4=severe	4	1=0-6"	1	3=Frequent	3	8	$1,551.70
4	Single-species allees		04RH0461					461	Defective	Ash, 'Rosehill' (RH)	70	18	70	90			Girdling Root									$3,591 07
4	Single-species allees		04RH0462					462		Ash, 'Rosehill' (RH)	70	13	65	90	Grate Lift	Crown Clean High	Tag says zone 2									$1,739 33
4	Single-species allees		04RH0463					463	Defective	Ash, 'Rosehill' (RH)	70	12	70	90			Girdling Root									$1,596 03
4	Single-species allees		04RH0464					464	Missing	Ash, 'Rosehill' (RH)	70	13	75	90	Grate Lift											$2,006 92
4	Single-species allees		04RH0465					465	Missing	Ash, 'Rosehill' (RH)	70	20	75	90												$4,750.10
4	Single-species allees		04RH0466					466	Missing	Ash, 'Rosehill' (RH)	70	18	75	90	Grate Lift		Girdling Root									$3,847 58
4	Single-species allees		04RH0467					467	Missing	Ash, 'Rosehill' (RH)	70	12	50	90	Crown Clean High		Girdling Root									$1,140 02
4	Single-species allees		04RH0468					468	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift		Forked									$2,172 38
4	Single-species allees	04RH0469	04RH0469					469		Ash, 'Rosehill' (RH)	70	16	65	90			Girdling Root	Tag Defective								$2,634.72
4	Single-species allees		04RH0470				X	470	Missing	Ash, 'Rosehill' (RH)	70	16	55	90			Girdling Root									$2,229 38
4	Single-species allees		04RH0471				X	471	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High	Crown Lifting	Trunk Wound									$1,706 87
4	Single-species allees	04RH0472	04RH0472			X		472		Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High											$3,203.15
4	Single-species allees	04RH0473	04RH0473					473		Ash, 'Rosehill' (RH)	70	14	70	90												$2,172 38
4	Single-species allees		04RH0474					474	Missing	Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High											$3,334 57
4	Single-species allees		04RH0475					475	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High		Girdling Root									$2,745 56
4	Single-species allees	04RH0476	04RH0476				X	476		Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
4	Single-species allees		04RH0477					477	Missing	Ash, 'Rosehill' (RH)	70	18	60	90	Crown Clean High											$3,078 06
4	Single-species allees		04RH0478					478	Missing	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High											$2,634.72
4	Single-species allees		04RH0479					479	Missing	Ash, 'Rosehill' (RH)	70	18	60	90	Crown Clean High											$3,078 06
4	Single-species allees		04RH0480					480	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
4	Single-species allees		04RH0481					481	Missing	Ash, 'Rosehill' (RH)	70	10	50	90	Crown Clean Low		Storm Damage									$791.68
4	Single-species allees		04RH0482					482	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune		Staked									$210.00
4	Single-species allees	04RH0483	04RH0483					483		Ash, 'Rosehill' (RH)	70	22	70	90	Crown Clean High	Crown Lifting	Tag says Zone 2									$5,364.45
4	Single-species allees		04RH0484					484	Missing	Ash, 'Rosehill' (RH)	70	22	70	90	Crown Clean High											$5,364.45
4	Single-species allees		04RH0485					485	Missing	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High											$2,634.72
4	Single-species allees		04RH0486					486	Missing	Ash, 'Rosehill' (RH)	70	9	75	90												$961.90
4	Single-species allees	04RH0487	04RH0487			X		487	Defective	Ash, 'Rosehill' (RH)	70	20	65	90	Crown Clean High		Trunk Wound	Tag Defective								$4,116.75
4	Single-species allees	04RH0488	04RH0488					488	Defective	Ash, 'Rosehill' (RH)	70	20	70	90	Crown Clean High											$4,433.43
4	Single-species allees		04RH0489					489	Missing	Ash, 'Rosehill' (RH)	70	20	65	90	Crown Clean High											$4,116.75
4	Single-species allees	04RH0490	04RH0490					490		Ash, 'Rosehill' (RH)	70	22	70	90	Crown Clean High											$5,364.45
4	Single-species allees		04RH0491					491	Missing	Ash, 'Rosehill' (RH)	70	19	65	90	Crown Clean High											$3,715 37
4	Single-species allees	04RH0492	04RH0492	X				492		Ash, 'Rosehill' (RH)	70	22	55	90	Crown Clean High		Borers									$4,214 92

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	South Pond Baldcypress Circle	04BC0068	04BC0068					68		Baldcypress (BC)	100	23	90	70												$8,376 01
4	South Pond Baldcypress Circle		04BC0069					69	Missing	Baldcypress (BC)	100	18	70	70	Crown Clean High											$3,990 08
4	South Pond Baldcypress Circle	04BC0070	04BC0070					70		Baldcypress (BC)	100	20	80	70												$5,629.75
4	South Pond Baldcypress Circle		04BC0174					174	Missing	Baldcypress (BC)	100	14	60	70			Trunk Wound									$2,068 93
4	South Pond Baldcypress Circle		04BC0175					175	Missing	Baldcypress (BC)	100	18	85	70												$4,845.10
4	South Pond Baldcypress Circle		04BC0176					176	Missing	Baldcypress (BC)	100	14	80	70												$2,758 58
4	South Pond Baldcypress Circle		04BC0178					178	Missing	Baldcypress (BC)	100	16	85	70												$3,828 23
4	South Pond Baldcypress Circle		04BC0179					179	Missing	Baldcypress (BC)	100	15	70	70			Mower Damage									$2,770 89
4	South Pond Baldcypress Circle		04BC0180					180	Missing	Baldcypress (BC)	100	17	80	70												$4,067.49
4	South Pond Baldcypress Circle		04BC0181					181	Missing	Baldcypress (BC)	100	14	80	70												$2,758 58
4	South Pond Baldcypress Circle		04BC0182					182	Missing	Baldcypress (BC)	100	14	75	70			Mower Damage	Girdling Root								$2,586.17
4	South Pond Baldcypress Circle		04BC0183					183	Missing	Baldcypress (BC)	100	16	60	70	Crown Clean High											$2,702 28
4	South Pond Baldcypress Circle		04BC0184					184	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
4	South Pond Baldcypress Circle		04BC0185					185	Missing	Baldcypress (BC)	100	18	75	70												$4,275 09
4	South Pond Baldcypress Circle		04BC0186					186	Missing	Baldcypress (BC)	100	18	80	70												$4,560.10
4	South Pond Baldcypress Circle	04BC0187	04BC0187					187		Baldcypress (BC)	100	14	70	70			Trunk Wound									$2,413.75
4	South Pond Baldcypress Circle		04BC0188					188	Missing	Baldcypress (BC)	100	15	70	70												$2,770 89
4	South Pond Baldcypress Circle		04BC0189					189	Missing	Baldcypress (BC)	100	15	80	70												$3,166.73
4	South Pond Baldcypress Circle		04BC0190					190	Missing	Baldcypress (BC)	100	18	80	70												$4,560.10
4	South Pond Baldcypress Circle	04BC0191	04BC0191					191		Baldcypress (BC)	100	16	75	70												$3,377 85
4	South Pond Baldcypress Circle		04BC0192					192	Missing	Baldcypress (BC)	100	14	70	70												$2,413.75
4	South Pond Baldcypress Circle	04BC0198	04BC0198					198		Baldcypress (BC)	100	18	80	70												$4,560.10
4	South Pond Baldcypress Circle		04BC0199					199	Missing	Baldcypress (BC)	100	14	70	70			Girdling Root									$2,413.75
4	South Pond Baldcypress Circle		04BC0200					200	Missing	Baldcypress (BC)	100	18	80	70												$4,560.10
4	South Pond Baldcypress Circle		04BC0201					201	Missing	Baldcypress (BC)	100	15	65	70	Crown Clean Low											$2,572 97
4	South Pond Baldcypress Circle		04BC0202					202	Missing	Baldcypress (BC)	100	16	65	70	Crown Clean Low		Mower Damage									$2,927.47
4	South Pond Baldcypress Circle		04BC0212					212	Defective	Baldcypress (BC)	100	16	75	70			Tag Defective, reads 213									$3,377 85
4	South Pond Baldcypress Circle		04BC0213					213	Missing	Baldcypress (BC)	100	18	70	70			Trunk Wound									$3,990 08
4	South Pond Baldcypress Circle		04BC0214					214	Missing	Baldcypress (BC)	100	15	80	70												$3,166.73
4	South Pond Baldcypress Circle		04BC0215					215	Missing	Baldcypress (BC)	100	15	70	70	Crown Clean High											$2,770 89
4	South Pond Baldcypress Circle		04BC0216					216	Missing	Baldcypress (BC)	100	15	80	70												$3,166.73
4	South Pond Baldcypress Circle		04BC0217					217	Missing	Baldcypress (BC)	100	17	80	70												$4,067.49
4	South Pond Baldcypress Circle		04BC0218					218	Missing	Baldcypress (BC)	100	14	80	70												$2,758 58
4	South Pond Baldcypress Circle	04BC0219	04BC0219					219		Baldcypress (BC)	100	15	65	70	Crown Clean High		Crowded									$2,572 97
4	South Pond Baldcypress Circle	04BC0250	04BC0250					250		Baldcypress (BC)	100	18	80	70			Trunk Wound									$4,560.10
4	South Pond Baldcypress Circle	04BC0251	04BC0251					251		Baldcypress (BC)	100	18	80	70			Trunk Wound									$4,560.10
4	South Pond Baldcypress Circle	04BC0252	04BC0252					252		Baldcypress (BC)	100	20	75	70												$5,277 89
4	South Pond Baldcypress Circle		04BC0253					253	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
4	South Pond Baldcypress Circle		04BC0254					254	Missing	Baldcypress (BC)	100	16	30	70			Trunk Wound									$1,351.14
4	South Pond Baldcypress Circle		04BC0255					255	Missing	Baldcypress (BC)	100	15	70	70												$2,770 89

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	South Pond Baldcypress Circle		04BC0256					256	Missing	Baldcypress (BC)	100	19	80	70												$5,080 85
4	South Pond Area Plantings		04BN0064					64	Missing	Birch, River (BN)	80	5	80	70	Crown Lifting		Multi-stem									$281.49
4	South Pond Area Plantings		04BN0071					71	Missing	Birch, River (BN)	80	5	75	70	Crown Lifting		Multi-stem									$263.89
4	South Pond Area Plantings		04BN0072					72	Missing	Birch, River (BN)	80	5	75	70	Crown Lifting		Multi-stem									$263.89
4	South Pond Area Plantings		04BN0098					98	Missing	Birch, River (BN)	80	4	85	70												$340.00
4	South Pond Area Plantings		04BN0139					139	Missing	Birch, River (BN)	80	2	50	70	Crown Repair		Multi-stem	Insect/Disease/Stress								$100.00
4	South Pond Area Plantings		04BN0141					141	Missing	Birch, River (BN)	80	3	70	70			Multi-stem									$210.00
4	South Pond Area Plantings		04BN0150					150	Missing	Birch, River (BN)	80	12	85	70	Crown Lifting		Multi-stem									$1,722.70
4	South Pond Area Plantings		04BN0169					169	Missing	Birch, River (BN)	80	3	80	70			Multi-stem									$240.00
4	South Pond Area Plantings		04BN0302					302	Missing	Birch, River (BN)	80	4	80	70			Multi-stem									$320.00
4	South Pond Area Plantings		04BN0315					315	Missing	Birch, River (BN)	80	4	80	70			Multi-stem									$320.00
4	South Pond Area Plantings		04BN0324					324	Missing	Birch, River (BN)	80	4	80	70			Multi-stem									$320.00
4	South Pond Area Plantings	04KC0051	04KC0051					51		Coffeetree, Kentucky (KC)	80	10	75	70	Crown Lifting		Mower Damage									$1,055 58
4	South Pond Area Plantings	04KC0052	04KC0052					52		Coffeetree, Kentucky (KC)	80	15	80	70	Crown Lifting											$2,533 39
4	South Pond Area Plantings	04KC0100	04KC0100					100		Coffeetree, Kentucky (KC)	80	8	75	70												$675.57
4	South Pond Area Plantings		04KC0248					248	Missing	Coffeetree, Kentucky (KC)	80	6	75	70			Trunk Wound									$380.01
4	South Pond Area Plantings		04KC0249					249	Missing	Coffeetree, Kentucky (KC)	80	7	80	70												$551.72
4	South Pond Area Plantings		04AC0316					316	Missing	Corktree, Amur (AC)	70	6	75	70			Mower Damage									$332.51
4	South Pond Area Plantings		04RC0026					26	Missing	Crabapple, Radiant (RC)	70	2.5	30	70			Insect/disease/stress									$75 00
4	South Pond Area Plantings		04RC0028					28	Missing	Crabapple, Radiant (RC)	70	12	60	70			Forked									$1,064 02
4	South Pond Area Plantings		04RC0088					88	Missing	Crabapple, Radiant (RC)	70	2	65	70												$130.00
4	South Pond Area Plantings		04RC0089					89	Missing	Crabapple, Radiant (RC)	70	2	65	70												$130.00
4	South Pond Area Plantings		04RC0093					93	Missing	Crabapple, Radiant (RC)	70	2	70	70												$140.00
4	South Pond Area Plantings		04RC0094					94	Missing	Crabapple, Radiant (RC)	70	2	70	70												$140.00
4	South Pond Area Plantings		04RC0095					95	Missing	Crabapple, Radiant (RC)	70	2	70	70												$140.00
4	South Pond Area Plantings		04RC0102					102	Missing	Crabapple, Radiant (RC)	70	2	55	70			Leaning									$110.00
4	South Pond Area Plantings		04RC0103					103	Missing	Crabapple, Radiant (RC)	70	2	65	70			Trunk Wound									$130.00
4	South Pond Area Plantings		04RC0104					104	Missing	Crabapple, Radiant (RC)	70	2	65	70												$130.00
4	South Pond Area Plantings		04SD0195					195	Missing	Crabapple, Radiant (RC)	70	8	40	70	Crown Clean Low		Trunk Wound									$315.27
4	South Pond Area Plantings		04SD0196					196	Missing	Crabapple, Radiant (RC)	70	10	30	70	Crown Clean Low		Trunk Wound	Insect/Disease/Stress								$369.45
4	South Pond Area Plantings		04SD0197					197	Missing	Crabapple, Radiant (RC)	70	10	30	70	Crown Clean Low		Trunk Wound	Insect/Disease/Stress								$369.45
4	South Pond Area Plantings		04RC0223					223	Missing	Crabapple, Radiant (RC)	70	2	60	70			Leaning									$120.00
4	South Pond Area Plantings		04RC0224					224	Missing	Crabapple, Radiant (RC)	70	2.5	70	70												$175.00
4	South Pond Area Plantings		04RC0319					319	Missing	Crabapple, Radiant (RC)	70	4.5	60	70			Mower Damage									$270.00
4	South Pond Area Plantings		04CR0040					40	Missing	Crabapple, Robinson (CR)	70	2.5	70	70			Mower Damage									$175.00
4	South Pond Area Plantings		04CR0041					41	Missing	Crabapple, Robinson (CR)	70	2	50	70			Mower Damage	Staked								$100.00
4	South Pond Area Plantings		04CR0092					92	Missing	Crabapple, Robinson (CR)	70	2	70	70			Mower Damage									$140.00
4	South Pond Area Plantings		04CR0096					96	Missing	Crabapple, Robinson (CR)	70	2.5	75	70												$187.50
4	South Pond Area Plantings		04CR0097					97	Missing	Crabapple, Robinson (CR)	70	2	65	70			Mower Damage									$130.00
4	South Pond Area Plantings		04CR0099					99	Missing	Crabapple, Robinson (CR)	70	2.5	70	70												$175.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	South Pond Area Plantings		04CR0105					105	Missing	Crabapple, Robinson (CR)	70	2	65	70			Mower Damage									$130.00
4	South Pond Area Plantings		04CR0106					106	Missing	Crabapple, Robinson (CR)	70	2	70	70			Mower Damage									$140.00
4	South Pond Area Plantings		04SD0017					17	Missing	Crabapple, Snowdrift (SD)	70	4	40	70	Crown Clean Low		Insect/disease/stress	Trunk Wound								$160.00
4	South Pond Area Plantings		04SD0018					18	Missing	Crabapple, Snowdrift (SD)	70	8	60	70			Sapsuckers									$472.90
4	South Pond Area Plantings		04SD0019					19	Missing	Crabapple, Snowdrift (SD)	70	6	60	70			Sapsuckers	Forked								$266.01
4	South Pond Area Plantings		04SD0027					27	Missing	Crabapple, Snowdrift (SD)	70	9	65	70			Sapsuckers									$648.39
4	South Pond Area Plantings		04SD0061					61	Missing	Crabapple, Snowdrift (SD)	70	8	65	70												$512.31
4	South Pond Area Plantings		04SD0062					62	Missing	Crabapple, Snowdrift (SD)	70	8	65	70												$512.31
4	South Pond Area Plantings		04SD0063					63	Missing	Crabapple, Snowdrift (SD)	70	6	65	70												$288.17
4	South Pond Area Plantings		04SD0075	X				75	Missing	Crabapple, Snowdrift (SD)	70	8	65	70												$512.31
4	South Pond Area Plantings		04SD0076	X				76	Missing	Crabapple, Snowdrift (SD)	70	8	55	70			Sapsuckers									$433.49
4	South Pond Area Plantings		04SD0081	X				81	Missing	Crabapple, Snowdrift (SD)	70	8	55	70			Sapsuckers	Mower Damage								$433.49
4	South Pond Area Plantings	04SD082	04SD0082					82		Crabapple, Snowdrift (SD)	70	10	60	70			Sapsuckers	Mower Damage								$738.90
4	South Pond Area Plantings	04SD193	04SD0193					193		Crabapple, Snowdrift (SD)	70	8	70	70			Sapsuckers									$551.72
4	South Pond Area Plantings		04SD0194					194	Missing	Crabapple, Snowdrift (SD)	70	6	50	70			Mower Damage									$221.67
4	South Pond Area Plantings	04SD0232	04SD0232					232		Crabapple, Snowdrift (SD)	70	8	70	70			Sapsuckers	Mower Damage								$551.72
4	South Pond Area Plantings		04SD0233					233	Missing	Crabapple, Snowdrift (SD)	70	8	60	70			Sapsuckers	Mower Damage								$472.90
4	South Pond Area Plantings		04SD0239					239	Missing	Crabapple, Snowdrift (SD)	70	2.5	70	70	Corrective Prune		Staked									$175.00
4	South Pond Area Plantings	04SD0260	04SD0260					260		Crabapple, Snowdrift (SD)	70	12	70	70			Trunk Wound									$1,241 36
4	South Pond Area Plantings	04SD261	04SD0261					261		Crabapple, Snowdrift (SD)	70	10	70	70	Crown Clean Low		Mower Damage									$862.06
4	South Pond Area Plantings		04SD0262					262	Missing	Crabapple, Snowdrift (SD)	70	10	75	70												$923.63
4	South Pond Area Plantings		04SD0284					284	Missing	Crabapple, Snowdrift (SD)	70	10.5	70	70	Mulch		Sapsuckers	Mower Damage								$950.42
4	South Pond Area Plantings		04SD0300					300	Missing	Crabapple, Snowdrift (SD)	70	7.5	70	70	Mulch		Sapsuckers									$484.91
4	South Pond Area Plantings		04SD0301					301	Missing	Crabapple, Snowdrift (SD)	70	2	65	70			Staked									$130.00
4	South Pond Area Plantings		04SD0311					311	Missing	Crabapple, Snowdrift (SD)	70	5	70	70			Forked									$215.51
4	South Pond Area Plantings		04SD0318					318	Missing	Crabapple, Snowdrift (SD)	70	8	65	70			Sapsuckers	Forked								$512.31
4	South Pond Area Plantings		04PD0073					73	Missing	Dogwood, Pagoda (PD)	90	2	20	70	Rec Remove		Root Damage	Storm Damage								$40 00
4	South Pond Area Plantings		04PD0080					80	Missing	Dogwood, Pagoda (PD)	90	2	75	70	Corrective Prune											$150.00
4	South Pond Area Plantings		04SH0004					4	Missing	Hackberry, Sugar (SH)	80	2	65	70												$130.00
4	South Pond Area Plantings		04SH0010					10	Missing	Hackberry, Sugar (SH)	80	3	65	70	Corrective Prune											$195.00
4	South Pond Area Plantings		04SH0078					78	Missing	Hackberry, Sugar (SH)	80	2	70	70												$140.00
4	South Pond Area Plantings		04SH0090					90	Missing	Hackberry, Sugar (SH)	80	2	70	70	Crown Lifting											$140.00
4	South Pond Area Plantings		04SH0091					91	Missing	Hackberry, Sugar (SH)	80	2	75	70	Corrective Prune											$150.00
4	South Pond Area Plantings		04SH0235					235	Missing	Hackberry, Sugar (SH)	80	3	75	70												$225.00
4	South Pond Area Plantings		04CH0236					236	Missing	Hackberry, Sugar (SH)	80	6	65	70			Staked									$329.34
4	South Pond Area Plantings		04SH0278					278	Missing	Hackberry, Sugar (SH)	80	3.3	85	70	Corrective Prune	Mulch										$280.50
4	South Pond Area Plantings		04SH0309					309	Missing	Hackberry, Sugar (SH)	80	10	55	70			Epicormic Branching									$774.09
4	South Pond Area Plantings		04CH0313					313	Missing	Hackberry, Sugar (SH)	80	2.5	75	70												$187.50
4	South Pond Area Plantings		04SH0314					314	Missing	Hackberry, Sugar (SH)	80	9	60	70	Crown Lifting		Girdling Root	Epicormic Branching								$684.01
4	South Pond Area Plantings		04WH0126					126	Missing	Hawthorn, Washington (WH)	60	7	75	70	Corrective Prune		Forked	Trunk Wound								$387.92

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	South Pond Area Plantings		04WH0127					127	Missing	Hawthorn, Washington (WH)	60	2	55	70	Corrective Prune		Multi-stem									$110.00
4	South Pond Area Plantings		04WH0128					128	Missing	Hawthorn, Washington (WH)	60	2	55	70			Multi-stem									$110.00
4	South Pond Area Plantings	04WH0129	04WH0129					129		Hawthorn, Washington (WH)	60	6	70	70			Mower Damage	Forked								$266.01
4	South Pond Area Plantings	04WH0131	04WH0131					131		Hawthorn, Washington (WH)	60	6	70	70			Mower Damage	Forked								$266.01
4	South Pond Area Plantings		04WH0132					132	Missing	Hawthorn, Washington (WH)	60	2.5	60	70			Multi-stem									$150.00
4	South Pond Area Plantings		04WH0133					133	Missing	Hawthorn, Washington (WH)	60	2.5	60	70			Multi-stem									$150.00
4	South Pond Area Plantings	04WH0266	04WH0266		X			266		Hawthorn, Washington (WH)	60	2		70			REPLANTED 12/08	Rust								$0.00
4	South Pond Area Plantings		04WH0268		X			268	Missing	Hawthorn, Washington (WH)	60	2		70			REPLANTED 12/08									$0.00
4	South Pond Area Plantings	04WH0270	04WH0270					270		Hawthorn, Washington (WH)	60	8	75	70												$506.68
4	South Pond Area Plantings		04HL0170					170	Missing	Honeylocust (HL)	75	3	70	70	Corrective Prune											$210.00
4	South Pond Area Plantings		04HL0220					220	Missing	Honeylocust (HL)	75	4	70	70												$280.00
4	South Pond Area Plantings		04HL0221					221	Missing	Honeylocust (HL)	75	4	70	70												$280.00
4	South Pond Area Plantings		04HL0222					222	Missing	Honeylocust (HL)	75	4	60	70	Corrective Prune		Poor Branch Form									$240.00
4	South Pond Area Plantings		04HL0321					321	Missing	Honeylocust (HL)	75	4	70	70												$280.00
4	South Pond Area Plantings		04HL0322					322	Missing	Honeylocust (HL)	75	3	75	70												$225.00
4	South Pond Area Plantings	04HL0020	04HL0020					20		Honeylocust, Shademaster (HL)	75	14	60	70	Crown Clean High											$1,551.70
4	South Pond Area Plantings		04HL0021		x			21	Missing	Honeylocust, Shademaster (HL)	75			70			replaced with AH 01 09									$0.00
4	South Pond Area Plantings		04HL0022					22	Missing	Honeylocust, Shademaster (HL)	75	2.5	70	70												$175.00
4	South Pond Area Plantings		04HL0048					48	Missing	Honeylocust, Shademaster (HL)	75			70			? CHANGED TO AH. Was HL									$0.00
4	South Pond Area Plantings		04HL0050					50	Missing	Honeylocust, Shademaster (HL)	75	15	30	70	Hazard Tree		Trunk Wound	Insect/Disease/Stress	2=Medium	2	2=7-18"	2	1=Occassional	1	5	
4	South Pond Area Plantings		04HL0056					56	Missing	Honeylocust, Shademaster (HL)	75	10		70			? CHANGED TO AH. Was HL								0	
4	South Pond Area Plantings		04HL0059					59	Missing	Honeylocust, Shademaster (HL)	75			70			? CHANGED TO AH. Was HL								0	
4	South Pond Area Plantings	04HL0060	04HL0060					60	Defective	Honeylocust, Shademaster (HL)	75	18	70	70	Crown Lifting											$2,992 56
4	South Pond Area Plantings		04HL0171					171	Missing	Honeylocust, Shademaster (HL)	75	16	20	70	Hazard Tree		Trunk Wound	Insect/Disease/Stress	2=Medium	2	2=7-18"	2	1=Occassional	1	5	
4	South Pond Area Plantings		04HL0172					172	Missing	Honeylocust, Shademaster (HL)	75	14	70	70	Crown Clean High											$1,810 32
4	South Pond Area Plantings		04HL0173					173	Missing	Honeylocust, Shademaster (HL)	75	12	70	70	Crown Lifting		Mower Damage									$1,330 03
4	South Pond Area Plantings		04HL0320					320	Missing	Honeylocust, Shademaster (HL)	75	15	55	70	Crown Clean High		Mower Damage									$1,632 85
4	South Pond Area Plantings	04GL0005	04GL0005					5		Linden, Greenspire (GL)	80	10	50	70	Crown Lifting		Trunk Wound	Mower Damage								$703.72
4	South Pond Area Plantings	04GL0008	04GL0008					8		Linden, Greenspire (GL)	80	12	70	70	Crown Lifting		Mower Damage	Girdling Root								$1,418.70
4	South Pond Area Plantings	04GL0009	04GL0009					9		Linden, Greenspire (GL)	80	12	75	70	Crown Lifting											$1,520 03
4	South Pond Area Plantings		04GL0065					65	Missing	Linden, Greenspire (GL)	80	12	70	70	Crown Lifting											$1,418.70
4	South Pond Area Plantings		04GL0067					67	Missing	Linden, Greenspire (GL)	80	14	70	70	Crown Lifting	Crown Clean Low	Mower Damage									$1,931 00
4	South Pond Area Plantings	04GL0074	04GL0074					74		Linden, Greenspire (GL)	80	10	65	70	Crown Lifting		Girdling Root									$914.83
4	South Pond Area Plantings	04GL0083	04GL0083					83		Linden, Greenspire (GL)	80	14	75	70	Crown Lifting		Girdling Root	Mower Damage								$2,068 93
4	South Pond Area Plantings	04GL0085	04GL0085					85		Linden, Greenspire (GL)	80	12	75	70	Crown Lifting											$1,520 03
4	South Pond Area Plantings	04GL0135	04GL0135					135		Linden, Greenspire (GL)	80	9	75	70	Crown Lifting											$855.02
4	South Pond Area Plantings		04GL0137					137	Missing	Linden, Greenspire (GL)	80	10	60	70	Crown Lifting		Girdling Root									$844.46
4	South Pond Area Plantings		04GL0138					138	Missing	Linden, Greenspire (GL)	80	10	50	70	Crown Lifting		Trunk Wound	Insect/Disease/Stress								$703.72
4	South Pond Area Plantings		04GL0140					140	Missing	Linden, Greenspire (GL)	80	10	65	70	Crown Lifting		Leaning									$914.83
4	South Pond Area Plantings		04GL0257		X			257	Missing	Linden, Greenspire (GL)	80	2		70			REPLANTED 01/09	Mower Damage								$0.00

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4	South Pond Area Plantings	04MS0046	04MS0046					46		Magnolia, Saucer (MS)	80	4	70	70			Multi-stem	Girdling Root								$280.00
4	South Pond Area Plantings	04MS0066	04MS0066					66		Magnolia, Saucer (MS)	80	4	60	70			Trunk Wound	Girdling Root								$240.00
4	South Pond Area Plantings	04MS0237	04MS0237					237		Magnolia, Saucer (MS)	80	4	50	70			Trunk Wound									$200.00
4	South Pond Area Plantings	04MS0273	04MS0273					273		Magnolia, Saucer (MS)	80	4	75	70			Multi-stem									$300.00
4	South Pond Area Plantings		04MS0274					274	Missing	Magnolia, Saucer (MS)	80	4	65	70			Multi-stem	Girdling Root								$260.00
4	South Pond Area Plantings	04RM0107	04RM0107					107		Maple, Red (RM)	90	12	70	70	Crown Clean Low											$1,596 03
4	South Pond Area Plantings	04RM0109	04RM0109					109		Maple, Red (RM)	90	14	70	70	Crown Lifting		Mower Damage									$2,172 38
4	South Pond Area Plantings		04RM0111					111	Missing	Maple, Red (RM)	90	13	55	70	Crown Clean Low											$1,471.74
4	South Pond Area Plantings		04RM0112					112	Missing	Maple, Red (RM)	90	2.5	65	70	Corrective Prune		Mower Damage									$162.50
4	South Pond Area Plantings	04RM0113	04RM0113					113		Maple, Red (RM)	90	13	70	70	Crown Lifting		Girdling Root									$1,873.12
4	South Pond Area Plantings	04RM0116	04RM0116					116		Maple, Red (RM)	90	12	65	70	Crown Clean Low											$1,482 03
4	South Pond Area Plantings		04RM0160					160	Missing	Maple, Red (RM)	90	6	50	70			Trunk Wound									$285.01
4	South Pond Area Plantings		04RM0161					161	Missing	Maple, Red (RM)	90	1.5	70	70	Corrective Prune											$105.00
4	South Pond Area Plantings	04RM0162	04RM0162					162		Maple, Red (RM)	90	10	60	70	Crown Clean High		Girdling Root									$950.02
4	South Pond Area Plantings	04RM0163	04RM0163					163		Maple, Red (RM)	90	10	65	70			Girdling Root	Trunk Wound								$1,029.19
4	South Pond Area Plantings	04RM0164	04RM0164					164		Maple, Red (RM)	90	12	80	70	Crown Lifting		Girdling Root									$1,824 04
4	South Pond Area Plantings		04RM0165					165	Missing	Maple, Red (RM)	90	12	75	70			Girdling Root	Mower Damage								$1,710 04
4	South Pond Area Plantings	04RM0166	04RM0166					166		Maple, Red (RM)	90	9	80	70			Mower Damage									$1,026 02
4	South Pond Area Plantings		04RM0167					167	Missing	Maple, Red (RM)	90	10	55	70			Poor Branch Form									$870.85
4	South Pond Area Plantings		04RM0263					263	Missing	Maple, Red (RM)	90	10	65	70	Crown Clean Low		Girdling Root									$1,029.19
4	South Pond Area Plantings	04RM0264	04RM0264					264		Maple, Red (RM)	90	10	70	70			Girdling Root									$1,108 36
4	South Pond Area Plantings	04RM0265	04RM0265	X				265		Maple, Red (RM)	90	12	70	70			Girdling Root	Mower Damage								$1,596 03
4	South Pond Area Plantings	04RM0282	04RM0282					282		Maple, Red (RM)	90	10	70	70	Mulch		Girdling Root	Mower Damage								$1,108 36
4	South Pond Area Plantings		04RM0283					283	Missing	Maple, Red (RM)	90	3	70	70	Corrective Prune	Mulch										$210.00
4	South Pond Area Plantings		04RM0285					285	Missing	Maple, Red (RM)	90	3.5	75	70	Corrective Prune	Mulch										$262.50
4	South Pond Area Plantings		04RM0305					305	Missing	Maple, Red (RM)	90	3	70	70	Corrective Prune											$210.00
4	South Pond Area Plantings		04RM0306					306	Missing	Maple, Red (RM)	90	4	80	70												$320.00
4	South Pond Area Plantings	04GL0077	04SM0077					77	Defective	Maple, Sugar (SM)	100	9	60	70			Tag says GL should be SM	Mower Damage								$855.02
4	South Pond Area Plantings	04SM0079	04SM0079					79		Maple, Sugar (SM)	100	10	45	70			Trunk Wound	Forked								$791.68
4	South Pond Area Plantings	04SM152	04SM152					152		Maple, Sugar (SM)	100	6	75	70	Corrective Prune											$475.01
4	South Pond Area Plantings	04SM159	04SM0159					159		Maple, Sugar (SM)	100	10	65	70			Girdling Root	Mower Damage								$1,143 54
4	South Pond Area Plantings		04SM0271					271	Missing	Maple, Sugar (SM)	100	5	45	70			Trunk Wound									$197.92
4	South Pond Area Plantings	04SM0276	04SM0276					276		Maple, Sugar (SM)	100	9	80	70	Mulch											$1,140 02
4	South Pond Area Plantings		04BO0037					37	Missing	Oak, Bur (BO)	100	16	70	70			Sapsuckers	Mower Damage								$3,152 66
4	South Pond Area Plantings		04BO0038					38	Missing	Oak, Bur (BO)	100	15	75	70												$2,968 81
4	South Pond Area Plantings		04BO0039					39	Missing	Oak, Bur (BO)	100	14	75	70			Mower Damage									$2,586.17
4	South Pond Area Plantings		04BO0042					42	Missing	Oak, Bur (BO)	100	15	60	70	Crown Clean High											$2,375 05
4	South Pond Area Plantings		04BO0043					43	Missing	Oak, Bur (BO)	100	16	75	70	Crown Clean High											$3,377 85
4	South Pond Area Plantings		04BO0044					44	Missing	Oak, Bur (BO)	100	11	75	70												$1,596 56
4	South Pond Area Plantings	04BO045	04BO0045					45		Oak, Bur (BO)	100	19	75	70	Crown Lifting											$4,763 29

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4	South Pond Area Plantings		04BO0117					117	Missing	Oak, Bur (BO)	100	15	75	70			Mower Damage									$2,968 81
4	South Pond Area Plantings		04BO0118					118	Missing	Oak, Bur (BO)	100	18	70	70	Crown Clean High		Mower Damage									$3,990 08
4	South Pond Area Plantings		04BO0120	X				120	Missing	Oak, Bur (BO)	100	18	75	70	Crown Clean High		Mower Damage									$4,275 09
4	South Pond Area Plantings		04BO0121					121	Missing	Oak, Bur (BO)	100	22	65	70	Crown Clean High		Mower Damage									$5,534.75
4	South Pond Area Plantings		04BO0122					122	Missing	Oak, Bur (BO)	100	16	70	70	Crown Clean High		Girdling Root									$3,152 66
4	South Pond Area Plantings		04BO0123					123	Missing	Oak, Bur (BO)	100	16	65	70	Crown Clean High	Crown Lifting	Mower Damage									$2,927.47
4	South Pond Area Plantings		04BO0124					124	Missing	Oak, Bur (BO)	100	15	65	70	Crown Lifting		Mower Damage									$2,572 97
4	South Pond Area Plantings		04BO0277					277	Missing	Oak, Bur (BO)	100	16.5	85	70	Mulch											$4,071 23
4	South Pond Area Plantings		04BO0279					279	Missing	Oak, Bur (BO)	100	17	75	70	Mulch		Girdling Root									$3,813 27
4	South Pond Area Plantings		04BO0280					280	Missing	Oak, Bur (BO)	100	15.5	75	70	Mulch	Crown Lifting	Mower Damage									$3,170 03
4	South Pond Area Plantings		04BO0281					281	Missing	Oak, Bur (BO)	100	17	80	70	Mulch											$4,067.49
4	South Pond Area Plantings		04BO0293					293	Defective	Oak, Bur (BO)	100	16.5	80	70	Crown Clean High	Mulch	Girdling Root									$3,831.75
4	South Pond Area Plantings	4BO294	04BO0294					294		Oak, Bur (BO)	100	19	85	70	Crown Clean High	Mulch										$5,398.40
4	South Pond Area Plantings		04BO0295					295	Missing	Oak, Bur (BO)	100	14.5	75	70	Mulch		Girdling Root	Mower Damage								$2,774.19
4	South Pond Area Plantings		04BO0296					296	Missing	Oak, Bur (BO)	100	15.5	80	70	Crown Clean High	Mulch										$3,381 37
4	South Pond Area Plantings		04BO0297					297	Missing	Oak, Bur (BO)	100	16	75	70	Crown Lifting											$3,377 85
4	South Pond Area Plantings		04BO0298					298	Missing	Oak, Bur (BO)	100	15	80	70			Mower Damage									$3,166.73
4	South Pond Area Plantings	4BO299	04BO0299					299		Oak, Bur (BO)	100	14.5	80	70			Girdling Root									$2,959.14
4	South Pond Area Plantings	04RO0149	04RO0149					149		Oak, Red (RO)	100	9	75	70												$1,068.77
4	South Pond Area Plantings		04RO0272					272	Missing	Oak, Red (RO)	100	11	70	70	Crown Clean Low											$1,490.12
4	South Pond Area Plantings	04RO0275	04RO0275					275		Oak, Red (RO)	100	13	75	70	Mulch		Mower Damage									$2,229 91
4	South Pond Area Plantings	04JP0025	04JP0025					25		Pagodatree, Japanese (JP)	70	14	75	70	Crown Clean High											$1,810 32
4	South Pond Area Plantings		04JP0029					29	Missing	Pagodatree, Japanese (JP)	70	10	75	70	Crown Clean High											$923.63
4	South Pond Area Plantings		04JP0030			X		30	Missing	Pagodatree, Japanese (JP)	70	12	70	70	Crown Clean Low											$1,241 36
4	South Pond Area Plantings		04JP0101					101	Missing	Pagodatree, Japanese (JP)	70	10	70	70	Crown Clean Low		Mower Damage									$862.06
4	South Pond Area Plantings		04JP0114					114	Missing	Pagodatree, Japanese (JP)	70	11	65	70	Crown Clean Low		Forked									$968.58
4	South Pond Area Plantings		04JP0115					115	Missing	Pagodatree, Japanese (JP)	70	12	65	70	Crown Clean Low	Crown Lifting	Forked	Mower Damage								$1,152 69
4	South Pond Area Plantings		04JP0243			X		243	Missing	Pagodatree, Japanese (JP)	70	10	40	70	Crown Repair		Insect/disease/stress									$492.60
4	South Pond Area Plantings		04JP0244			X		244	Missing	Pagodatree, Japanese (JP)	70	6	35	70	Crown Clean Low		Insect/disease/stress	Trunk Wound								$155.17
4	South Pond Area Plantings		04BP0003		X			3	Missing	Pear, Bradford (BP)	60			70			REPLACED WITH CP 04 09									$0.00
4	South Pond Area Plantings		04BP0143					116	Missing	Pear, Bradford (BP)	60	15	30	70	Hazard Tree		Trunk Wound	Insect/Disease/Stress	2=Medium	2	2=7-18"	2	1=Occassional	1	5	
4	South Pond Area Plantings	04BP0145	04BP0145					145		Pear, Bradford (BP)	60	15	50	70			Mower Damage									$1,187 52
4	South Pond Area Plantings		04BP0146					146	Missing	Pear, Bradford (BP)	60	2		70			REPLNTED 4/09		3=High	3	2=7-18"	2	1=Occassional	1	6	
4	South Pond Area Plantings		04BP0147					147	Missing	Pear, Bradford (BP)	60	15	40	70	Crown Clean Low		Insect/disease/stress									$950.02
4	South Pond Area Plantings		04BP0204					204	Missing	Pear, Bradford (BP)	60	15	50	70	Crown Clean High		Mower Damage									$1,187 52
4	South Pond Area Plantings		04BP0205					205	Missing	Pear, Bradford (BP)	60	16	45	70	Hazard Limb High	Rec. Removal	Mower Damage	Storm Damage	3=High	3	1=0-6"	1	1=Occassional	1	5	$1,216 03
4	South Pond Area Plantings		04BP0206					206	Missing	Pear, Bradford (BP)	60	16	20	70	Hazard Tree		Trunk Wound		3=High	3	2=7-18"	2	1=Occassional	1	6	
4	South Pond Area Plantings	04BP0207	04BP0207					207		Pear, Bradford (BP)	60	16	50	70	Crown Clean High		Insect/disease/stress									$1,351.14
4	South Pond Area Plantings		04BP0210					210	Missing	Pear, Bradford (BP)	60	16	35	70	Hazard Limb High	Rec. Removal	Trunk Wound		3=High	3	2=7-18"	2	1=Occassional	1	6	$945.80
4	South Pond Area Plantings	04BP0211	04BP0211					211		Pear, Bradford (BP)	60	14	45	70			Trunk Wound	Mower Damage								$931.02

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
4	South Pond Area Plantings	4RS307	04RS0307					307		Pear, Redspire (RS)	65	10	65	70			Mower Damage									$743.30
4	South Pond Area Plantings	4RS308	04RS0308					308	Defective	Pear, Redspire (RS)	65	12	65	70			Mower Damage									$1,070 36
4	South Pond Area Plantings		04RB0012					12	Missing	Redbud, Eastern (RB)	80	8	75	70			Forked									$675.57
4	South Pond Area Plantings		04RB0014					14	Missing	Redbud, Eastern (RB)	80	5	60	70	Crown Clean Low		Forked									$211.12
4	South Pond Area Plantings		04RB0015					15	Missing	Redbud, Eastern (RB)	80	6.5	55	70			Trunk Wound	Mower Damage								$327.05
4	South Pond Area Plantings		04RB0016					16	Missing	Redbud, Eastern (RB)	80	2.5	75	70	Mulch											$187.50
4	South Pond Area Plantings		04RB0031		X			31	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 11 08									$0.00
4	South Pond Area Plantings		04RB0032					32	Missing	Redbud, Eastern (RB)	80	2.5	70	70			Mower Damage									$175.00
4	South Pond Area Plantings		04RB0033					33	Missing	Redbud, Eastern (RB)	80	2.5	70	70	Corrective Prune											$175.00
4	South Pond Area Plantings		04RB0034					34	Missing	Redbud, Eastern (RB)	80	3.5	65	70	Corrective Prune		Girdling Root									$227.50
4	South Pond Area Plantings	04RB0053	04RB0053					53		Redbud, Eastern (RB)	80	8	70	70			Mower Damage									$630.53
4	South Pond Area Plantings	04RB0054	04RB0054					54		Redbud, Eastern (RB)	80	8	70	70	Crown Clean Low		Mower Damage									$630.53
4	South Pond Area Plantings		04RB0057					57	Missing	Redbud, Eastern (RB)	80	8	55	70	Crown Clean Low		Forked	Trunk Wound								$495.42
4	South Pond Area Plantings		04RB0058					58	Missing	Redbud, Eastern (RB)	80	5	55	70	Crown Clean Low		Storm Damage	Forked								$193.52
4	South Pond Area Plantings		04RB0065					65	Missing	Redbud, Eastern (RB)	80	8	75	70			Mower Damage									$675.57
4	South Pond Area Plantings		04RB0153					153	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 12/08									$0.00
4	South Pond Area Plantings		04RB0154					154	Missing	Redbud, Eastern (RB)	80	2		70			REPLNTED 12/08									$0.00
4	South Pond Area Plantings		04RB0155					155	Missing	Redbud, Eastern (RB)	80	6	50	70	Crown Clean Low		Crowded	Trunk Wound								$253.34
4	South Pond Area Plantings	04RB0156	04RB0156					156		Redbud, Eastern (RB)	80	2		70			REPLANTED 5/09									$0.00
4	South Pond Area Plantings		04RB0157					157	Missing	Redbud, Eastern (RB)	80	10	65	70	Crown Clean Low		Forked	Mower Damage								$914.83
4	South Pond Area Plantings		04RB0158					158	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 12/08	Leaning								$0.00
4	South Pond Area Plantings		04RB0228	X				228	Missing	Redbud, Eastern (RB)	80	9	50	70	Crown Clean Low		Mower Damage	Forked								$570.01
4	South Pond Area Plantings	04RB0229	04RB0229					229		Redbud, Eastern (RB)	80	9	60	70	Crown Clean Low		Mower Damage	Forked								$684.01
4	South Pond Area Plantings		04RB0230					230	Missing	Redbud, Eastern (RB)	80	4	70	70			Mower Damage	Forked								$280.00
4	South Pond Area Plantings		04RB0240					240	Missing	Redbud, Eastern (RB)	80	2.5	70	70	Corrective Prune											$175.00
4	South Pond Area Plantings		04RB0241			X		241	Missing	Redbud, Eastern (RB)	80	10	60	70	Crown Clean Low		Trunk Wound									$844.46
4	South Pond Area Plantings		04RB0242					242	Missing	Redbud, Eastern (RB)	80	2.5	70	70	Corrective Prune											$175.00
4	South Pond Area Plantings		04RB0286					286	Missing	Redbud, Eastern (RB)	80	4	45	70			Trunk Wound									$180.00
4	South Pond Area Plantings		04RB0288					288	Missing	Redbud, Eastern (RB)	80	8	35	70	Hazard Tree		Ganaderma at Base		2=Medium	2	2=7-18"	2	2=Intermediate	2	6	
4	South Pond Area Plantings		04RB0290					290	Missing	Redbud, Eastern (RB)	80	3.5	60	70			Forked	Girdling Root								$210.00
4	South Pond Area Plantings	04RB0291	04RB0291					291		Redbud, Eastern (RB)	80	10	35	70	Hazard Tree		Ganaderma at Base	Girdling Root	2=Medium	2	2=7-18"	2	2=Intermediate	2	6	
4	South Pond Area Plantings		04RB0292					292	Missing	Redbud, Eastern (RB)	80	9.5	50	70	Mulch		Tag Missing	Mower Damage								$635.11
4	South Pond Area Plantings		04RB0310					310	Missing	Redbud, Eastern (RB)	80	12	35	70	Crown Clean Low		Ganaderma at Base	Trunk Wound								$709.35
4	South Pond Area Plantings		04RB0323					323	Missing	Redbud, Eastern (RB)	80	3.5	35	70			Forked									$122.50
4	South Pond Area Plantings		04ZS0303					303	Missing	Zelkova (ZS)	70	8	60	70			Girdling Root									$472.90
5	Single-species allees	05RH0308	05RH0308					308	Defective	Ash, 'Rosehill' (RH)	70	9	65	90	Crown Lifting		Tree growing around tag	Forked								$833.64
5	Single-species allees		05RH0309					309	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Lifting		Girdling Root	Mower Damage								$2,837 39
5	Single-species allees	05RH0310	05RH0310					310		Ash, 'Rosehill' (RH)	70	15	75	90	Grate Lift											$2,671 93
5	Single-species allees		05RH0311					311	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High											$2,745 56
5	Single-species allees	05RH0312	05RH0312				X	312		Ash, 'Rosehill' (RH)	70	20	55	90	Hazard Limb High	Crown Clean High	Forked		3=High	3	1=0-6"	1	2=Intermediate	2	6	$3,483.41
5	Single-species allees		05RH0313				X	313	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
5	Single-species allees	05RH0314	05RH0314			X		314		Ash, 'Rosehill' (RH)	70	15	80	90												$2,850 06

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
5	Single-species allees		05RH0315				X	315	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Storm Damage	Girdling Root								$1,862 04
5	Single-species allees		05RH0316					316	Missing	Ash, 'Rosehill' (RH)	70	3	80	90	Corrective Prune											$240.00
5	Single-species allees		05RH0317				X	317	Missing	Ash, 'Rosehill' (RH)	70	16	75	90	Crown Lifting											$3,040 06
5	Single-species allees		05RH0318					318	Missing	Ash, 'Rosehill' (RH)	70	17	75	90			No Grate									$3,431 95
5	Single-species allees		05RH0319					319	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
5	Single-species allees	05RH0320	05RH0320					320		Ash, 'Rosehill' (RH)	70	18	75	90	Grate Lift	Crown Clean High										$3,847 58
5	Single-species allees	05RH0321	05RH0321					321		Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High	Crown Lifting										$2,837 39
5	Single-species allees	05RH0322	05RH0322					322		Ash, 'Rosehill' (RH)	70	15	80	90	Grate Lift											$2,850 06
5	Single-species allees		05RH0323					323	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Girdling Root									$2,432 05
5	Single-species allees		05RH0324					324	Missing	Ash, 'Rosehill' (RH)	70	15	80	90												$2,850 06
5	Single-species allees	05RH0325	05RH0325					325		Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High		Trunk Wound	Mower Damage								$1,959.42
5	Single-species allees	05RH0326	05RH0326					326		Ash, 'Rosehill' (RH)	70	14	40	90	Crown Clean High		Trunk Wound	Borers								$1,241 36
5	Single-species allees		05RH0327			X		327	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Mower Damage	Forked								$2,137 54
5	Single-species allees		05RH0328					328	Missing	Ash, 'Rosehill' (RH)	70	16	75	90	Crown Clean High											$3,040 06
5	Single-species allees	05RH329	05RH0329			X		329		Ash, 'Rosehill' (RH)	70	10	45	90	Crown Clean High		Insect/disease/stress									$712.51
5	Single-species allees	05RH0330	05RH0330					330		Ash, 'Rosehill' (RH)	70	18	75	90	Crown Clean High	Grate Lift										$3,847 58
5	Single-species allees		05RH0331					331	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Lifting											$2,837 39
5	Single-species allees		05RH0332	X				332	Missing	Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
5	Single-species allees		05RH0333					333	Missing	Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High											$2,837 39
5	Single-species allees	05RH0334	05RH0334					334		Ash, 'Rosehill' (RH)	70	14	80	90												$2,482.72
5	Single-species allees		05RH0335					335	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High	Crown Lifting	Mower Damage	Girdling Root								$2,137 54
5	Single-species allees		05RH0336					336	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High	Grate Lift										$2,017 21
5	Single-species allees		05RH0337			X		337	Missing	Ash, 'Rosehill' (RH)	70	20	65	90	Crown Clean High											$4,116.75
5	Single-species allees		05RH0338	X				338	Ineffective	Ash, 'Rosehill' (RH)	70	18	70	90	Crown Clean High		No Grate									$3,591 07
5	Single-species allees		05RH0339	X				339	Missing	Ash, 'Rosehill' (RH)	70	20	70	90	Crown Clean High		Mower Damage									$4,433.43
5	Single-species allees		05RH0340	X				340	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High		No Grate									$2,745 56
5	Single-species allees		05RH0341	X				341	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High		Trunk Wound									$1,605 53
5	Single-species allees	05RH0342	05RH0342					342		Ash, 'Rosehill' (RH)	70	19	70	90	Grate Lift	Crown Clean High										$4,001.17
5	Single-species allees	05RH0343	05RH0343					343		Ash, 'Rosehill' (RH)	70	15	75	90	Crown Clean High		Mower Damage									$2,671 93
5	Single-species allees	05RH0344	05RH0344					344		Ash, 'Rosehill' (RH)	70	17	70	90			No Grate									$3,203.15
5	Single-species allees		05RH0345					345	Missing	Ash, 'Rosehill' (RH)	70	19	80	90	Crown Clean High											$4,572.76
5	Single-species allees	05RH0346	05RH0346	X				346		Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift											$2,172 38
5	Single-species allees	05RH0347	05RH0347					347		Ash, 'Rosehill' (RH)	70	12	80	90												$1,824 04
5	Single-species allees	05RH0348	05RH0348					348		Ash, 'Rosehill' (RH)	70	15	70	90			No Grate									$2,493 80
5	Single-species allees		05RH0349	X				349	Missing	Ash, 'Rosehill' (RH)	70	14	70	90			Forked									$2,172 38
5	Single-species allees	05RH050	05RH0350					350		Ash, 'Rosehill' (RH)	70	12	75	90			No Grate									$1,710 04
5	Single-species allees		05RH0351					351	Missing	Ash, 'Rosehill' (RH)	70	9	70	90			Forked	Girdling Root								$897.77
5	Single-species allees		05RH0370					370	Missing	Ash, 'Rosehill' (RH)	70	4	80	70	Crown Lifting		In Grate									$320.00
5	Single-species allees		05RH0371					371	Missing	Ash, 'Rosehill' (RH)	70	4	70	70	Crown Lifting	Corrective Prune	In Grate	Trunk Wound								$280.00
5	South Pond Plantings; Baldcypress Circle		05BC0061					61	Missing	Baldcypress (BC)	100	11	80	70	Trunk Repair		Mower Damage									$1,703 00
5	South Pond Plantings; Baldcypress Circle	05BC062	05BC0062					62		Baldcypress (BC)	100	12	80	70			Mower Damage	Girdling Root								$2,026.71
5	South Pond Plantings; Baldcypress Circle	05BC063	05BC0063					63		Baldcypress (BC)	100	11	80	70			Storm Damage	Mower Damage								$1,703 00
5	South Pond Plantings; Baldcypress Circle	05BC064	05BC0064					64		Baldcypress (BC)	100	11	75	70			Trunk Wound									$1,596 56
5	South Pond Plantings; Baldcypress Circle		05BC0065					65	Missing	Baldcypress (BC)	100	12	55	70			Crowded									$1,393 36
5	South Pond Area Plantings		05BN0066					66	Missing	Birch, River (BN)	80	12.5	80	70												$1,759 30
5	South Pond Area Plantings		05BN0077					77	Missing	Birch, River (BN)	80	8	75	70	Crown Lifting											$675.57
5	South Pond Area Plantings		05BN0078					78	Missing	Birch, River (BN)	80	7.5	75	70	Crown Lifting		Girdling Root									$593.76
5	South Pond Area Plantings		05BN0079		X			79	Missing	Birch, River (BN)	80	2		70												$0.00
5	South Pond Area Plantings	05BN187	05BN0187					187		Birch, River (BN)	80	12	75	70	Crown Lifting		Forked									$1,520 03

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
5	South Pond Area Plantings	05BN188	05BN0188					188		Birch, River (BN)	80	11	75	70	Crown Lifting											$1,277 25
5	South Pond Area Plantings		05BN0352					352	Missing	Birch, River (BN)	80	7	70	70	Crown Lifting											$482.75
5	South Pond Area Plantings		05BN0353					353	Missing	Birch, River (BN)	80	7	70	70	Crown Lifting											$482.75
5	South Pond Area Plantings		05BN0354					354	Missing	Birch, River (BN)	80	9	65	70	Crown Lifting		Trunk Wound									$741.02
5	South Pond Area Plantings		05BN0355		X			355	Missing	Birch, River (BN)	80	2		70												$0.00
5	South Pond Area Plantings		05BN0356					356	Missing	Birch, River (BN)	80	7.5	75	70	Mulch	Crown Lifting										$593.76
5	South Pond Area Plantings		05BN0357					357	Missing	Birch, River (BN)	80	8	70	70	Crown Clean High		Storm Damage	Forked								$630.53
5	South Pond Area Plantings; South Service Area	05KC056	05KC0056					56		Coffeetree, Kentucky (KC)	80	11	70	70	Crown Clean High	Mulch	Mower Damage	Girdling Root								$1,192.10
5	South Pond Area Plantings; South Service Area		05KC0057					57	Missing	Coffeetree, Kentucky (KC)	80	2.5	65	70	Corrective Prune	Mulch										$162.50
5	South Pond Area Plantings; South Service Area	05RC0085	05RC0085	X				85		Crabapple, Radiant (RC)	70	11	25	70			Trunk Wound	Sapsuckers	3=High	3	2=7-18"	2	1=Occassional	1	6	$372.53
5	South Pond Area Plantings; South Service Area	05RC0087	05RC0087					87		Crabapple, Radiant (RC)	70	10	45	70			Sapsuckers	Forked								$554.18
5	South Pond Area Plantings; South Service Area	05RC0100	05RC0100			X		100		Crabapple, Radiant (RC)	70	12	40	70	Crown Clean Low		Trunk Wound	Forked								$709.35
5	South Pond Area Plantings; South Service Area	05RC0101	05RC0101			X		101		Crabapple, Radiant (RC)	70	12	45	70			Trunk Wound									$798.02
5	South Pond Area Plantings; South Service Area	05RC0102	05RC0102			X		102		Crabapple, Radiant (RC)	70	12	50	70	Crown Clean Low		Forked									$886.69
5	South Pond Area Plantings; South Service Area	05RC0103	05RC0103			X		103		Crabapple, Radiant (RC)	70	10	55	70	Crown Clean Low		Trunk Wound	Forked								$677.33
5	South Pond Area Plantings; South Service Area	05RC0104	05RC0104			X		104		Crabapple, Radiant (RC)	70	10	50	70	Crown Clean Low		Forked									$615.75
5	South Pond Area Plantings; South Service Area	05RC0105	05RC0105			X		105		Crabapple, Radiant (RC)	70	14	50	70	Crown Clean Low		Forked									$1,206 88
5	South Pond Area Plantings; South Service Area		05RC0180					180	Missing	Crabapple, Radiant (RC)	70	13	85	70			Multi-stem									$1,769 06
5	South Pond Area Plantings; South Service Area		05SD0045					45	Missing	Crabapple, Snowdrift (SD)	70	5	60	70			Trunk Wound									$184.73
5	South Pond Area Plantings; South Service Area		05SD0179					179	Missing	Crabapple, Snowdrift (SD)	70	9	60	70	Crown Lifting		Sapsuckers	Forked								$598.51
5	South Pond Area Plantings; South Service Area	05SD182	05SD0182					182		Crabapple, Snowdrift (SD)	70	10	70	70			Forked									$862.06
5	South Pond Area Plantings; South Service Area		05SD0183					183	Missing	Crabapple, Snowdrift (SD)	70	12	65	70			Sapsuckers	Forked								$1,152 69
5	South Pond Area Plantings; South Service Area		05FD0148					148	Missing	Dogwood, Flowering (FD)	100	5.5	80	70												$425.75
5	South Pond Area Plantings; South Service Area	1SH151	05SH0043					43	Defective	Hackberry, Sugar (SH)	80	5.5	75	70			Tag is incorrect									$319.31
5	South Pond Area Plantings; South Service Area		05SH0165					165	Missing	Hackberry, Sugar (SH)	80	3	70	70	Corrective Prune	Crown Lifting	Mower Damage	Girdling Root								$210.00
5	South Pond Area Plantings; South Service Area		05SH0166					166	Missing	Hackberry, Sugar (SH)	80	2.5	75	70	Corrective Prune											$187.50
5	South Pond Area Plantings; South Service Area		05WH0142					142	Missing	Hawthorn, Washington (WH)	60	3	55	70			Multi-stem	Staked								$165.00
5	South Pond Area Plantings; South Service Area	05WH0143	05WH0143					143		Hawthorn, Washington (WH)	60	7	60	70	Crown Clean Low		Forked									$310.34
5	South Pond Area Plantings; South Service Area		05WH0155					155	Missing	Hawthorn, Washington (WH)	60	3	60	70			Multi-stem	Trunk Wound								$180.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
5	South Pond Area Plantings; South Service Area	05WH0156	05WH0156		X			156		Hawthorn, Washington (WH)	60	2		70			REPLANTED 01 09	Forked								$0.00
5	South Pond Area Plantings; South Service Area		05WH0159					159	Missing	Hawthorn, Washington (WH)	60	5	75	70			Multi-stem									$197.92
5	South Pond Area Plantings; South Service Area		05WH0160					160	Missing	Hawthorn, Washington (WH)	60	5	65	70			Rust	Forked								$171.53
5	South Pond Area Plantings; South Service Area	05WH0161	05WH0161					161		Hawthorn, Washington (WH)	60	6	65	70			Rust	Trunk Wound								$247.01
5	South Pond Area Plantings; South Service Area		05HL0072					72	Missing	Honeylocust (HL)	75	3.5	75	70	Corrective Prune											$262.50
5	South Pond Area Plantings; South Service Area		05HL0127					127	Missing	Honeylocust (HL)	75	4.5	70	70	Corrective Prune											$315.00
5	South Pond Area Plantings; South Service Area	05GL0069	05GL0069		X			69		Honeylocust, Shademaster (HL)	75	2		70			REPLACED WITH AH 12 08									
5	South Pond Area Plantings; South Service Area	05GL0070	05GL0070		X			70		Honeylocust, Shademaster (HL)	75	2		70			REPLACED WITH AH 12 08									$0.00
5	South Pond Area Plantings; South Service Area	05HL0128	05HL0128					128		Honeylocust, Shademaster (HL)	75	15	30	70	Hazard Limb High	Rec. Removal	Insect/disease/stress		4=severe	4	2=7-18"	2	1=Occassional	1	7	$890.64
5	South Pond Area Plantings; South Service Area	05HL0132	05HL0132		X			132		Honeylocust, Shademaster (HL)	75	2		70			REPLANTED W AH 12 08	Tag Defective	2=Medium	2	2=7-18"	2	1=Occassional	1	5	$0.00
5	South Pond Area Plantings; South Service Area		05HL0133		X			133	Missing	Honeylocust, Shademaster (HL)	75	2		70			REPLANTED W AH 12 08									$0.00
5	South Pond Area Plantings; South Service Area		05HL0134		X			134	Missing	Honeylocust, Shademaster (HL)	75	2		70			REPLANTED W AH 12 08									$0.00
5	South Pond Area Plantings; South Service Area	05GL0068	05GL0068					68		Linden, Greenspire (GL)	80	9	75	70	Mulch		Crowded	Poor Branch Form								$855.02
5	South Pond Area Plantings; South Service Area	05RC0106	05RC0106					106		Linden, Greenspire (GL)	80	15	80	70												$2,533 39
5	South Pond Area Plantings; South Service Area	05RC0108	05RC0108					108		Linden, Greenspire (GL)	80	15	70	70												$2,216.71
5	South Pond Area Plantings; South Service Area	05RC0109	05RC0109					109		Linden, Greenspire (GL)	80	13	75	70	Crown Lifting		Girdling Root									$1,783 93
5	South Pond Area Plantings; South Service Area	05RC0110	05RC0110					110		Linden, Greenspire (GL)	80	18	80	70	Crown Lifting		Forked									$3,648 08
5	South Pond Area Plantings; South Service Area	05RC0111	05RC0111	X				111		Linden, Greenspire (GL)	80	16.5	80	70	Crown Lifting		Forked									$3,065.40
5	South Pond Area Plantings; South Service Area	05RC0116	05RC0116			X		116		Linden, Greenspire (GL)	80	16	80	70			Storm Damage									$2,882.43
5	South Pond Area Plantings; South Service Area	05GL0164	05GL0164					164		Linden, Greenspire (GL)	80	13	80	70	Crown Lifting		Mower Damage									$1,902 85
5	South Pond Area Plantings; South Service Area		05GL0177					177	Missing	Linden, Greenspire (GL)	80	11	80	70	Crown Lifting		Girdling Root									$1,362.40
5	South Pond Area Plantings; South Service Area	05RM0074	05RM0074					74		Maple, Red (RM)	90	9	60	70	Crown Lifting		Girdling Root									$769.52
5	South Pond Area Plantings; South Service Area	05RM0075	05RM0075					75		Maple, Red (RM)	90	8.5	60	70	Crown Lifting		Girdling Root									$686.39
5	South Pond Area Plantings; South Service Area	05RM0076	05RM0076					76		Maple, Red (RM)	90	8.5	65	70	Crown Lifting		Girdling Root	Mower Damage								$743.59
5	South Pond Area Plantings; South Service Area		05RM0117					117	Missing	Maple, Red (RM)	90	2.5	75	70												$187.50
5	South Pond Area Plantings; South Service Area	05RM0118	05RM0118					118		Maple, Red (RM)	90	9	50	70	Crown Lifting		Trunk Wound									$641.26
5	South Pond Area Plantings; South Service Area	05RM0119	05RM0119					119		Maple, Red (RM)	90	7	70	70			Girdling Root									$543.09

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5	South Pond Area Plantings; South Service Area		05RM0122					122	Missing	Maple, Red (RM)	90	3	75	70	Corrective Prune											$225.00
5	South Pond Area Plantings; South Service Area	05RM0123	05RM0123					123		Maple, Red (RM)	90	14	75	70	Crown Lifting											$2,327 55
5	South Pond Area Plantings; South Service Area	05RM0169	05RM0169					169	Defective	Maple, Red (RM)	90	14	75	70	Crown Clean High		Mower Damage	Tree Growing around tag								$2,327 55
5	South Pond Area Plantings; South Service Area	05RM0170	05RM0170					170		Maple, Red (RM)	90	11	75	70			Girdling Root									$1,436 91
5	South Pond Area Plantings; South Service Area	05RM0171	05RM0171					171		Maple, Red (RM)	90	12	75	70	Crown Clean High		Girdling Root									$1,710 04
5	South Pond Area Plantings; South Service Area		05RM0172					172	Missing	Maple, Red (RM)	90	15	75	70	Crown Clean High	Crown Lifting	Girdling Root	Mower Damage								$2,671 93
5	South Pond Area Plantings; South Service Area	05RM0173	05RM0173					173		Maple, Red (RM)	90	14	75	70	Crown Clean High		Girdling Root	Mower Damage								$2,327 55
5	South Pond Area Plantings; South Service Area	05RM0174	05RM0174					174		Maple, Red (RM)	90	15.5	75	70	Crown Clean High		Girdling Root									$2,853 03
5	South Pond Area Plantings; South Service Area	05RM0175	05RM0175					175		Maple, Red (RM)	90	12	80	70	Crown Clean High											$1,824 04
5	South Pond Area Plantings; South Service Area	05RM0176	05RM0176					176		Maple, Red (RM)	90	11	75	70	Crown Clean High		Girdling Root	Mower Damage								$1,436 91
5	South Pond Area Plantings; South Service Area		05RM0360					360	Missing	Maple, Red (RM)	90	4	70	70	Crown Lifting	Mulch	Mower Damage									$280.00
5	South Pond Area Plantings; South Service Area	05SM0028	05SM0028					28		Maple, Sugar (SM)	100	7	80	70												$689.64
5	South Pond Area Plantings; South Service Area	05SM0041	05SM0041					41		Maple, Sugar (SM)	100	10	80	70	Mulch	Crown Clean High										$1,407.44
5	South Pond Area Plantings; South Service Area		05SM0042					42	Missing	Maple, Sugar (SM)	100	11	30	70	Hazard Limb High	Crown Repair	Storm Damage		4=severe	4	1=0-6"	1	1=Occassional	1	6	$638.62
5	South Pond Area Plantings; South Service Area	05SM0044	05SM0044					44		Maple, Sugar (SM)	100	6.5	75	70	Crown Lifting											$557.48
5	South Pond Area Plantings; South Service Area	05SM0089	05SM0089					89		Maple, Sugar (SM)	100	12	85	70												$2,153 38
5	South Pond Area Plantings; South Service Area	05SM0158	05SM0158					158		Maple, Sugar (SM)	100	6	45	70	Crown Clean Low		Trunk Wound	Insect/Disease/Stress								$285.01
5	South Pond Area Plantings; South Service Area		05BO0090					90	Missing	Oak, Bur (BO)	100	22	75	70	Crown Lifting	Crown Clean High										$6,386 24
5	South Pond Area Plantings; South Service Area	05BO129	05BO0129					129		Oak, Bur (BO)	100	25	75	70	Crown Clean High											$8,246.70
5	South Pond Area Plantings; South Service Area		05BO0137					137	Missing	Oak, Bur (BO)	100	8	60	70	Crown Clean High		Forked									$675.57
5	South Pond Area Plantings; South Service Area		05BO0144	X				144	Missing	Oak, Bur (BO)	100	23	60	70	Crown Clean High		Mower Damage									$5,584 01
5	South Pond Area Plantings; South Service Area	05BO145	05BO0145					145		Oak, Bur (BO)	100	20	60	70	Crown Clean High		Crowded									$4,222 31
5	South Pond Area Plantings; South Service Area	05BO146	05BO0146					146		Oak, Bur (BO)	100	15	60	70	Crown Clean High		Crowded									$2,375 05
5	South Pond Area Plantings; South Service Area		05RB0365					365	Missing	Oak, Bur (BO)	100	2	60	70												$120.00
5	South Pond Area Plantings; South Service Area		05RO0151				X	151	Missing	Oak, Red (RO)	100	16.5	75	70												$3,592 26
5	South Pond Area Plantings; South Service Area		05RO0366					366	Missing	Oak, Red (RO)	100	2	75	70	Corrective Prune											$150.00
5	South Pond Area Plantings; South Service Area	05SW091	05SW0091					91		Oak, Swamp White (SW)	100	22	75	70	Crown Lifting											$6,386 24

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
5	South Pond Area Plantings; South Service Area		05SW0124			X		124	Missing	Oak, Swamp White (SW)	100	16.5	85	70												$4,071 23
5	South Pond Area Plantings; South Service Area		05SW0130					130	Missing	Oak, Swamp White (SW)	100	16	75	70	Crown Lifting	Crown Clean High										$3,377 85
5	South Pond Area Plantings; South Service Area	05SW131	05SW0131			X		131		Oak, Swamp White (SW)	100	10	65	70	Crown Clean Low		Trunk Wound									$1,143 54
5	South Pond Area Plantings; South Service Area		05SW0135					135	Missing	Oak, Swamp White (SW)	100	2	70	70												$140.00
5	South Pond Area Plantings; South Service Area		05SW0147					147	Missing	Oak, Swamp White (SW)	100	13	75	70	Crown Lifting	Crown Clean Low										$2,229 91
5	South Pond Area Plantings; South Service Area		05SW0150					150	Missing	Oak, Swamp White (SW)	100	19	70	70	Crown Clean High											$4,445.74
5	South Pond Area Plantings; South Service Area		05JP0002					2	Missing	Pagodatree, Japanese (JP)	70	24.5	75	70	Crown Clean High											$5,544 09
5	South Pond Area Plantings; South Service Area		05JP0006	X				6	Missing	Pagodatree, Japanese (JP)	70	21	35	70	Hazard Tree	Crown Clean High	Trunk Wound		1=Low	1	3=19-32"	3	2=Intermediate	2	6	
5	South Pond Area Plantings; South Service Area	05JP0047	05JP0047					47		Pagodatree, Japanese (JP)	70	13.5	75	70	Crown Clean High	Mulch	Girdling Root									$1,683 32
5	South Pond Area Plantings; South Service Area	05JP0051	05JP0051					51		Pagodatree, Japanese (JP)	70	10.5	55	70	Crown Clean High	Mulch	Crowded									$746.76
5	South Pond Area Plantings; South Service Area		05BP0049		X			49	Missing	Pear, Bradford (BP)	60	2		70			REPLACED WITH CP 04 09	Mower Damage								$0.00
5	South Pond Area Plantings; South Service Area		05BP0050					50	Missing	Pear, Bradford (BP)	60	16	50	70	Crown Clean High		Forked									$1,351.14
5	South Pond Area Plantings; South Service Area	05BP0052	05BP0052			X		52		Pear, Bradford (BP)	60	16	50	70	Crown Clean High		Mower Damage									$1,351.14
5	South Pond Area Plantings; South Service Area		05BP0054					54	Missing	Pear, Bradford (BP)	60	18.5	50	70	Crown Clean High		Mower Damage	Girdling Root								$1,806 36
5	South Pond Area Plantings; South Service Area		05BP0055	X				55	Missing	Pear, Bradford (BP)	60	19	50	70	Crown Clean High		Trunk Wound	Poor Branch Form								$1,905 32
5	South Pond Area Plantings; South Service Area	05BP0058	05BP0058		X			58		Pear, Bradford (BP)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area	05BP0060	05BP0060					60		Pear, Bradford (BP)	60	15	55	70			Girdling Root	Forked								$1,306 28
5	South Pond Area Plantings; South Service Area	05BP067	05BP0067		X			67		Pear, Bradford (BP)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area	05BP120	05BP0120		X			120		Pear, Bradford (BP)	60	2		70			REPLANTED W CP 04 09	Forked	2=Medium	2	2=7-18"	2	2=Intermediate	2	6	$0.00
5	South Pond Area Plantings; South Service Area		05BP0121		X			121	Missing	Pear, Bradford (BP)	60	2		70			REPLANTED W CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area		05RS0358		X			358	Missing	Pear, Redspire (RS)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area		05RS0359		X			359	Missing	Pear, Redspire (RS)	60	2		70			REPLACED WITH CP 04 09	Trunk Wound	3=High	3	2=7-18"	2	3=Frequent	3	8	
5	South Pond Area Plantings; South Service Area		05RS0361		X			361	Missing	Pear, Redspire (RS)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area		05RS0362		X			362	Missing	Pear, Redspire (RS)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area		05RS0363		X			363	Missing	Pear, Redspire (RS)	60	2		70			REPLACED WITH CP 04 09									$0.00
5	South Pond Area Plantings; South Service Area		05RS0367					367	Missing	Pear, Redspire (RS)	65	12	70	70			In Grate	Forked								$1,152 69
5	South Pond Area Plantings; South Service Area		05RS0368					368	Missing	Pear, Redspire (RS)	65	10	60	70			In Grate	Forked, Trunk Wound								$686.13

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5	South Pond Area Plantings; South Service Area		05RS0369		X			369	Missing	Pear, Redspire (RS)	65	2		70			REPLACED WITH CP 04 09										$0.00
5	South Pond Area Plantings; South Service Area	05JB0013	05JB0013					13		Pine, Japanese Black (JB)	50	13.5	60	70	Crown Clean Low												$961.90
5	South Pond Area Plantings; South Service Area	05JB0014	05JB0014					14		Pine, Japanese Black (JB)	50	10	70	70													$615.75
5	South Pond Area Plantings; South Service Area		05JB0082					82	Missing	Pine, Japanese Black (JB)	50	8	55	70													$309.64
5	South Pond Area Plantings; South Service Area		05RB0092					92	Missing	Redbud, Eastern (RB)	80	10	35	70	Crown Lifting		Trunk Wound	Mower Damage									$492.60
5	South Pond Area Plantings; South Service Area		05RB0095					95	Missing	Redbud, Eastern (RB)	80	5	70	70	Mulch												$246.30
5	South Pond Area Plantings; South Service Area	05RB0096	05RB0096					96		Redbud, Eastern (RB)	80	8	70	70	Mulch												$630.53
5	South Pond Area Plantings; South Service Area	05RB0097	05RB0097					97		Redbud, Eastern (RB)	80	12	60	70	Crown Clean High		Girdling Root										$1,216 03
5	South Pond Area Plantings; South Service Area	05RB0099	05RB0099					99		Redbud, Eastern (RB)	80	10	30	70	Rec Remove		Trunk Wound	Insect/Disease/Stress									$422.23
5	South Pond Area Plantings; South Service Area		05RB0107					107	Missing	Redbud, Eastern (RB)	80	2	60	70													$120.00
5	South Pond Area Plantings; South Service Area		05RB0112					112	Defective	Redbud, Eastern (RB)	80	4	70	70			Tag says species name										$280.00
5	South Pond Area Plantings; South Service Area		05RB0152					152	Missing	Redbud, Eastern (RB)	80	3	65	70			Girdling Root	Forked									$195.00
5	South Pond Area Plantings; South Service Area		05RB0153					153	Missing	Redbud, Eastern (RB)	80	3	60	70			Girdling Root	Forked									$180.00
5	South Pond Area Plantings; South Service Area		05RB0184					184	Missing	Redbud, Eastern (RB)	80	6	50	70	Crown Clean Low		Trunk Wound										$253.34
5	South Pond Area Plantings; South Service Area		05RB0185					185	Missing	Redbud, Eastern (RB)	80	6	75	70													$380.01
5	South Pond Area Plantings; South Service Area		05RB0186					186	Missing	Redbud, Eastern (RB)	80	8	80	70													$720.61
5	South Pond Area Plantings; South Service Area		05RRB364					364	Missing	Redbud, Eastern (RB)	80	2	70	70													$140.00
7	Single-species allees	07RH0493	07RH0493					493	Defective	Ash, 'Rosehill' (RH)	70	16	75	90			Mower Damage	Girdling Root									$3,040 06
7	Single-species allees	07RH0494	07RH0494					494		Ash, 'Rosehill' (RH)	70	14	75	90			Mower Damage										$2,327 55
7	Single-species allees	07RH0495	07RH0495					495		Ash, 'Rosehill' (RH)	70	12	80	90			Girdling Root										$1,824 04
7	Single-species allees	07RH0496	07RH0496					496		Ash, 'Rosehill' (RH)	70	15	80	90													$2,850 06
7	Single-species allees	07RH0497	07RH0497					497		Ash, 'Rosehill' (RH)	70	14	55	90	Grate Lift	Crown Clean High	Mower Damage	Storm Damage									$1,706 87
7	Single-species allees	07RH0498	07RH0498					498		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Mower Damage										$1,862 04
7	Single-species allees	07RH0499	07RH0499	X				499	Defective	Ash, 'Rosehill' (RH)	70			90													$0.00
7	Single-species allees		07RH0500					500	Missing	Ash, 'Rosehill' (RH)	70	3	55	90	Corrective Prune		Trunk Wound										$165.00
7	Single-species allees		07RH0501					501	Missing	Ash, 'Rosehill' (RH)	70	16	35	90	Hazard Limb High		Trunk Wound		2=Medium	2	2=7-18"	2	2=Intermediate	2	6	$1,418.70
7	Single-species allees	07RH0502	07RH0502					502		Ash, 'Rosehill' (RH)	70	13	45	90			Trunk Wound										$1,204.15
7	Single-species allees	07RH0503	07RH0503					503		Ash, 'Rosehill' (RH)	70	6	30	90	Rec Remove		Trunk Wound	Insect/Disease/Stress									$171.00
7	Single-species allees	07RH0504	07RH0504					504		Ash, 'Rosehill' (RH)	70	15	75	90													$2,671 93
7	Single-species allees		07RH0505					505	Missing	Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High		Girdling Root										$1,368 03
7	Single-species allees	07RH0506	07RH0506					506		Ash, 'Rosehill' (RH)	70	16	75	90			1/2 Grate										$3,040 06
7	Single-species allees	07RH0507	07RH0507					507		Ash, 'Rosehill' (RH)	70	11	65	90			Mower Damage	Forked									$1,245 32
7	Single-species allees	07RH0508	07RH0508					508		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		Forked										$2,315 67
7	Single-species allees		07RH0509					509	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Lifting		Girdling Root										$2,017 21
7	Single-species allees	07RH0510	07RH0510					510		Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High												$1,368 03
7	Single-species allees	07RH0511	07RH0511					511		Ash, 'Rosehill' (RH)	70	13	75	90	Crown Lifting												$2,006 92
7	Single-species allees	07RH0512	07RH0512					512		Ash, 'Rosehill' (RH)	70	12	70	90	Grate Lift												$1,596 03
7	Single-species allees		07RH0513					513	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune												$210.00
7	Single-species allees	07RH0514	07RH0514					514		Ash, 'Rosehill' (RH)	70	12	70	90	Crown Clean High												$1,596 03

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	Single-species allees		07RH0515					515	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Lifting		Forked									$1,873.12
7	Single-species allees	07RH0516	07RH0516					516		Ash, 'Rosehill' (RH)	70	10	70	90	Crown Clean High		No Grate									$1,108 36
7	Single-species allees		07RH0517					517	Missing	Ash, 'Rosehill' (RH)	70	12	70	90			Forked									$1,596 03
7	Single-species allees	07RH0518	07RH0518					518		Ash, 'Rosehill' (RH)	70	15	75	90	Grate Lift	Crown Clean High										$2,671 93
7	Single-species allees		07RH0519					519	Missing	Ash, 'Rosehill' (RH)	70	9	75	90	Crown Lifting											$961.90
7	Single-species allees		07RH0520					520	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Grate Lift	Crown Clean High										$2,017 21
7	Single-species allees		07RH0521					521	Missing	Ash, 'Rosehill' (RH)	70	13	75	90	Crown Lifting											$2,006 92
7	Single-species allees		07RH0522					522	Missing	Ash, 'Rosehill' (RH)	70	14	75	90			No Grate									$2,327 55
7	Single-species allees	07RH0523	07RH0523					523		Ash, 'Rosehill' (RH)	70	12	50	90	Crown Clean High	Crown Lifting										$1,140 02
7	Single-species allees	07RH0524	07RH0524					524		Ash, 'Rosehill' (RH)	70	12	65	90	Crown Lifting		No Grate									$1,482 03
7	Single-species allees	07RH0525	07RH0525					525		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Forked									$2,137 54
7	Single-species allees	07RH0526	07RH0526					526		Ash, 'Rosehill' (RH)	70	13	70	90	Grate Lift											$1,873.12
7	Single-species allees		07RH0527					527	Missing	Ash, 'Rosehill' (RH)	70	12	75	90	Crown Clean Low											$1,710 04
7	Single-species allees	07RH0528	07RH0528					528		Ash, 'Rosehill' (RH)	70	14	75	90												$2,327 55
7	Single-species allees	07RH0529	07RH0529					529		Ash, 'Rosehill' (RH)	70	14	75	90	Crown Lifting											$2,327 55
7	Single-species allees	07RH0530	07RH0530					530		Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High	Grate Lift										$2,493 80
7	Single-species allees		07RH0531					531	Ineffective	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Lifting											$1,739 33
7	Single-species allees	07RH0532	07RH0532					532		Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High	Grate Lift										$1,605 53
7	Single-species allees		07RH0533					533	Missing	Ash, 'Rosehill' (RH)	70	3	75	90	Corrective Prune		Staked									$225.00
7	Single-species allees	07RH0534	07RH0534					534		Ash, 'Rosehill' (RH)	70	15	60	90	Grate Lift		Forked									$2,137 54
7	Single-species allees	07RH0535	07RH0535					535		Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
7	Single-species allees	07RH0536	07RH0536					536		Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift	Crown Lifting										$2,172 38
7	Single-species allees	07RH0537	07RH0537					537		Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
7	Single-species allees	07RH0538	07RH0538					538		Ash, 'Rosehill' (RH)	70	11	60	90	Crown Clean High											$1,149 52
7	Single-species allees		07RH0539					539	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High											$2,315 67
7	Single-species allees	07RH0540	07RH0540					540		Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High											$1,706 87
7	Single-species allees		07RH0541					541	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
7	Single-species allees		07RH0542					542	Missing	Ash, 'Rosehill' (RH)	70	13	40	90	Crown Clean High		Trunk Wound	Insect/Disease/Stress								$1,070 36
7	Single-species allees		07RH0543					543	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
7	Single-species allees		07RH0544					544	Missing	Ash, 'Rosehill' (RH)	70	15	45	90	Crown Clean High		Trunk Wound									$1,603.16
7	Single-species allees		07RH0545					545	Missing	Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High		Mower Damage	Forked								$1,471.74
7	Single-species allees		07RH0546					546	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High		Forked									$1,706 87
7	Single-species allees	07RH0547	07RH0547					547		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
7	Single-species allees	07RH0548	07RH0548					548		Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
7	Single-species allees	07RH0549	07RH0549					549		Ash, 'Rosehill' (RH)	70	16	35	90	Hazard Limb High		Trunk Wound	Mower Damage	2=Medium	2	2=7-18"	2	2=Intermediate	2	6	$1,418.70
7	Single-species allees		07RH0550					550	Missing	Ash, 'Rosehill' (RH)	70	14	40	90	Hazard Tree	Crown Clean High	Trunk Wound		1=Low	1	2=7-18"	2	2=Intermediate	2	5	
7	Single-species allees	07RH0551	07RH0551					551		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04
7	Single-species allees		07RH0552					552	Missing	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High											$1,337 94
7	Single-species allees		07RH0553					553	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High		Forked									$2,017 21
7	Single-species allees		07RH0554					554	Defective	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Tag wrong, says 07RH0556									$1,862 04
7	Single-species allees		07RH0555					555	Missing	Ash, 'Rosehill' (RH)	70	15	70	90												$2,493 80
7	Single-species allees		07RH0556					556	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
7	Single-species allees		07RH0557					557	Ineffective	Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High		Girdling Root	Trunk Wound								$1,471.74
7	Single-species allees		07RH0558					558	Missing	Ash, 'Rosehill' (RH)	70	12	50	90	Crown Clean High											$1,140 02
7	Single-species allees	07RH0559	07RH0559					559		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Lifting	Crown Clean High										$1,862 04
7	Single-species allees		07RH0560					560	Missing	Ash, 'Rosehill' (RH)	70	11	55	90	Crown Clean High											$1,053.73
7	Single-species allees	07RH0561	07RH0561					561		Ash, 'Rosehill' (RH)	70	5	55	90												$217.71
7	Single-species allees		07RH0562					562	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High											$1,862 04

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	Single-species allees	07RH0563	07RH0563					563		Ash, 'Rosehill' (RH)	70	12	55	90	Crown Clean High											$1,254 03
7	Single-species allees		07RH0564					564	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
7	Single-species allees		07RH0565					565	Missing	Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High											$1,471.74
7	Single-species allees		07RH0566					566	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High		Forked									$2,017 21
7	Single-species allees		07RH0567					567	Missing	Ash, 'Rosehill' (RH)	70	11	50	90	Crown Clean High											$957.94
7	Single-species allees		07RH0568					568	Missing	Ash, 'Rosehill' (RH)	70	12	50	90	Crown Clean High											$1,140 02
7	Single-species allees		07RH0569					569	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
7	Single-species allees		07RH0570					570	Ineffective	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
7	Single-species allees		07RH0571					571	Missing	Ash, 'Rosehill' (RH)	70	12	75	90												$1,710 04
7	Single-species allees	07RH0572	07RH0572					572		Ash, 'Rosehill' (RH)	70	11	70	90												$1,341.11
7	Single-species allees		07RH0573					573	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
7	Single-species allees	07RH0574	07RH0574					574		Ash, 'Rosehill' (RH)	70	13	65	90			Trunk Wound									$1,739 33
7	Single-species allees		07RH0575					575	Missing	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean Low											$2,634.72
7	Single-species allees		07RH0576					576	Missing	Ash, 'Rosehill' (RH)	70	4	65	90	Corrective Prune	Grate Lift										$260.00
7	Single-species allees		07RH0577					577	Missing	Ash, 'Rosehill' (RH)	70	14	45	90	Crown Clean High		Trunk Wound									$1,396 53
7	Single-species allees		07RH0578					578	Ineffective	Ash, 'Rosehill' (RH)	70	8	55	90	Crown Clean High											$557.34
7	Single-species allees		07RH0579					579	Missing	Ash, 'Rosehill' (RH)	70	15	70	90												$2,493 80
7	Single-species allees		07RH0580					580	Missing	Ash, 'Rosehill' (RH)	70	17	55	90	Crown Clean High		Forked									$2,516.76
7	Single-species allees		07RH0581					581	Missing	Ash, 'Rosehill' (RH)	70	16	55	90	Crown Clean High		Forked									$2,229 38
7	Single-species allees		07RH0582					582	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune		Staked									$210.00
7	Single-species allees	07RH0583	07RH0583					583		Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High	Crown Lifting	Girdling Root	Forked								$2,745 56
7	Single-species allees		07RH0584					584	Missing	Ash, 'Rosehill' (RH)	70	16	50	90	Crown Clean High	Grate Lift	Trunk Wound									$2,026.71
7	Single-species allees		07RH0585					585	Missing	Ash, 'Rosehill' (RH)	70	14	50	90	Crown Clean High											$1,551.70
7	Single-species allees		07RH0586					586	Missing	Ash, 'Rosehill' (RH)	70	15	70	90		Grate Lift										$2,493 80
7	Single-species allees		07RH0587					587	Missing	Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High		Forked									$1,337 94
7	Single-species allees		07RH0588					588	Missing	Ash, 'Rosehill' (RH)	70	13	65	90												$1,739 33
7	Single-species allees		07RH0589					589	Missing	Ash, 'Rosehill' (RH)	70	14	50	90	Crown Clean High		Girdling Root	Mower Damage								$1,551.70
7	Single-species allees		07RH0590					590	Missing	Ash, 'Rosehill' (RH)	70	4	75	90	Corrective Prune		Staked									$300.00
7	Single-species allees		07RH0591					591	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High											$2,432 05
7	Single-species allees		07RH0592					592	Missing	Ash, 'Rosehill' (RH)	70	4	75	90	Corrective Prune		Staked									$300.00
7	Single-species allees		07RH0593					593	Missing	Ash, 'Rosehill' (RH)	70	3	60	90	Corrective Prune		Mower Damage	Borers								$180.00
7	Single-species allees	07RH0594	07RH0594			X		594		Ash, 'Rosehill' (RH)	70	13	40	90	Grate Lift		Insect/disease/stress									$1,070 36
7	Single-species allees	07RH0595	07RH0595					595		Ash, 'Rosehill' (RH)	70	13	65	90			Girdling Root									$1,739 33
7	Single-species allees		07RH0596					596	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Grate Lift											$1,862 04
7	Single-species allees		07RH0597					597	Missing	Ash, 'Rosehill' (RH)	70	16	65	90												$2,634.72
7	Single-species allees		07RH0598					598	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High											$1,959.42
7	Single-species allees		07RH0599					599	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		Trunk Wound	Girdling Root								$2,315 67
7	Single-species allees		07RH0600	X				600	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
7	Single-species allees		07RH0601					601	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Girdling Root									$2,137 54
7	Single-species allees		07RH0602					602	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune		Staked									$210.00
7	Single-species allees	07RH0603	07RH0603					603		Ash, 'Rosehill' (RH)	70	16	70	90												$2,837 39
7	Single-species allees		07RH0604					604	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Grate Lift	Crown Clean High										$2,137 54
7	Single-species allees		07RH0605					605	Missing	Ash, 'Rosehill' (RH)	70	12	60	90			Girdling Root	Forked								$1,368 03
7	Single-species allees		07RH0606					606	Missing	Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High	Grate Lift	Forked									$1,471.74
7	Single-species allees		07RH0607					607	Missing	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High		Girdling Root	Forked								$2,634.72
7	Single-species allees		07RH0608					608	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High	Grate Lift										$1,959.42
7	Single-species allees		07RH0609					609	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High		Storm Damage	Girdling Root								$2,745 56
7	Single-species allees		07RH0610					610	Missing	Ash, 'Rosehill' (RH)	70	16	70	90												$2,837 39
7	Single-species allees		07RH0611					611	Missing	Ash, 'Rosehill' (RH)	70	19	70	90												$4,001.17
7	Single-species allees	07RH0612	07RH0612					612		Ash, 'Rosehill' (RH)	70	13	60	90	Grate Lift	Crown Clean High										$1,605 53
7	Single-species allees		07RH0613					613	Missing	Ash, 'Rosehill' (RH)	70	16	65	90			Girdling Root	Trunk Wound								$2,634.72
7	Single-species allees		07RH0614					614	Missing	Ash, 'Rosehill' (RH)	70	11	50	90			No Grate	Girdling Root								$957.94
7	Single-species allees		07RH0615					615	Missing	Ash, 'Rosehill' (RH)	70	15	70	90			Girdling Root									$2,493 80

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	Single-species allees	07RH0617	07RH0617					617		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Girdling Root	Trunk Wound								$1,862 04
7	Single-species allees		07RH0618					618	Missing	Ash, 'Rosehill' (RH)	70	18	55	90	Crown Lifting	Crown Clean High	Forked									$2,821 56
7	Single-species allees		07RH0619					619	Missing	Ash, 'Rosehill' (RH)	70	2	65	90	Corrective Prune											$130.00
7	Single-species allees	07RH0620	07RH0620					620		Ash, 'Rosehill' (RH)	70	16	65	90		Crown Clean High	Girdling Root									$2,634.72
7	Single-species allees		07RH0621					621	Missing	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
7	Single-species allees		07RH0622	X				622	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
7	Single-species allees		07RH0623					623	Missing	Ash, 'Rosehill' (RH)	70	11	75	90			Forked									$1,436 91
7	Single-species allees	07RH0624	07RH0624					624		Ash, 'Rosehill' (RH)	70	18	75	90	Grate Lift											$3,847 58
7	Single-species allees		07RH0625					625	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean Low		Girdling Root									$2,172 38
7	Single-species allees	07RH0626	07RH0626					626		Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High		Girdling Root									$2,837 39
7	Single-species allees	07RH0627	07RH0627					627		Ash, 'Rosehill' (RH)	70	13	60	90			Girdling Root									$1,605 53
7	Single-species allees	07RH0628	07RH0628					628	Defective	Ash, 'Rosehill' (RH)	70	13	60	90			Forked									$1,605 53
7	Single-species allees		07RH0629					629	Missing	Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High		Mower Damage									$3,334 57
7	Single-species allees		07RH0630					630	Ineffective	Ash, 'Rosehill' (RH)	70	13	70	90	Grate Lift	Crown Clean High										$1,873.12
7	Single-species allees		07RH0632					632	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Grate Lift											$2,493 80
7	Single-species allees		07RH0633					633	Missing	Ash, 'Rosehill' (RH)	70	24	60	90			Forked									$5,472.11
7	Single-species allees		07RH0634					634	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Grate Lift	Crown Clean High										$1,739 33
7	Single-species allees		07RH0635					635	Missing	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High		Trunk Wound									$2,634.72
7	Single-species allees	07RH0636	07RH0636					636		Ash, 'Rosehill' (RH)	70	14	60	90	Grate Lift	Crown Clean High										$1,862 04
7	Single-species allees		07RH0637					637	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High											$1,959.42
7	Single-species allees	07RH0638	07RH0638					638		Ash, 'Rosehill' (RH)	70	15	75	90	Grate Lift											$2,671 93
7	Single-species allees		07RH0639					639	Missing	Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
7	Single-species allees	07RH0640	07RH0640					640		Ash, 'Rosehill' (RH)	70	16	60	90			No Grate									$2,432 05
7	Single-species allees		07RH0641					641	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High		Girdling Root	Mower Damage								$2,493 80
7	Single-species allees		07RH0642					642	Missing	Ash, 'Rosehill' (RH)	70	11	70	90	Grate Lift											$1,341.11
7	Single-species allees	07RH0643	07RH0643					643		Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High		Girdling Root									$3,334 57
7	Single-species allees		07RH0644					644	Missing	Ash, 'Rosehill' (RH)	70	17	65	90	Crown Clean High	Grate Lift										$2,974 35
7	Single-species allees		07RH0645					645	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Trunk Wound	Girdling Root								$2,432 05
7	Single-species allees		07RH0646					646	Missing	Ash, 'Rosehill' (RH)	70	4	70	90	Corrective Prune											$280.00
7	Single-species allees	07RH0647	07RH0647					647		Ash, 'Rosehill' (RH)	70	16	70	90	Crown Clean High		Girdling Root									$2,837 39
7	Single-species allees	07RH0648	07RH0648					648		Ash, 'Rosehill' (RH)	70	13	75	90	Grate Lift											$2,006 92
7	Single-species allees		07RH0649					649	Missing	Ash, 'Rosehill' (RH)	70	14	60	90			Forked									$1,862 04
7	Single-species allees	07RH0650	07RH0650					650		Ash, 'Rosehill' (RH)	70	15	70	90	Grate Lift											$2,493 80
7	Single-species allees	07RH0651	07RH0651					651		Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
7	Single-species allees		07RH0652					652	Missing	Ash, 'Rosehill' (RH)	70	14	65	90												$2,017 21
7	Single-species allees	07RH0653	07RH0653					653		Ash, 'Rosehill' (RH)	70	15	75	90												$2,671 93
7	North Pond Baldcypress Circle		07BC0017					17	Missing	Baldcypress (BC)	100	14	65	70			Trunk Wound	Mower Damage								$2,241 34
7	North Pond Baldcypress Circle		07BC0018					18	Missing	Baldcypress (BC)	100	15	80	70			Mower Damage									$3,166.73
7	North Pond Baldcypress Circle	07BC0019	07BC0019					19		Baldcypress (BC)	100	15	85	70												$3,364 65
7	North Pond Baldcypress Circle	07BC0022	07BC0022					22		Baldcypress (BC)	100	14	75	70			Trunk Wound									$2,586.17
7	North Pond Baldcypress Circle	07BC0023	07BC0023					23		Baldcypress (BC)	100	15	80	70			Mower Damage									$3,166.73
7	North Pond Baldcypress Circle		07BC0024					24	Missing	Baldcypress (BC)	100	16	75	70			Mower Damage									$3,377 85
7	North Pond Baldcypress Circle	07BC0025	07BC0025					25		Baldcypress (BC)	100	14	70	70			Trunk Wound									$2,413.75
7	North Pond Baldcypress Circle	07BC0026	07BC0026					26		Baldcypress (BC)	100	14	80	70												$2,758 58
7	North Pond Baldcypress Circle	07BC0029	07BC0029					29		Baldcypress (BC)	100	14	80	70												$2,758 58
7	North Pond Baldcypress Circle		07BC0030					30	Missing	Baldcypress (BC)	100	13	80	70												$2,378 57
7	North Pond Baldcypress Circle		07BC0031					31	Missing	Baldcypress (BC)	100	20	85	70												$5,981 61
7	North Pond Baldcypress Circle	07BC0032	07BC0032					32		Baldcypress (BC)	100	16	80	70												$3,603 04
7	North Pond Baldcypress Circle	07BC0035	07BC0035					35	Defective	Baldcypress (BC)	100	16	80	70												$3,603 04
7	North Pond Baldcypress Circle	07BC0036	07BC0036					36		Baldcypress (BC)	100	13	80	70												$2,378 57
7	North Pond Baldcypress Circle		07BC0037					37	Defective	Baldcypress (BC)	100	19	80	70			Tag says species name									$5,080 85

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Baldcypress Circle	07BC0038	07BC0038					38	Defective	Baldcypress (BC)	100	19	85	70												$5,398.40
7	North Pond Baldcypress Circle	07BC0039	07BC0039					39		Baldcypress (BC)	100	16	80	70												$3,603 04
7	North Pond Baldcypress Circle		07BC0040					40	Missing	Baldcypress (BC)	100	13	75	70												$2,229 91
7	North Pond Baldcypress Circle		07BC0041					41	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
7	North Pond Baldcypress Circle	07BC0042	07BC0042					42		Baldcypress (BC)	100	17	85	70												$4,321.71
7	North Pond Baldcypress Circle		07BC0043					43	Missing	Baldcypress (BC)	100	15	80	70												$3,166.73
7	North Pond Baldcypress Circle		07BC0044					44	Missing	Baldcypress (BC)	100	19	65	70			Trunk Wound									$4,128.19
7	North Pond Baldcypress Circle		07BC0045					45	Missing	Baldcypress (BC)	100	16	75	70												$3,377 85
7	North Pond Baldcypress Circle	07BC0121	07BC0121					121		Baldcypress (BC)	100	12	70	70												$1,773 37
7	North Pond Baldcypress Circle		07BC0122					122	Missing	Baldcypress (BC)	100	16	85	70												$3,828 23
7	North Pond Baldcypress Circle		07BC0123			X		123	Missing	Baldcypress (BC)	100	14	60	70	Crown Clean Low		Girdling Root									$2,068 93
7	North Pond Baldcypress Circle	07BC0124	07BC0124					124		Baldcypress (BC)	100	15	80	70												$3,166.73
7	North Pond Baldcypress Circle		07BC0125					125	Missing	Baldcypress (BC)	100	12	80	70												$2,026.71
7	North Pond Baldcypress Circle		07BC0280					280	Missing	Baldcypress (BC)	100	18	80	70												$4,560.10
7	North Pond Baldcypress Circle	07BC0281	07BC0281					281		Baldcypress (BC)	100	19	80	70			Mower Damage									$5,080 85
7	North Pond Baldcypress Circle		07BC0282					282	Missing	Baldcypress (BC)	100	20	30	70			Trunk Wound									$2,111.16
7	North Pond Baldcypress Circle	07BC0283	07BC0283					283		Baldcypress (BC)	100	16	75	70			Trunk Wound									$3,377 85
7	North Pond Baldcypress Circle	07BC0284	07BC0284					284		Baldcypress (BC)	100	16	80	70												$3,603 04
7	North Pond Baldcypress Circle		07BC0285					285	Missing	Baldcypress (BC)	100	19	80	70			Forked									$5,080 85
7	North Pond Baldcypress Circle	07BC0286	07BC0286					286		Baldcypress (BC)	100	16	85	70												$3,828 23
7	North Pond Baldcypress Circle	07BC0287	07BC0287					287		Baldcypress (BC)	100	15	80	70			Trunk Wound	Mower Damage								$3,166.73
7	North Pond Baldcypress Circle		07BC0376					376	Missing	Baldcypress (BC)	100	20	90	70												$6,333.47
7	North Pond Baldcypress Circle	07BC0378	07BC0378					378		Baldcypress (BC)	100	20	90	70			Mower Damage									$6,333.47
7	North Pond Baldcypress Circle		07BC0379					379	Missing	Baldcypress (BC)	100	20	85	70			Mower Damage									$5,981 61
7	North Pond Baldcypress Circle	07BC0380	07BC0380					380		Baldcypress (BC)	100	15	80	70			Mower Damage									$3,166.73
7	North Pond Baldcypress Circle	07BC0381	07BC0381					381		Baldcypress (BC)	100	15	75	70			Trunk Wound									$2,968 81
7	North Pond Baldcypress Circle		07BC0382					382	Missing	Baldcypress (BC)	100	5	85	70												$373.85
7	North Pond Baldcypress Circle	07BC0401	07BC0401					401		Baldcypress (BC)	100	15	80	70												$3,166.73
7	North Pond Baldcypress Circle	07BC0402	07BC0402					402		Baldcypress (BC)	100	13	85	70												$2,527 23
7	North Pond Baldcypress Circle		07BC0405					405	Missing	Baldcypress (BC)	100	13	80	70												$2,378 57
7	North Pond Baldcypress Circle		07BC0406					406	Ineffective	Baldcypress (BC)	100	16	75	70	Crown Clean Low											$3,377 85
7	North Pond Baldcypress Circle		07BC0412					412	Missing	Baldcypress (BC)	100	14	65	70	Crown Clean Low											$2,241 34
7	North Pond Baldcypress Circle	07BC0414	07BC0414					414		Baldcypress (BC)	100	14	70	70			Girdling Root									$2,413.75
7	North Pond Baldcypress Circle		07BC0415					415	Missing	Baldcypress (BC)	100	15	85	70												$3,364 65
7	North Pond Baldcypress Circle		07BC0416					416	Missing	Baldcypress (BC)	100	17	85	70												$4,321.71
7	North Pond Baldcypress Circle		07BC0417					417	Missing	Baldcypress (BC)	100	15	80	70												$3,166.73
7	North Pond Baldcypress Circle	07BC0418	07BC0418					418	Defective	Baldcypress (BC)	100	15	80	70			Mower Damage									$3,166.73
7	North Pond Baldcypress Circle		07BC0421					421	Ineffective	Baldcypress (BC)	100	19	75	70			Mower Damage									$4,763 29
7	North Pond Baldcypress Circle		07BC0422					422	Missing	Baldcypress (BC)	100	19	90	70			Mower Damage									$5,715 95
7	North Pond Baldcypress Circle		07BC0500					500	Missing	Baldcypress (BC)	100	2	85	70												$170.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Baldcypress Circle		07BC0505					505	Missing	Baldcypress (BC)	100	15	70	70			Girdling Root	Trunk Wound								$2,770 89
7	North Pond Area Plantings		07BN0012					12	Missing	Birch, River (BN)	80	11	80	70			Multi-stem									$1,362.40
7	North Pond Area Plantings		07BN0014					14	Missing	Birch, River (BN)	80	9	85	70			Multi-stem									$969.02
7	North Pond Area Plantings		07BN0016					16	Missing	Birch, River (BN)	80	10	80	70			Multi-stem									$1,125 95
7	North Pond Area Plantings		07BN0130					130	Missing	Birch, River (BN)	80	3	70	70	Crown Lifting		Multi-stem									$210.00
7	North Pond Area Plantings		07BN0135					135	Missing	Birch, River (BN)	80	3	70	70	Crown Lifting		Multi-stem									$210.00
7	North Pond Area Plantings		07BN0137					137	Missing	Birch, River (BN)	80	3	70	70	Crown Lifting		Multi-stem									$210.00
7	North Pond Area Plantings		07BN0138					138	Missing	Birch, River (BN)	80	3	75	70	Crown Lifting		Multi-stem									$225.00
7	North Pond Area Plantings		07BN0142					142	Missing	Birch, River (BN)	80	3	70	70	Crown Lifting		Multi-stem									$210.00
7	North Pond Area Plantings		07BN0144					144	Missing	Birch, River (BN)	80	3	75	70	Crown Lifting		Multi-stem									$225.00
7	North Pond Area Plantings		07BN0171					171	Missing	Birch, River (BN)	80	2.5	75	70	Crown Lifting		Multi-stem									$187.50
7	North Pond Area Plantings		07BN0172					172	Missing	Birch, River (BN)	80	2.5	75	70	Crown Lifting		Multi-stem									$187.50
7	North Pond Area Plantings		07BN0173					173	Missing	Birch, River (BN)	80	2.5	70	70	Crown Lifting		Multi-stem									$175.00
7	North Pond Area Plantings		07BN0174					174	Missing	Birch, River (BN)	80	2.5	75	70	Crown Lifting		Multi-stem									$187.50
7	North Pond Area Plantings		07BN0175					175	Missing	Birch, River (BN)	80	2.5	70	70	Crown Lifting		Multi-stem	Girdling Root								$175.00
7	North Pond Area Plantings		07BN0373					373	Missing	Birch, River (BN)	80	3	75	70			Multi-stem									$225.00
7	North Pond Area Plantings		07BN0433					433	Missing	Birch, River (BN)	80	5	80	70	Crown Lifting	Corrective Prune	Multi-stem									$281.49
7	North Pond Area Plantings		07HB0244					244	Missing	Birch, River 'Heritage' (HB)	80	6	70	70												$354.67
7	North Pond Area Plantings		07HB0255					255	Missing	Birch, River 'Heritage' (HB)	80	6	75	70			Mower Damage									$380.01
7	North Pond Area Plantings		07HB0256					256	Missing	Birch, River 'Heritage' (HB)	80	5	70	70			Mower Damage									$246.30
7	North Pond Area Plantings		07HB0258					258	Missing	Birch, River 'Heritage' (HB)	80	5	70	70												$246.30
7	North Pond Area Plantings		07HB0263					263	Missing	Birch, River 'Heritage' (HB)	80	4	70	70												$280.00
7	North Pond Area Plantings		07HB0264					264	Missing	Birch, River 'Heritage' (HB)	80	4	70	70	Crown Clean Low		Trunk Wound									$280.00
7	North Pond Area Plantings		07HB0269					269	Missing	Birch, River 'Heritage' (HB)	80	5	70	70			Mower Damage									$246.30
7	North Pond Area Plantings		07HB0270					270	Missing	Birch, River 'Heritage' (HB)	80	5	75	70												$263.89
7	North Pond Area Plantings		07HB0271					271	Missing	Birch, River 'Heritage' (HB)	80	5	65	70			Mower Damage	Girdling Root								$228.71
7	North Pond Area Plantings		07HB0353					353	Missing	Birch, River 'Heritage' (HB)	80	5	70	70			Mower Damage									$246.30
7	North Pond Area Plantings		07HB0358					358	Missing	Birch, River 'Heritage' (HB)	80	4	65	70	Corrective Prune											$260.00
7	North Pond Area Plantings		07HB0359					359	Missing	Birch, River 'Heritage' (HB)	80	6	75	70												$380.01
7	North Pond Area Plantings		07HB0360					360	Missing	Birch, River 'Heritage' (HB)	80	4	70	70			Mower Damage									$280.00
7	North Pond Area Plantings	7KC0147	07KC0147			X		147		Coffeetree, Kentucky (KC)	80	15	85	70	Crown Lifting											$2,691.72
7	North Pond Area Plantings	07KC0232	07KC0232					232		Coffeetree, Kentucky (KC)	80	14	75	70	Crown Clean Low											$2,068 93
7	North Pond Area Plantings		07KC0314					314	Missing	Coffeetree, Kentucky (KC)	80	3	75	70	Corrective Prune											$225.00
7	North Pond Area Plantings	07KC0315	07KC0315					315		Coffeetree, Kentucky (KC)	80	11	80	70												$1,362.40
7	North Pond Area Plantings		07KC0374					374	Missing	Coffeetree, Kentucky (KC)	80	10	80	70			Forked									$1,125 95
7	North Pond Area Plantings		07AC0431					431	Missing	Corktree, Amur (AC)	70	5	50	70			Mower Damage									$153.94
7	North Pond Area Plantings	7AC434	07AC434					434		Corktree, Amur (AC)	70	4	70	70												$280.00
7	North Pond Area Plantings		07RC0059	X				59	Missing	Crabapple, Radiant (RC)	70			70												$0.00
7	North Pond Area Plantings		07RC0063	X				63	Missing	Crabapple, Radiant (RC)	70			70												$0.00
7	North Pond Area Plantings	07RC0064	07RC0064			X		64		Crabapple, Radiant (RC)	70	12	45	70			Sapsuckers	Trunk Wound								$798.02

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings		07RC0148	X				148	Missing	Crabapple, Radiant (RC)	70			70												$0.00
7	North Pond Area Plantings		07RC0149	X				149	Missing	Crabapple, Radiant (RC)	70			70												$0.00
7	North Pond Area Plantings	07RC0166	07RC0166					166		Crabapple, Radiant (RC)	70	8	45	70												$354.67
7	North Pond Area Plantings		07RC0237					237	Missing	Crabapple, Radiant (RC)	70	10	55	70			Trunk Wound									$677.33
7	North Pond Area Plantings	07RC0238	07RC0238					238		Crabapple, Radiant (RC)	70	9	55	70			Trunk Wound									$548.64
7	North Pond Area Plantings		07RC0240					240	Missing	Crabapple, Radiant (RC)	70	8	65	70												$512.31
7	North Pond Area Plantings		07RC0364					364	Missing	Crabapple, Radiant (RC)	70	5	60	70			Mower Damage									$184.73
7	North Pond Area Plantings	07RC0365	07RC0365					365		Crabapple, Radiant (RC)	70	10	70	70												$862.06
7	North Pond Area Plantings	07RC0366	07RC0366					366		Crabapple, Radiant (RC)	70	6	70	70												$310.34
7	North Pond Area Plantings		07RC0367					367	Missing	Crabapple, Radiant (RC)	70	11	55	70			Trunk Wound									$819.57
7	North Pond Area Plantings		07RC0442					442	Missing	Crabapple, Radiant (RC)	70	7	60	70												$362.06
7	North Pond Area Plantings	7RC443	07RC0443					443	Defective	Crabapple, Radiant (RC)	70	4	50	70												$200.00
7	North Pond Area Plantings		07RC0460					460	Missing	Crabapple, Radiant (RC)	70	4	55	70			Trunk Wound									$220.00
7	North Pond Area Plantings		07CR0242					242	Missing	Crabapple, Robinson (CR)	70	3	75	70												$225.00
7	North Pond Area Plantings		07CR0243					243	Missing	Crabapple, Robinson (CR)	70	3	75	70												$225.00
7	North Pond Area Plantings		07CR0259					259	Missing	Crabapple, Robinson (CR)	70	3	70	70												$210.00
7	North Pond Area Plantings		07CR0260					260	Missing	Crabapple, Robinson (CR)	70	5	40	70			Trunk Wound	Insect/Disease/Stress								$123.15
7	North Pond Area Plantings		07CR0261					261	Missing	Crabapple, Robinson (CR)	70	8	20	70	Rec Remove		Ganaderma at Base	Trunk Wound								$157.63
7	North Pond Area Plantings		07CR0268					268	Missing	Crabapple, Robinson (CR)	70	3	70	70	Crown Clean Low											$210.00
7	North Pond Area Plantings		07CR0368					368	Missing	Crabapple, Robinson (CR)	70	3	65	70			Girdling Root									$195.00
7	North Pond Area Plantings		07CR0393					393	Missing	Crabapple, Robinson (CR)	70	2	70	70												$140.00
7	North Pond Area Plantings		07CR0394					394	Missing	Crabapple, Robinson (CR)	70	3	70	70			Girdling Root									$210.00
7	North Pond Area Plantings		07SD0002					2	Missing	Crabapple, Snowdrift (SD)	70	7	55	70	Crown Clean Low											$331.89
7	North Pond Area Plantings		07SD0081					81	Missing	Crabapple, Snowdrift (SD)	70	9	50	70			Sapsuckers	Leaning								$498.76
7	North Pond Area Plantings		07SD0082					82	Missing	Crabapple, Snowdrift (SD)	70	14	55	70			Sapsuckers	Mower Damage								$1,327 56
7	North Pond Area Plantings		07SD0178					178	Missing	Crabapple, Snowdrift (SD)	70	8	60	70			Mower Damage									$472.90
7	North Pond Area Plantings		07SD0179					179	Missing	Crabapple, Snowdrift (SD)	70	6	55	70			Girdling Root									$243.84
7	North Pond Area Plantings		07SD0236	X				236	Missing	Crabapple, Snowdrift (SD)	70															$0.00
7	North Pond Area Plantings		07SD0245					245	Missing	Crabapple, Snowdrift (SD)	70	8	65	70			Sapsuckers									$512.31
7	North Pond Area Plantings		07SD0249		X			249	Missing	Crabapple, Snowdrift (SD)	70	2		70			REPLACED W DS 04 09									$0.00
7	North Pond Area Plantings		07SD0250			X		250	Missing	Crabapple, Snowdrift (SD)	70	8	55	70			Sapsuckers									$433.49
7	North Pond Area Plantings		07SD0251					251	Missing	Crabapple, Snowdrift (SD)	70	11	60	70			Sapsuckers	Girdling Root								$894.07
7	North Pond Area Plantings		07SD0279					279	Missing	Crabapple, Snowdrift (SD)	70	9	70	70												$698.26
7	North Pond Area Plantings		07SD0288					288	Missing	Crabapple, Snowdrift (SD)	70	10	70	70			Sapsuckers									$862.06
7	North Pond Area Plantings		07SD0291					291	Missing	Crabapple, Snowdrift (SD)	70	11	60	70			Sapsuckers	Mower Damage								$894.07
7	North Pond Area Plantings		07SD0292					292	Missing	Crabapple, Snowdrift (SD)	70	12	60	70	Crown Clean Low		Sapsuckers	Mower Damage								$1,064 02
7	North Pond Area Plantings		07SD0293					293	Missing	Crabapple, Snowdrift (SD)	70	8	70	70												$551.72
7	North Pond Area Plantings		07SD0330					330	Missing	Crabapple, Snowdrift (SD)	70	8	70	70			Girdling Root									$551.72
7	North Pond Area Plantings	7SD448	07SD0448	X				448		Crabapple, Snowdrift (SD)	70			70												$0.00
7	North Pond Area Plantings		07SD0504					504	Missing	Crabapple, Snowdrift (SD)	70	2	50	70												$100.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings		07FD0221					221	Missing	Dogwood, Flowering (FD)	100	8	75	70												$844.46
7	North Pond Area Plantings		07PD0001					1	Missing	Dogwood, Pagoda (PD)	90	3	70	70												$210.00
7	North Pond Area Plantings		07PD0034					34	Missing	Dogwood, Pagoda (PD)	90	2	55	70			Trunk Wound									$110.00
7	North Pond Area Plantings		07PD0107					107	Missing	Dogwood, Pagoda (PD)	90	5	80	70												$316.67
7	North Pond Area Plantings		07PD0388					388	Missing	Dogwood, Pagoda (PD)	90	3	65	70												$195.00
7	North Pond Area Plantings		07PD0456					456	Missing	Dogwood, Pagoda (PD)	90	2	80	70												$160.00
7	North Pond Area Plantings		07PD0457					457	Missing	Dogwood, Pagoda (PD)	90	2	75	70			Mower Damage									$150.00
7	North Pond Area Plantings		07SH0005					5	Missing	Hackberry, Sugar (SH)	80	4	65	70	Crown Lifting	Corrective Prune										$260.00
7	North Pond Area Plantings		07SH0065					65	Missing	Hackberry, Sugar (SH)	80	4	80	70	Crown Lifting											$320.00
7	North Pond Area Plantings		07SH0067					67	Missing	Hackberry, Sugar (SH)	80	4	80	70	Crown Lifting		Girdling Root									$320.00
7	North Pond Area Plantings		07SH0167					167	Missing	Hackberry, Sugar (SH)	80	2.5	70	70	Corrective Prune											$175.00
7	North Pond Area Plantings		07SH0196					196	Missing	Hackberry, Sugar (SH)	80	2.5	75	70	Corrective Prune											$187.50
7	North Pond Area Plantings		07SH0213					213	Missing	Hackberry, Sugar (SH)	80	2.5	75	70	Corrective Prune											$187.50
7	North Pond Area Plantings		07SH0455					455	Missing	Hackberry, Sugar (SH)	80	3.5	75	70	Crown Lifting	Corrective Prune										$262.50
7	North Pond Area Plantings		07SH0503					503	Missing	Hackberry, Sugar (SH)	80	4	70	70	Crown Lifting		Girdling Root									$280.00
7	North Pond Area Plantings	07WH0084	07WH0084					84	Defective	Hawthorn, Washington (WH)	60	6	60	70												$228.00
7	North Pond Area Plantings	07WH0085	07WH0085		X			85	Defective	Hawthorn, Washington (WH)	60	2		70			REPLANTED W WK 10/09									$0.00
7	North Pond Area Plantings	07WH0086	07WH0086	X				86		Hawthorn, Washington (WH)	60			70												$0.00
7	North Pond Area Plantings	07WH0095	07WH0095		X			95		Hawthorn, Washington (WH)	60	2		70			REPLANTED W WK 10/09									$0.00
7	North Pond Area Plantings		07WH0117		X			117	Missing	Hawthorn, Washington (WH)	60	2		70			REPLACED W WK 12/08									$0.00
7	North Pond Area Plantings		07WH0118		X			118	Missing	Hawthorn, Washington (WH)	60	2		70			REPLACED W WK 12/08									$0.00
7	North Pond Area Plantings		07WH0190					190	Missing	Hawthorn, Washington (WH)	60	2	65	70			Multi-stem									$130.00
7	North Pond Area Plantings		07WH0191					191	Missing	Hawthorn, Washington (WH)	60	2	75	70			Multi-stem									$150.00
7	North Pond Area Plantings		07WH0194					194	Missing	Hawthorn, Washington (WH)	60	2	65	70			Multi-stem	Trunk Wound								$130.00
7	North Pond Area Plantings		07WH0197					197	Missing	Hawthorn, Washington (WH)	60	2	75	70			Multi-stem									$150.00
7	North Pond Area Plantings		07WH0301					301	Missing	Hawthorn, Washington (WH)	60	6	75	70												$285.01
7	North Pond Area Plantings		07WH0302					302	Missing	Hawthorn, Washington (WH)	60	5	75	70			Mower Damage									$197.92
7	North Pond Area Plantings		07WH0354					354	Missing	Hawthorn, Washington (WH)	60	2	70	70			Multi-stem									$140.00
7	North Pond Area Plantings	07WH0355	07WH0355					355		Hawthorn, Washington (WH)	60	6	75	70												$285.01
7	North Pond Area Plantings		07WH0356					356	Missing	Hawthorn, Washington (WH)	60	2	70	70			Multi-stem									$140.00
7	North Pond Area Plantings		07WH0357					357	Missing	Hawthorn, Washington (WH)	60	2	60	70			Multi-stem									$120.00
7	North Pond Area Plantings		07HL0227					227	Missing	Honeylocust (HL)	75	3	60	70	Corrective Prune		Trunk Wound									$180.00
7	North Pond Area Plantings		07HL0228					228	Missing	Honeylocust (HL)	75	4	70	70	Corrective Prune											$280.00
7	North Pond Area Plantings		07HL0229			X		229	Missing	Honeylocust (HL)	75	14	30	70	Hazard Limb High	Crown Clean High	Insect/disease/stress		4=severe	4	1=0-6"	1	1=Occassional	1	6	$775.85
7	North Pond Area Plantings		07HL0230			X		230	Missing	Honeylocust (HL)	75	11	45	70			Trunk Wound									$718.45
7	North Pond Area Plantings		07HL0298			X		298	Missing	Honeylocust (HL)	75	5	75	70	Corrective Prune											$247.40
7	North Pond Area Plantings		07HL0319			X		319	Missing	Honeylocust (HL)	75	4	80	70												$320.00
7	North Pond Area Plantings		07HL0320					320	Missing	Honeylocust (HL)	75	4	70	70	Corrective Prune											$280.00
7	North Pond Area Plantings		07HL0335			X		335	Missing	Honeylocust (HL)	75	4	75	70	Crown Lifting											$300.00
7	North Pond Area Plantings		07HL0336			X		336	Missing	Honeylocust (HL)	75	4	75	70	Corrective Prune											$300.00

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings	07HL0337	07HL0337			X		337	Defective	Honeylocust (HL)	75	16	65	70	Crown Lifting	Crown Clean High	Mower Damage									$2,195 60
7	North Pond Area Plantings		07HL0338			X		338	Missing	Honeylocust (HL)	75	5	75	70	Crown Clean Low	Corrective Prune										$247.40
7	North Pond Area Plantings		07HL0398					398	Missing	Honeylocust (HL)	75	3	40	70			Trunk Wound									$120.00
7	North Pond Area Plantings	7HL15	07HL0015					15		Honeylocust, Shademaster (HL)	75	14	55	70	Crown Clean High		Mower Damage									$1,422 39
7	North Pond Area Plantings	07HL0115	07HL0115		X			115		Honeylocust, Shademaster (HL)	75	2		70			REPLACED W AH									
7	North Pond Area Plantings	07HL0116	07HL0116		X			116		Honeylocust, Shademaster (HL)	75	2		70			REPLACED W AH									$0.00
7	North Pond Area Plantings		07HL0223			X		223	Missing	Honeylocust, Shademaster (HL)	75	16	50	70	Crown Clean High		Vines									$1,688 92
7	North Pond Area Plantings	07HL225	07HL0225		X			225		Honeylocust, Shademaster (HL)	75	2		70			REPLACED W AH									
7	North Pond Area Plantings	07HL226	07HL0226		X			226		Honeylocust, Shademaster (HL)	75	2		70			REPLACED W AH									$0.00
7	North Pond Area Plantings		07HL0312			X		312	Missing	Honeylocust, Shademaster (HL)	75	19	50	70	Crown Clean High		Mower Damage									$2,381 65
7	North Pond Area Plantings		07HL0316			X		316	Missing	Honeylocust, Shademaster (HL)	75	13	20	70	Hazard Tree		Insect/disease/stress	Trunk Wound	4=severe	4	2=7-18"	2	1=Occassional	1	7	
7	North Pond Area Plantings	07HL0317	07HL0317			X		317	Defective	Honeylocust, Shademaster (HL)	75	15	60	70	Crown Clean High		Mower Damage									$1,781 29
7	North Pond Area Plantings		07HL0396			X		396	Missing	Honeylocust, Shademaster (HL)	75	15	55	70	Crown Lifting	Crown Clean High	Mower Damage									$1,632 85
7	North Pond Area Plantings		07HL0397			X		397	Missing	Honeylocust, Shademaster (HL)	75	15	55	70	Crown Lifting	Crown Clean High	Mower Damage	Trunk Wound								$1,632 85
7	North Pond Area Plantings		07HL0399			X		399	Missing	Honeylocust, Shademaster (HL)	75	19	20	70	Hazard Tree		Trunk Wound	Insect/Disease/Stress	3=High	3	3=19-32"	3	3=Frequent	3	9	
7	North Pond Area Plantings	07GL010	07GL0010					10		Linden, Greenspire (GL)	80	11	75	70			Mower Damage									$1,277 25
7	North Pond Area Plantings		07GL0070					70	Missing	Linden, Greenspire (GL)	80	15	75	70			Girdling Root									$2,375 05
7	North Pond Area Plantings	07GL0073	07GL0073					73		Linden, Greenspire (GL)	80	14	75	70												$2,068 93
7	North Pond Area Plantings	07GL0074	07GL0074					74	Defective	Linden, Greenspire (GL)	80	15	70	70			Girdling Root									$2,216.71
7	North Pond Area Plantings	07GL0136	07GL0136					136		Linden, Greenspire (GL)	80	9	45	70	Crown Lifting		Trunk Wound	Girdling Root								$513.01
7	North Pond Area Plantings		07GL0139					139	Missing	Linden, Greenspire (GL)	80	11	60	70	Crown Lifting		Girdling Root									$1,021 80
7	North Pond Area Plantings		07GL0140					140	Ineffective	Linden, Greenspire (GL)	80	13	70	70	Crown Lifting											$1,665 00
7	North Pond Area Plantings		07GL0141					141	Missing	Linden, Greenspire (GL)	80	11	60	70	Crown Lifting		Mower Damage	Girdling Root								$1,021 80
7	North Pond Area Plantings	07GL0143	07GL0143		X			143		Linden, Greenspire (GL)	80	2		70			REPLACED W BN									$0.00
7	North Pond Area Plantings		07GL0186	X				186	Missing	Linden, Greenspire (GL)	80	20	70	70			BLOCKED WIRELESS SIGNAL									$3,940 82
7	North Pond Area Plantings	07GL0187	07GL0187	X				187		Linden, Greenspire (GL)	80	18	75	70			BLOCKED WIRELESS SIGNAL									$3,420 07
7	North Pond Area Plantings		07GL0188					188	Missing	Linden, Greenspire (GL)	80	16	75	70	Crown Lifting											$2,702 28
7	North Pond Area Plantings		07GL0222					222	Missing	Linden, Greenspire (GL)	80	13	65	70												$1,546 07
7	North Pond Area Plantings	07GL0257	07GL0257	X				257		Linden, Greenspire (GL)	80			70												$0.00
7	North Pond Area Plantings	07GL0262	07GL0262					262		Linden, Greenspire (GL)	80	14	75	70			Mower Damage									$2,068 93
7	North Pond Area Plantings		07GL0273					273	Missing	Linden, Greenspire (GL)	80	12	65	70			Forked									$1,317 36
7	North Pond Area Plantings	07GL0348	07GL0348					348		Linden, Greenspire (GL)	80	14	60	70			Girdling Root									$1,655.15
7	North Pond Area Plantings		07GL0349					349	Missing	Linden, Greenspire (GL)	80	13	75	70			Girdling Root									$1,783 93
7	North Pond Area Plantings		07GL0350					350	Defective	Linden, Greenspire (GL)	80	15	80	70			Tag reads 02RH0467									$2,533 39
7	North Pond Area Plantings	07GL0361	07GL0361					361		Linden, Greenspire (GL)	80	9	65	70			Girdling Root									$741.02
7	North Pond Area Plantings	7GL363	07GL0363					363		Linden, Greenspire (GL)	80	7	70	70			Girdling Root									$482.75
7	North Pond Area Plantings	07GL413	07GL0413					413		Linden, Greenspire (GL)	80	13	70	70			Girdling Root									$1,665 00
7	North Pond Area Plantings		07GL0419					419	Defective	Linden, Greenspire (GL)	80	15	80	70												$2,533 39
7	North Pond Area Plantings		07GL0420					420	Missing	Linden, Greenspire (GL)	80	14	65	70			Leaning	Girdling Root								$1,793 07
7	North Pond Area Plantings		07GL0424					424	Missing	Linden, Greenspire (GL)	80	16	70	70			Leaning	Girdling Root								$2,522.13

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings	7GL453	07GL0453					453		Linden, Greenspire (GL)	80	17	80	70												$3,253 99
7	North Pond Area Plantings	07MS0069	07MS0069					69		Magnolia, Saucer (MS)	80	6	70	70												$354.67
7	North Pond Area Plantings	07MS0274	07MS0274					274		Magnolia, Saucer (MS)	80	6	50	70			Trunk Wound									$253.34
7	North Pond Area Plantings	07MS0339	07MS0339					339		Magnolia, Saucer (MS)	80	6	65	70			Trunk Wound									$329.34
7	North Pond Area Plantings		07MS0340					340	Missing	Magnolia, Saucer (MS)	80	6	70	70												$354.67
7	North Pond Area Plantings		07MS0404					404	Missing	Magnolia, Saucer (MS)	80	5	75	70												$263.89
7	North Pond Area Plantings		07MS0409					409	Missing	Magnolia, Saucer (MS)	80	4	30	70			Trunk Wound									$120.00
7	North Pond Area Plantings		07MS0410					410	Missing	Magnolia, Saucer (MS)	80	5	70	70												$246.30
7	North Pond Area Plantings		07RM0046					46	Missing	Maple, Red (RM)	90	11	80	70	Crown Clean Low		Girdling Root									$1,532.70
7	North Pond Area Plantings		07RM0091					91	Missing	Maple, Red (RM)	90	13	65	70	Crown Clean High											$1,739 33
7	North Pond Area Plantings		07RM0093					93	Missing	Maple, Red (RM)	90	11	65	70	Crown Clean High											$1,245 32
7	North Pond Area Plantings		07RM0102					102	Missing	Maple, Red (RM)	90	15	75	70			Trunk Wound	Mower Damage								$2,671 93
7	North Pond Area Plantings		07RM0104					104	Defective	Maple, Red (RM)	90	13	70	70	Crown Lifting		Girdling Root									$1,873.12
7	North Pond Area Plantings		07RM0176					176		Maple, Red (RM)	90	15	50	70	Crown Clean High		Storm Damage									$1,781 29
7	North Pond Area Plantings	07RM0184	07RM0184					184		Maple, Red (RM)	90	9	55	70			Girdling Root									$705.39
7	North Pond Area Plantings		07RM0185					185	Missing	Maple, Red (RM)	90	13	75	70	Crown Clean Low											$2,006 92
7	North Pond Area Plantings		07RM0375					375	Missing	Maple, Red (RM)	90	10	75	70			Mower Damage									$1,187 52
7	North Pond Area Plantings		07RM0384					384	Missing	Maple, Red (RM)	90	14	75	70			Mower Damage									$2,327 55
7	North Pond Area Plantings		07RM0385			X		385	Missing	Maple, Red (RM)	90	10	75	70			Girdling Root									$1,187 52
7	North Pond Area Plantings		07RM0386					386	Missing	Maple, Red (RM)	90	15	75	70	Crown Lifting		Girdling Root	Mower Damage								$2,671 93
7	North Pond Area Plantings		07RM0391					391	Missing	Maple, Red (RM)	90	14	75	70			Mower Damage									$2,327 55
7	North Pond Area Plantings	07SM0007	07SM0007					7		Maple, Sugar (SM)	100	6	60	70	Crown Clean Low											$380.01
7	North Pond Area Plantings	07SM0066	07SM0066		X			66		Maple, Sugar (SM)	100	2		70			REPLACED W SH 05/09									$0.00
7	North Pond Area Plantings	07SM0182	07SM0182					182		Maple, Sugar (SM)	100	9	70	70			Girdling Root									$997.52
7	North Pond Area Plantings		07SM0183					183	Defective	Maple, Sugar (SM)	100	10	75	70			Tag says 07RM0183									$1,319.47
7	North Pond Area Plantings		07SM0199					199	Defective	Maple, Sugar (SM)	100	10	70	70												$1,231 51
7	North Pond Area Plantings	07SM0201	07SM0201					201		Maple, Sugar (SM)	100	10	80	70			Mower Damage									$1,407.44
7	North Pond Area Plantings	07SM0202	07SM0202					202		Maple, Sugar (SM)	100	11	80	70												$1,703 00
7	North Pond Area Plantings	07BP0207	07BP0207		X			207		Maple, Sugar (SM)	100	2		70			REPLACED W CP 04 09									$0.00
7	North Pond Area Plantings		07SM0209					209	Missing	Maple, Sugar (SM)	100	10	85	70												$1,495.40
7	North Pond Area Plantings	07SM0277	07SM0277					277		Maple, Sugar (SM)	100	10	55	70			Trunk Wound	Mower Damage								$967.61
7	North Pond Area Plantings		07SM0290					290	Missing	Maple, Sugar (SM)	100	12	75	70	Crown Clean Low		Girdling Root	Mower Damage								$1,900 04
7	North Pond Area Plantings	07SM0351	07SM0351					351		Maple, Sugar (SM)	100	8	65	70			Girdling Root									$731.87
7	North Pond Area Plantings		07SM0392					392	Missing	Maple, Sugar (SM)	100	10	30	70			Girdling Root	Trunk Wound								$527.79
7	North Pond Area Plantings	7AC432	07AC0432					432		Maple, Sugar (SM)	100	5	55	70	Crown Clean Low											$241.90
7	North Pond Area Plantings		07BO0164					164	Missing	Oak, Bur (BO)	100	18	80	70												$4,560.10
7	North Pond Area Plantings		07BO0309					309	Missing	Oak, Bur (BO)	100	16	70	70	Crown Clean Low											$3,152 66
7	North Pond Area Plantings		07BO0321					321	Missing	Oak, Bur (BO)	100	15	45	70	Crown Clean High											$1,781 29
7	North Pond Area Plantings		07BO0322					322	Missing	Oak, Bur (BO)	100	18	65	70	Crown Clean High	Crown Lifting										$3,705 08
7	North Pond Area Plantings		07BO0323					323	Missing	Oak, Bur (BO)	100	19	75	70	Crown Clean High											$4,763 29

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7	North Pond Area Plantings	07BO326	07BO0326					326	Defective	Oak, Bur (BO)	100	14	75	70			Girdling Root									$2,586.17
7	North Pond Area Plantings		07BO0329					329	Missing	Oak, Bur (BO)	100	18	85	70	Crown Lifting											$4,845.10
7	North Pond Area Plantings		07RO0077					77	Missing	Oak, Red (RO)	100	9	80	70	Corrective Prune											$1,140 02
7	North Pond Area Plantings	07RO0078	07RO0078					78		Oak, Red (RO)	100	16	85	70			Girdling Root									$3,828 23
7	North Pond Area Plantings		07RO0161					161	Missing	Oak, Red (RO)	100	13	60	70			Girdling Root									$1,783 93
7	North Pond Area Plantings		07RO0162					162	Missing	Oak, Red (RO)	100	17	75	70			Trunk Wound									$3,813 27
7	North Pond Area Plantings		07RO0163					163	Missing	Oak, Red (RO)	100	8	55	70			Girdling Root									$619.27
7	North Pond Area Plantings	07RO0218	07RO0218					218		Oak, Red (RO)	100	15	75	70												$2,968 81
7	North Pond Area Plantings		07RO0219					219	Missing	Oak, Red (RO)	100	4	70	70												$280.00
7	North Pond Area Plantings		07RO0220				X	220	Missing	Oak, Red (RO)	100	17	80	70												$4,067.49
7	North Pond Area Plantings		07RO0370					370	Missing	Oak, Red (RO)	100	12	80	70												$2,026.71
7	North Pond Area Plantings		07RO0371					371	Missing	Oak, Red (RO)	100	11	80	70												$1,703 00
7	North Pond Area Plantings		07RO0372					372	Missing	Oak, Red (RO)	100	12	75	70	Crown Clean Low											$1,900 04
7	North Pond Area Plantings		07SW0047					47	Missing	Oak, Swamp White (SW)	100	12	80	70	Crown Clean Low		Mower Damage									$2,026.71
7	North Pond Area Plantings		07SW0048					48	Missing	Oak, Swamp White (SW)	100	13	75	70	Crown Clean Low		Mower Damage									$2,229 91
7	North Pond Area Plantings		07SW0049					49	Missing	Oak, Swamp White (SW)	100	15	80	70	Crown Clean Low		Mower Damage									$3,166.73
7	North Pond Area Plantings		07SW0050					50	Missing	Oak, Swamp White (SW)	100	11	80	70												$1,703 00
7	North Pond Area Plantings	7SW052	07SW0052					52		Oak, Swamp White (SW)	100	9	75	70			Girdling Root									$1,068.77
7	North Pond Area Plantings	7SW054	07SW0054					54		Oak, Swamp White (SW)	100	12	80	70												$2,026.71
7	North Pond Area Plantings	7SW055	07SW0055					55		Oak, Swamp White (SW)	100	15	80	70	Crown Clean Low		Mower Damage									$3,166.73
7	North Pond Area Plantings		07SW0056					56	Missing	Oak, Swamp White (SW)	100	14	75	70			Girdling Root									$2,586.17
7	North Pond Area Plantings		07SW0057					57	Missing	Oak, Swamp White (SW)	100	12	70	70												$1,773 37
7	North Pond Area Plantings		07SW0076			X		76	Missing	Oak, Swamp White (SW)	100	14	85	70												$2,930 99
7	North Pond Area Plantings	7SW079	07SW0079					79		Oak, Swamp White (SW)	100	11	80	70			Girdling Root									$1,703 00
7	North Pond Area Plantings	7SW87	07SW0087					87		Oak, Swamp White (SW)	100	14	70	70	Crown Lifting		Girdling Root	Mower Damage								$2,413.75
7	North Pond Area Plantings		07SW0088					88	Missing	Oak, Swamp White (SW)	100	16	70	70	Crown Clean High											$3,152 66
7	North Pond Area Plantings		07SW0094					94	Missing	Oak, Swamp White (SW)	100	14	70	70	Crown Clean Low		Girdling Root									$2,413.75
7	North Pond Area Plantings		07SW0096					96	Missing	Oak, Swamp White (SW)	100	13	75	70	Crown Clean Low		Mower Damage									$2,229 91
7	North Pond Area Plantings		07SW0097					97	Missing	Oak, Swamp White (SW)	100	15	75	70	Crown Clean Low											$2,968 81
7	North Pond Area Plantings	7SW098	07SW0098					98		Oak, Swamp White (SW)	100	15	70	70	Crown Lifting		Mower Damage									$2,770 89
7	North Pond Area Plantings		07SW0150			X		150	Missing	Oak, Swamp White (SW)	100	15	75	70	Crown Lifting											$2,968 81
7	North Pond Area Plantings		07SW0151					151	Missing	Oak, Swamp White (SW)	100	14	70	70	Crown Lifting		Girdling Root									$2,413.75
7	North Pond Area Plantings		07SW0152					152	Missing	Oak, Swamp White (SW)	100	17	75	70	Crown Lifting											$3,813 27
7	North Pond Area Plantings	07SW0153	07SW0153					153		Oak, Swamp White (SW)	100	11	80	70												$1,703 00
7	North Pond Area Plantings	07SW0154	07SW0154					154	Defective	Oak, Swamp White (SW)	100	12	75	70												$1,900 04
7	North Pond Area Plantings		07SW0155					155	Missing	Oak, Swamp White (SW)	100	12	75	70												$1,900 04
7	North Pond Area Plantings	7SW0159	07SW0159					159	Ineffective	Oak, Swamp White (SW)	100	16	80	70	Crown Lifting		Mower Damage									$3,603 04
7	North Pond Area Plantings	7SW0160	07SW0160					160		Oak, Swamp White (SW)	100	12	70	70	Crown Lifting											$1,773 37
7	North Pond Area Plantings		07SW0233					233	Missing	Oak, Swamp White (SW)	100	10	75	70	Crown Lifting											$1,319.47
7	North Pond Area Plantings	7SW0235	07SW0235					235		Oak, Swamp White (SW)	100	10	85	70												$1,495.40

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings		07SW0236					236	Missing	Oak, Swamp White (SW)	100	14	75	70	Crown Lifting											$2,586.17
7	North Pond Area Plantings	7SW0246	07SW0246					246		Oak, Swamp White (SW)	100	13	70	70			Trunk Wound									$2,081 25
7	North Pond Area Plantings		07SW0247					247	Missing	Oak, Swamp White (SW)	100	14	80	70												$2,758 58
7	North Pond Area Plantings		07SW0248					248	Missing	Oak, Swamp White (SW)	100	15	80	70												$3,166.73
7	North Pond Area Plantings		07SW0294					294	Missing	Oak, Swamp White (SW)	100	12	85	70												$2,153 38
7	North Pond Area Plantings	7SW0295	07SW0295					295		Oak, Swamp White (SW)	100	16	80	70	Crown Lifting											$3,603 04
7	North Pond Area Plantings		07SW0295					296	Missing	Oak, Swamp White (SW)	100	14	75	70	Crown Lifting											$2,586.17
7	North Pond Area Plantings	7SW0297	07SW0297					297		Oak, Swamp White (SW)	100	16	85	70	Crown Lifting											$3,828 23
7	North Pond Area Plantings	7SW0303	07SW0303					303		Oak, Swamp White (SW)	100	12	75	70												$1,900 04
7	North Pond Area Plantings	7SW0310	07SW0310					310	Defective	Oak, Swamp White (SW)	100	14	75	70	Crown Lifting											$2,586.17
7	North Pond Area Plantings		07JP0071					71	Missing	Pagodatree, Japanese (JP)	70	12	40	70	Crown Clean High		Insect/disease/stress									$709.35
7	North Pond Area Plantings		07JP0072					72	Missing	Pagodatree, Japanese (JP)	70	18	45	70	Crown Clean High		Insect/disease/stress	Girdling Root								$1,795 54
7	North Pond Area Plantings		07JP0525					252	Missing	Pagodatree, Japanese (JP)	70	15	55	70	Hazard Limb High		Mower Damage	Trunk Wound	2=Medium	2	2=7-18"	2	1=Occassional	1	5	$1,523 99
7	North Pond Area Plantings	07JP0313	07JP0313					313		Pagodatree, Japanese (JP)	70	18	55	70	Crown Clean High		Mower Damage									$2,194 55
7	North Pond Area Plantings		07JP0383					383	Missing	Pagodatree, Japanese (JP)	70	15	45	70	Crown Clean High											$1,246 90
7	North Pond Area Plantings	7BP108	07BP0108					108		Pear, Bradford (BP)	60	18	50	70	Crown Lifting	Crown Clean High	Girdling Root									$1,710 04
7	North Pond Area Plantings	7BP109	07BP0109					109		Pear, Bradford (BP)	60	15	50	70	Crown Clean High		Mower Damage									$1,187 52
7	North Pond Area Plantings		07BP0110					110	Missing	Pear, Bradford (BP)	60	14	55	70	Crown Clean High											$1,137 91
7	North Pond Area Plantings	07BP0111	07BP0111					111		Pear, Bradford (BP)	60	17	55	70	Crown Lifting		Mower Damage									$1,677 84
7	North Pond Area Plantings		07BP0128					128	Missing	Pear, Bradford (BP)	60	16	60	70												$1,621 37
7	North Pond Area Plantings		07BP0129					129	Missing	Pear, Bradford (BP)	60	15	55	70	Crown Clean High		Mower Damage									$1,306 28
7	North Pond Area Plantings		07BP0131					131	Missing	Pear, Bradford (BP)	60	19	25	70	Hazard Tree		Trunk Wound		3=High	3	3=19-32"	3	1=Occassional	1	7	
7	North Pond Area Plantings	BP225	07BP0225					225	Defective	Pear, Bradford (BP)	60	18	50	70	Crown Clean High		Mower Damage									$1,710 04
7	North Pond Area Plantings		07BP0227					227	Missing	Pear, Bradford (BP)	60	18	50	70	Crown Clean High		Mower Damage									$1,710 04
7	North Pond Area Plantings		07BP0305					305	Missing	Pear, Bradford (BP)	60	14	50	70	Crown Clean High											$1,034.47
7	North Pond Area Plantings		07BP0307					307	Missing	Pear, Bradford (BP)	60	14	55	70	Crown Clean High		Forked									$1,137 91
7	North Pond Area Plantings	07BP0308	07BP0308					308		Pear, Bradford (BP)	60	14	50	70	Crown Clean High		Forked									$1,034.47
7	North Pond Area Plantings		07BP0400		X			400	Missing	Pear, Bradford (BP)	60	2		70												$0.00
7	North Pond Area Plantings		07RB0004					4	Missing	Redbud, Eastern (RB)	80	3	60	70			Girdling Root									$180.00
7	North Pond Area Plantings		07RB0061					61	Missing	Redbud, Eastern (RB)	80	4	70	70			Trunk Wound									$280.00
7	North Pond Area Plantings		07RB0103					103	Missing	Redbud, Eastern (RB)	80	10	55	70	Crown Clean Low		Mower Damage									$774.09
7	North Pond Area Plantings		07RB0134					134	Missing	Redbud, Eastern (RB)	80	4	80	70												$320.00
7	North Pond Area Plantings		07RB0210					210	Missing	Redbud, Eastern (RB)	80	3	75	70												$225.00
7	North Pond Area Plantings		07RB0211					211	Missing	Redbud, Eastern (RB)	80	4	45	70	Crown Repair		Trunk Wound									$180.00
7	North Pond Area Plantings		07RB0212		X			212	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 01 09									$0.00
7	North Pond Area Plantings		07RB0214					214	Missing	Redbud, Eastern (RB)	80	2.5	70	70												$175.00
7	North Pond Area Plantings		07RB0216					216	Missing	Redbud, Eastern (RB)	80	6	75	70												$380.01
7	North Pond Area Plantings		07RB0217					217	Missing	Redbud, Eastern (RB)	80	4	70	70												$280.00
7	North Pond Area Plantings		07RB0289					289	Missing	Redbud, Eastern (RB)	80	3.5	75	70												$262.50
7	North Pond Area Plantings	07RB0331	07RB0331					331		Redbud, Eastern (RB)	80	10	10	70	Rec Remove		Trunk Wound									$140.74

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
7	North Pond Area Plantings		07RB0332					332	Missing	Redbud, Eastern (RB)	80	10	55	70	Crown Clean High											$774.09
7	North Pond Area Plantings		07RB0346		X			346	Missing	Redbud, Eastern (RB)	80	2		70			REPLANTED 01 09									$0.00
7	North Pond Area Plantings		07RB0347		X			347	Missing	Redbud, Eastern (RB)	80	2	70	70			REPLANTED 01 09									$140.00
7	North Pond Area Plantings		07BC0373					373	Missing	Redbud, Eastern (RB)	80	4	75	70												$300.00
7	North Pond Area Plantings		07RB0389					389	Missing	Redbud, Eastern (RB)	80	11	25	70	Hazard Tree		Trunk Wound	Insect/Disease/Stress	3=High	3	2=7-18"	2	1=Occassional	1	6	
7	North Pond Area Plantings		07RB0390					390	Missing	Redbud, Eastern (RB)	80	5	70	70												$246.30
7	North Pond Area Plantings		07RB0423		X			423	Missing	Redbud, Eastern (RB)	80	2		70			REPLACED 08 09									$0.00
7	North Pond Area Plantings		07RB0425		X			425	Missing	Redbud, Eastern (RB)	80	2		70			REPLACED 08 09									$0.00
7	North Pond Area Plantings		07RB0426		X			426	Missing	Redbud, Eastern (RB)	80	2		70			REPLACED 08 09									$0.00
7	North Pond Area Plantings	7RB435	07RB0435					435		Redbud, Eastern (RB)	80	8	70	70												$630.53
7	North Pond Area Plantings	7RB437	07RB0437		X			437		Redbud, Eastern (RB)	80	2		70			REPLANTED 01 09									$0.00
7	North Pond Area Plantings	7RB438	07RB0438		X			438		Redbud, Eastern (RB)	80	2		70			REPLANTED 01 09	Trunk Wound								$0.00
7	North Pond Area Plantings		07RB0439					439	Missing	Redbud, Eastern (RB)	80	8	70	70			Mower Damage									$630.53
7	North Pond Area Plantings	7RB440	07RB0440					440		Redbud, Eastern (RB)	80	10	70	70	Crown Clean Low		Mower Damage									$985.21
7	North Pond Area Plantings	7RB441	07RB0441					441		Redbud, Eastern (RB)	80	10	30	70	Hazard Limb Low		Mower Damage	Trunk Wound	3=High	3	2=7-18"	2	1=Occassional	1	6	$422.23
7	North Pond Area Plantings		07RB0444					444	Missing	Redbud, Eastern (RB)	80	6	25	70	Rec Remove		Trunk Wound	Insect/Disease/Stress								$126.67
7	North Pond Area Plantings		07RB0445					445	Missing	Redbud, Eastern (RB)	80	9	60	70	Crown Clean Low		Mower Damage									$684.01
7	North Pond Area Plantings		07RB0446					446	Missing	Redbud, Eastern (RB)	80	8	60	70	Crown Clean Low		Trunk Wound	Mower Damage								$540.46
7	North Pond Area Plantings		07RB0447					447	Missing	Redbud, Eastern (RB)	80	10	55	70	Crown Clean Low		Trunk Wound	Mower Damage								$774.09
7	North Pond Area Plantings	7RB449	07RB0449					449		Redbud, Eastern (RB)	80	6	30	70	Rec Remove		Trunk Wound	Insect/Disease/Stress								$152.00
7	North Pond Area Plantings		07RB0450					450	Missing	Redbud, Eastern (RB)	80	9	50	70	Crown Clean Low		Mower Damage	Trunk Wound								$570.01
7	North Pond Area Plantings		07DS0458					458	Missing	Serviceberry, Downy	80	2.5	60	70			Multi-stem									$150.00
7	North Pond Area Plantings	7ZS451	07ZS0451					451		Zelkova (ZS)	70	10	70	70												$862.06
7	North Pond Area Plantings	7ZS452	07ZS0452					452		Zelkova (ZS)	70	12	60	70												$1,064 02
7	North Pond Area Plantings		07ZS0454					454	Missing	Zelkova (ZS)	70	10	75	70												$923.63
8	Single-species allees		08RH0654					654	Missing	Ash, 'Rosehill' (RH)	70	3	55	90	Corrective Prune		Trunk Wound									$165.00
8	Single-species allees		08RH0655					655	Missing	Ash, 'Rosehill' (RH)	70	3	75	90	Corrective Prune		Staked									$225.00
8	Single-species allees	08RH0656	08RH0656					656		Ash, 'Rosehill' (RH)	70	8	65	90	Grate Lift											$658.68
8	Single-species allees	08RH0657	08RH0657					657		Ash, 'Rosehill' (RH)	70	12	70	90			Forked									$1,596 03
8	Single-species allees	08RH0658	08RH0658					658		Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
8	Single-species allees	08RH0659	08RH0659					659		Ash, 'Rosehill' (RH)	70	11	75	90												$1,436 91
8	Single-species allees		08RH0660					660	Ineffective	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
8	Single-species allees	08RH0661	08RH0661					661		Ash, 'Rosehill' (RH)	70	11	70	90												$1,341.11
8	Single-species allees	08RH0662	08RH0662					662		Ash, 'Rosehill' (RH)	70	9	70	90			Trunk Wound									$897.77
8	Single-species allees	08RH0663	08RH0663					663		Ash, 'Rosehill' (RH)	70	7	50	90	Corrective Prune		Forked									$387.92
8	Single-species allees		08RH0664					664	Missing	Ash, 'Rosehill' (RH)	70	2.5	65	90	Corrective Prune											$162.50
8	Single-species allees		08RH0665					665	Missing	Ash, 'Rosehill' (RH)	70	10	65	90	Crown Clean Low		Trunk Wound									$1,029.19
8	Single-species allees		08RH0666					666	Missing	Ash, 'Rosehill' (RH)	70	4	40	90	Corrective Prune		Trunk Wound									$160.00
8	Single-species allees		08RH0667					667	Ineffective	Ash, 'Rosehill' (RH)	70	10	70	90	Grate Lift											$1,108 36
8	Single-species allees		08RH0668					668	Missing	Ash, 'Rosehill' (RH)	70	6	60	90												$342.01
8	Single-species allees	08RH0669	08RH0669					669		Ash, 'Rosehill' (RH)	70	9	50	90	Grate Lift	Crown Clean Low	Trunk Wound									$641.26
8	Single-species allees		08RH0670					670	Missing	Ash, 'Rosehill' (RH)	70	3	80	90												$240.00
8	Single-species allees		08RH0671					671	Missing	Ash, 'Rosehill' (RH)	70	8	50	90	Hazard Tree		Trunk Wound		3=High	3	2=7-18"	2	3=Frequent	3	8	
8	Single-species allees		08RH0672					672	Missing	Ash, 'Rosehill' (RH)	70	9	50	90			Trunk Wound									$641.26
8	Single-species allees		08RH0673					673	Missing	Ash, 'Rosehill' (RH)	70	8	60	90	Corrective Prune		Trunk Wound									$608.01
8	Single-species allees	08RH0674	08RH0674					674		Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
8	Single-species allees	08RH0675	08RH0675					675		Ash, 'Rosehill' (RH)	70	15	70	90			No Grate									$2,493 80
8	Single-species allees	08RH0676	08RH0676					676		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High	Grate Lift										$2,315 67
8	Single-species allees	08RH0677	08RH0677					677		Ash, 'Rosehill' (RH)	70	15	70	90												$2,493 80
8	Single-species allees	08RH0678	08RH0678					678		Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High											$3,203.15

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
8	Single-species allees	08RH0679	08RH0679					679		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		1/2 Grate									$2,137 54
8	Single-species allees		08RH0680					680	Missing	Ash, 'Rosehill' (RH)	70	16	55	90	Crown Clean High	Grate Lift	Forked									$2,229 38
8	Single-species allees	08RH0681	08RH0681					681		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
8	Single-species allees		08RH0682					682	Missing	Ash, 'Rosehill' (RH)	70	13	35	90	Crown Clean High		Trunk Wound									$936.56
8	Single-species allees		08RH0683					683	Missing	Ash, 'Rosehill' (RH)	70	12	55	90	Crown Clean High											$1,254 03
8	Single-species allees		08RH0684					684	Ineffective	Ash, 'Rosehill' (RH)	70	9	60	90	Crown Clean High											$769.52
8	Single-species allees		08RH0685					685	Missing	Ash, 'Rosehill' (RH)	70	13	70	90												$1,873.12
8	Single-species allees		08RH0686					686	Missing	Ash, 'Rosehill' (RH)	70	7	30	90	Hazard Tree		Trunk Wound		2=Medium	2	2=7-18"	2	3=Frequent	3	7	
8	Single-species allees		08RH0687					687	Missing	Ash, 'Rosehill' (RH)	70	11	45	90			Trunk Wound									$862.14
8	Single-species allees	08RH0688	08RH0688					688		Ash, 'Rosehill' (RH)	70	10	65	90												$1,029.19
8	Single-species allees	08RH0689	08RH0689					689		Ash, 'Rosehill' (RH)	70	11	70	90	Grate Lift											$1,341.11
8	Single-species allees	08RH0690	08RH0690					690		Ash, 'Rosehill' (RH)	70	11	65	90			Forked									$1,245 32
8	Single-species allees		08RH0691					691	Missing	Ash, 'Rosehill' (RH)	70	11	65	90	Grate Lift		Forked									$1,245 32
8	Single-species allees	08RH0692	08RH0692					692		Ash, 'Rosehill' (RH)	70	13	65	90	Grate Lift		Trunk Wound									$1,739 33
8	Single-species allees		08RH0693					693	Missing	Ash, 'Rosehill' (RH)	70	3	70	90	Corrective Prune		Staked									$210.00
8	Single-species allees		08RH0694			X		694	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Grate Lift	Crown Clean High	Forked									$2,137 54
8	Single-species allees		08RH0695					695	Missing	Ash, 'Rosehill' (RH)	70	10	60	90	Crown Clean High											$950.02
8	Single-species allees		08RH0696					696	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Grate Lift	Crown Clean High										$1,959.42
8	Single-species allees	08RH0697	08RH0697					697		Ash, 'Rosehill' (RH)	70	14	60	90	Grate Lift	Crown Clean High										$1,862 04
8	Single-species allees	08RH0698	08RH0698					698		Ash, 'Rosehill' (RH)	70	13	55	90	Crown Clean High											$1,471.74
8	Single-species allees		08RH0699					699	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
8	Single-species allees		08RH0700					700	Missing	Ash, 'Rosehill' (RH)	70	5	70	90												$277.09
8	Single-species allees		08RH0701					701	Ineffective	Ash, 'Rosehill' (RH)	70	15	65	90			No Grate									$2,315 67
8	Single-species allees		08RH0702					702	Ineffective	Ash, 'Rosehill' (RH)	70	14	60	90			Forked									$1,862 04
8	Single-species allees		08RH0703					703	Missing	Ash, 'Rosehill' (RH)	70	19	70	90			No Grate	Mower Damage								$4,001.17
8	Single-species allees		08RH0704					704	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Grate Lift											$1,605 53
8	Single-species allees		08RH0705					705	Missing	Ash, 'Rosehill' (RH)	70	18	70	90	Grate Lift											$3,591 07
8	Single-species allees		08RH0706			X		706	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Grate Lift	Crown Clean High										$2,432 05
8	Single-species allees		08RH0707	X				707	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees		08RH0708					708	Missing	Ash, 'Rosehill' (RH)	70	17	65	90	Crown Clean High	Grate Lift										$2,974 35
8	Single-species allees		08RH0709					709	Missing	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High											$2,017 21
8	Single-species allees		08RH0711					711	Missing	Ash, 'Rosehill' (RH)	70	15	50	90	Crown Lifting	Grate Lift										$1,781 29
8	Single-species allees	08RH0712	08RH0712					712		Ash, 'Rosehill' (RH)	70	14	55	90			Poor Branch Form									$1,706 87
8	Single-species allees		08RH0713					713	Ineffective	Ash, 'Rosehill' (RH)	70	13	60	90												$1,605 53
8	Single-species allees	08RH0714	08RH0714					714		Ash, 'Rosehill' (RH)	70	15	70	90	Grate Lift	Crown Lifting										$2,493 80
8	Single-species allees	08RH0715	08RH0715					715		Ash, 'Rosehill' (RH)	70	5	65	90			Forked									$257.30
8	Single-species allees	08RH0716	08RH0716	X				716		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees		08RH0717					717	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift											$2,172 38
8	Single-species allees		08RH0718					718	Missing	Ash, 'Rosehill' (RH)	70	14	40	90	Grate Lift	Crown Clean High	Trunk Wound									$1,241 36
8	Single-species allees	08RH0719	08RH0719					719		Ash, 'Rosehill' (RH)	70	9	60	90			Trunk Wound									$769.52
8	Single-species allees	08RH0720	08RH0720	X				720		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0721	08RH0721	X				721		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0722	08RH0722					722		Ash, 'Rosehill' (RH)	70	3	40	90	Corrective Prune		Forked	Trunk Wound								$120.00
8	Single-species allees	08RH0723	08RH0723	X				723		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0724	08RH0724					724		Ash, 'Rosehill' (RH)	70	11	50	90	Grate Lift		Vehicle Damage									$957.94
8	Single-species allees	08RH0725	08RH0725					725		Ash, 'Rosehill' (RH)	70	9	70	90	Grate Lift											$897.77
8	Single-species allees		08RH0726					726	Missing	Ash, 'Rosehill' (RH)	70	7	60	90	Corrective Prune											$465.51
8	Single-species allees	08RH0727	08RH0727					727		Ash, 'Rosehill' (RH)	70	10	60	90	Crown Clean Low		Trunk Wound									$950.02
8	Single-species allees	08RH0728	08RH0728					728		Ash, 'Rosehill' (RH)	70	11	60	90	Crown Lifting	Grate Lift	Trunk Wound									$1,149 52
8	Single-species allees	08RH0729	08RH0729					729		Ash, 'Rosehill' (RH)	70	10	70	90	Grate Lift											$1,108 36
8	Single-species allees		08RH0730					730	Missing	Ash, 'Rosehill' (RH)	70	14	75	90	Crown Lifting	Grate Lift	Forked									$2,327 55
8	Single-species allees	08RH0731	08RH0731					731		Ash, 'Rosehill' (RH)	70	13	70	90												$1,873.12
8	Single-species allees	08RH0732	08RH0732					732		Ash, 'Rosehill' (RH)	70	15	75	90	Grate Lift											$2,671 93
8	Single-species allees		08RH0733					733	Missing	Ash, 'Rosehill' (RH)	70	18	70	90	Grate Lift	Crown Clean High										$3,591 07
8	Single-species allees	08RH0734	08RH0734	X				734		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0735	08RH0735	X				735		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees		08RH0736					736	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
8	Single-species allees	08RH0737	08RH0737					737		Ash, 'Rosehill' (RH)	70	14	65	90												$2,017 21
8	Single-species allees	08RH0738	08RH0738	X				738		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees		08RH0739					739	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		No Grate									$2,432 05
8	Single-species allees		08RH0740					740	Missing	Ash, 'Rosehill' (RH)	70	19	60	90	Crown Clean High											$3,429 57

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
8	Single-species allees	08RH0741	08RH0741					741		Ash, 'Rosehill' (RH)	70	5	70	90	Corrective Prune											$277.09
8	Single-species allees		08RH0742					742	Missing	Ash, 'Rosehill' (RH)	70	19	60	90	Crown Clean High		Forked									$3,429 57
8	Single-species allees		08RH0743					743	Missing	Ash, 'Rosehill' (RH)	70	5	65	90	Corrective Prune		Forked									$257.30
8	Single-species allees		08RH0744					744	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High		Forked									$2,432 05
8	Single-species allees		08RH0745					745	Missing	Ash, 'Rosehill' (RH)	70	18	65	90	Grate Lift	Crown Clean High	Forked									$3,334 57
8	Single-species allees		08RH0746					746	Missing	Ash, 'Rosehill' (RH)	70	7	65	90			Forked									$504.30
8	Single-species allees		08RH0747					747	Missing	Ash, 'Rosehill' (RH)	70	3	60	90												$180.00
8	Single-species allees		08RH0748					748	Missing	Ash, 'Rosehill' (RH)	70	11	70	90	Grate Lift											$1,341.11
8	Single-species allees		08RH0749					749	Missing	Ash, 'Rosehill' (RH)	70	19	60	90			Forked									$3,429 57
8	Single-species allees		08RH0750					750	Missing	Ash, 'Rosehill' (RH)	70	16	50	90	Crown Clean High	Grate Lift	Forked									$2,026.71
8	Single-species allees	08RH0751	08RH0751					751		Ash, 'Rosehill' (RH)	70	19	55	90	Crown Clean High											$3,143.77
8	Single-species allees	08RH0752	08RH0752					752		Ash, 'Rosehill' (RH)	70	14	40	90			Trunk Wound	Forked								$1,241 36
8	Single-species allees	08RH0753	08RH0753					753		Ash, 'Rosehill' (RH)	70	15	40	90			Trunk Wound									$1,425 03
8	Single-species allees	08RH0754	08RH0754					754		Ash, 'Rosehill' (RH)	70	13	35	90	Crown Clean High		Trunk Wound									$936.56
8	Single-species allees		08RH0755					755	Missing	Ash, 'Rosehill' (RH)	70	13	60	90	Crown Clean High											$1,605 53
8	Single-species allees		08RH0756					756	Missing	Ash, 'Rosehill' (RH)	70	14	60	90			Forked									$1,862 04
8	Single-species allees		08RH0757					757	Missing	Ash, 'Rosehill' (RH)	70	14	65	90												$2,017 21
8	Single-species allees		08RH0758	X				758	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees		08RH0759					759	Missing	Ash, 'Rosehill' (RH)	70	13	70	90			Trunk Wound									$1,873.12
8	Single-species allees		08RH0760					760	Missing	Ash, 'Rosehill' (RH)	70	12	70	90												$1,596 03
8	Single-species allees		08RH0761					761	Missing	Ash, 'Rosehill' (RH)	70	4	65	90	Corrective Prune		Forked									$260.00
8	Single-species allees	08RH0762	08RH0762					762		Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
8	Single-species allees		08RH0763					763	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High		Trunk Wound									$1,706 87
8	Single-species allees		08RH0764					764	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High											$2,172 38
8	Single-species allees		08RH0765					765	Missing	Ash, 'Rosehill' (RH)	70	14	60	90												$1,862 04
8	Single-species allees		08RH0766	X				766	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0767	08RH0767					767		Ash, 'Rosehill' (RH)	70	15	40	90	Grate Lift		Trunk Wound									$1,425 03
8	Single-species allees	08RH0768	08RH0768	X				768		Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0769	08RH0769					769		Ash, 'Rosehill' (RH)	70	17	70	90												$3,203.15
8	Single-species allees	08RH0770	08RH0770					770		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High		1/2 Grate									$2,315 67
8	Single-species allees		08RH0771	X				771	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
8	Single-species allees	08RH0772	08RH0772					772		Ash, 'Rosehill' (RH)	70	16	70	90												$2,837 39
8	Single-species allees		08RH0773					773	Missing	Ash, 'Rosehill' (RH)	70	16	50	90			Trunk Wound									$2,026.71
8	Single-species allees	08RH0774	08RH0774					774		Ash, 'Rosehill' (RH)	70	15	60	90	Grate Lift	Crown Clean High	Forked									$2,137 54
8	Single-species allees		08RH0775					775	Ineffective	Ash, 'Rosehill' (RH)	70	14	65	90	Grate Lift											$2,017 21
8	Single-species allees	08RH0776	08RH0776					776		Ash, 'Rosehill' (RH)	70	18	65	90	Crown Clean High	Grate Lift	Trunk Wound									$3,334 57
9	North East Side Slope		09MA0880			X		880	Missing	Ash, Marshall's Seedless (MA)	70	15	50	70	Crown Clean High		Forked									$1,385.45
9	North East Side Slope		09MA0881			X		881	Missing	Ash, Marshall's Seedless (MA)	70	10	55	70	Crown Lifting		Forked									$677.33
9	North East Side Slope		09MA0883	X				883	Missing	Ash, Marshall's Seedless (MA)	70			70												$0.00
9	North East Side Slope		09MA0884	X				884	Missing	Ash, Marshall's Seedless (MA)	70			70												$0.00
9	North East Side Slope		09MA0885	X				885	Missing	Ash, Marshall's Seedless (MA)	70			70												$0.00
9	North East Side Slope		09MA0887	X				887	Missing	Ash, Marshall's Seedless (MA)	70			70												$0.00
9	North East Side Slope		09MA0916					916	Missing	Ash, Marshall's Seedless (MA)	70	15	65	70	Crown Clean High											$1,801 08
9	North East Side Slope		09MA0917			X		917	Missing	Ash, Marshall's Seedless (MA)	70	16	55	70	Crown Clean High		Forked									$1,733 96
9	North East Side Slope		09MA0918			X		918	Missing	Ash, Marshall's Seedless (MA)	70	20	55	70	Crown Clean High		Forked									$2,709 32
9	North East Side Slope		09MA0920			X		920	Missing	Ash, Marshall's Seedless (MA)	70	14	50	70	Crown Clean High		Forked									$1,206 88
9	Single-species allees		09RH0777					777	Missing	Ash, 'Rosehill' (RH)	70	14	65	90												$2,017 21
9	Single-species allees		09RH0778					778	Missing	Ash, 'Rosehill' (RH)	70	16	60	90			Girdling Root									$2,432 05
9	Single-species allees		09RH0779					779	Ineffective	Ash, 'Rosehill' (RH)	70	14	45	90	Hazard Limb Low		Trunk Wound	Mower Damage	2=Medium	2	2=7-18"	2	1=Occassional	1	5	$1,396 53
9	Single-species allees		09RH0780					780	Missing	Ash, 'Rosehill' (RH)	70	3	80	90	Corrective Prune											$240.00
9	Single-species allees		09RH0781					781	Missing	Ash, 'Rosehill' (RH)	70	16	75	90			Vines									$3,040 06
9	Single-species allees		09RH0782					782	Missing	Ash, 'Rosehill' (RH)	70	19	55	90	Grate Lift	Crown Clean High	Forked									$3,143.77
9	Single-species allees		09RH0783					783	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High		Vines									$2,137 54
9	Single-species allees		09RH0784					784	Missing	Ash, 'Rosehill' (RH)	70	13	55	90	Grate Lift	Crown Clean High	Forked	Trunk Wound								$1,471.74
9	Single-species allees	09RH0785	09RH0785					785		Ash, 'Rosehill' (RH)	70	20	70	90	Crown Clean High		Vines									$4,433.43
9	Single-species allees		09RH0786					786	Missing	Ash, 'Rosehill' (RH)	70	15	50	90	Grate Lift	Crown Clean High	Forked	Trunk Wound								$1,781 29
9	Single-species allees	09RH0787	09RH0787					787		Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High	Crown Lifting	Vines	Forked								$2,745 56

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
9	Single-species allees	09RH0788	09RH0788					788		Ash, 'Rosehill' (RH)	70	15	65	90	Grate Lift	Crown Clean High										$2,315 67
9	Single-species allees	09RH0790	09RH0790					790		Ash, 'Rosehill' (RH)	70	22	60	90	Grate Lift	Crown Clean High										$4,598.10
9	Single-species allees	09RH0791	09RH0791					791		Ash, 'Rosehill' (RH)	70	15	55	90	Crown Clean High		Vines									$1,959.42
9	Single-species allees		09RH0792					792	Missing	Ash, 'Rosehill' (RH)	70	17	60	90	Crown Clean High		No Grate									$2,745 56
9	Single-species allees	09RH0793	09RH0793					793		Ash, 'Rosehill' (RH)	70	22	55	90	Crown Clean High		Forked									$4,214 92
9	Single-species allees	09RH0794	09RH0794					794		Ash, 'Rosehill' (RH)	70	15	65	90	Crown Clean High											$2,315 67
9	Single-species allees		09RH0795					795	Missing	Ash, 'Rosehill' (RH)	70	13	70	90	Crown Clean High											$1,873.12
9	Single-species allees		09RH0796					796	Missing	Ash, 'Rosehill' (RH)	70	4	55	90	Corrective Prune		Trunk Wound									$220.00
9	Single-species allees		09RH0797					797	Ineffective	Ash, 'Rosehill' (RH)	70	16	35	90	Hazard Limb High	Crown Clean High	Insect/Disease/Stress		4=severe	4	2=7-18"	2	2=Intermediate	2	8	$1,418.70
9	Single-species allees		09RH0798					798	Missing	Ash, 'Rosehill' (RH)	70	20	65	90	Crown Clean High		Forked									$4,116.75
9	Single-species allees		09RH0799					799	Missing	Ash, 'Rosehill' (RH)	70	4	75	90	Corrective Prune											$300.00
9	Single-species allees	09RH0800	09RH0800					800		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High	Grate Lift	Forked									$1,862 04
9	Single-species allees	09RH0801	09RH0801					801		Ash, 'Rosehill' (RH)	70	19	75	90	Crown Clean High											$4,286 96
9	Single-species allees		09RH0802					802	Missing	Ash, 'Rosehill' (RH)	70	4	70	90												$280.00
9	Single-species allees	09RH0803	09RH0803					803		Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High											$2,432 05
9	Single-species allees	09RH0804	09RH0804					804		Ash, 'Rosehill' (RH)	70	13	70	90	Grate Lift											$1,873.12
9	Single-species allees		09RH0805					805	Ineffective	Ash, 'Rosehill' (RH)	70	15	40	90	Crown Clean High		Trunk Wound	Forked								$1,425 03
9	Single-species allees	09RH0806	09RH0806					806		Ash, 'Rosehill' (RH)	70	12	65	90	Grate Lift		Forked									$1,482 03
9	Single-species allees	09RH0807	09RH0807					807		Ash, 'Rosehill' (RH)	70	16	50	90	Crown Clean High		Mower Damage	Forked								$2,026.71
9	Single-species allees	09RH0808	09RH0808					808		Ash, 'Rosehill' (RH)	70	10	75	90	Grate Lift											$1,187 52
9	Single-species allees	09RH0809	09RH0809					809	Defective	Ash, 'Rosehill' (RH)	70	19	55	90	Crown Clean High		Mower Damage	Forked								$3,143.77
9	Single-species allees	09RH0810	09RH0810					810		Ash, 'Rosehill' (RH)	70	12	60	90	Crown Clean High	Grate Lift	Forked									$1,368 03
9	Single-species allees		09RH0811					811	Missing	Ash, 'Rosehill' (RH)	70	17	55	90	Crown Clean High		Forked									$2,516.76
9	Single-species allees		09RH0812					812	Missing	Ash, 'Rosehill' (RH)	70	9	60	90	Crown Clean High	Grate Lift	Forked									$769.52
9	Single-species allees	09RH0813	09RH0813					813		Ash, 'Rosehill' (RH)	70	13	50	90	Crown Clean High											$1,337 94
9	Single-species allees	09RH0814	09RH0814					814		Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High		Trunk Wound									$1,862 04
9	Single-species allees		09RH0815					815	Missing	Ash, 'Rosehill' (RH)	70	22	50	90	Crown Clean High		Mower Damage	Trunk Wound								$3,831.75
9	Single-species allees	09RH0816	09RH0816					816		Ash, 'Rosehill' (RH)	70	10	70	90												$1,108 36
9	Single-species allees		09RH0817					817	Missing	Ash, 'Rosehill' (RH)	70	2	70	90	Corrective Prune											$140.00
9	Single-species allees	09RH0818	09RH0818					818		Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High	Grate Lift	Forked									$2,634.72
9	Single-species allees		09RH0819					819	Missing	Ash, 'Rosehill' (RH)	70	3	60	90	Corrective Prune		Mower Damage									$180.00
9	Single-species allees	09RH0820	09RH0820			X		820		Ash, 'Rosehill' (RH)	70	10	75	90												$1,187 52
9	Single-species allees	09RH0821	09RH0821	X				821		Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees	09RH0822	09RH0822					822		Ash, 'Rosehill' (RH)	70	7	70	90												$543.09
9	Single-species allees		09RH0823	X				823	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees	09RH0824	09RH0824					824		Ash, 'Rosehill' (RH)	70	11	65	90	Grate Lift		Forked									$1,245 32
9	Single-species allees		09RH0825					825	Missing	Ash, 'Rosehill' (RH)	70	21	55	90	Crown Clean High	Crown Lifting	Forked									$3,840.46
9	Single-species allees		09RH0826	X				826	Ineffective	Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0827					827	Missing	Ash, 'Rosehill' (RH)	70	3	50	90			Trunk Wound	Storm Damage								$150.00
9	Single-species allees		09RH0828	X				828	Ineffective	Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0829					829	Missing	Ash, 'Rosehill' (RH)	70	16	55	90	Crown Clean High		Forked									$2,229 38
9	Single-species allees		09RH0830					830	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High											$1,482 03
9	Single-species allees	09RH0831	09RH0831					831		Ash, 'Rosehill' (RH)	70	20	60	90	Crown Clean High		Forked									$3,800 08
9	Single-species allees	09RH0832	09RH0832					832		Ash, 'Rosehill' (RH)	70	8	50	90	Crown Clean High	Grate Lift										$506.68
9	Single-species allees	09RH0833	09RH0833					833		Ash, 'Rosehill' (RH)	70	7	50	90	Crown Lifting		Trunk Wound									$387.92
9	Single-species allees		09RH0834					834	Ineffective	Ash, 'Rosehill' (RH)	70	11	50	90	Crown Clean High											$957.94
9	Single-species allees		09RH0835					835	Ineffective	Ash, 'Rosehill' (RH)	70	19	45	90	Crown Clean High											$2,572.18
9	Single-species allees		09RH0836					836	Missing	Ash, 'Rosehill' (RH)	70	11	60	90												$1,149 52
9	Single-species allees		09RH0837					837	Ineffective	Ash, 'Rosehill' (RH)	70	18	35	90	Crown Clean High		Trunk Wound	Storm Damage								$1,795 54
9	Single-species allees	09RH0838	09RH0838					838		Ash, 'Rosehill' (RH)	70	11	55	90	Crown Clean High											$1,053.73

Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
9	Single-species allees		09RH0839					839	Ineffective	Ash, 'Rosehill' (RH)	70	19	50	90	Crown Clean High		Girdling Root									$2,857 98
9	Single-species allees	09RH0840	09RH0840					840		Ash, 'Rosehill' (RH)	70	15	60	90	Crown Clean High											$2,137 54
9	Single-species allees		09RH0841					841	Missing	Ash, 'Rosehill' (RH)	70	19	40	90	Crown Clean High		Forked									$2,286 38
9	Single-species allees		09RH0842					842	Missing	Ash, 'Rosehill' (RH)	70	15	70	90	Crown Clean High											$2,493 80
9	Single-species allees		09RH0843	X				843	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0844					844	Missing	Ash, 'Rosehill' (RH)	70	14	60	90	Crown Clean High	Grate Lift										$1,862 04
9	Single-species allees	09RH0845	09RH0845					845		Ash, 'Rosehill' (RH)	70	4	75	90												$300.00
9	Single-species allees		09RH0846					846	Missing	Ash, 'Rosehill' (RH)	70	13	65	90			Forked									$1,739 33
9	Single-species allees		09RH0847	X				847	Missing	Ash, 'Rosehill' (RH)	70			90											0	
9	Single-species allees	09RH0848	09RH0848					848		Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High											$1,706 87
9	Single-species allees	09RH0849	09RH0849	X				849		Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0850					850	Missing	Ash, 'Rosehill' (RH)	70	16	60	90	Crown Clean High	Grate Lift	Forked									$2,432 05
9	Single-species allees		09RH0851					851	Missing	Ash, 'Rosehill' (RH)	70	22	50	90	Crown Clean High		Girdling Root	Forked								$3,831.75
9	Single-species allees	09RH0852	09RH0852					852		Ash, 'Rosehill' (RH)	70	14	70	90	Crown Clean High	Grate Lift										$2,172 38
9	Single-species allees		09RH0853					853	Missing	Ash, 'Rosehill' (RH)	70	13	45	90	Crown Clean High											$1,204.15
9	Single-species allees		09RH0854					854	Ineffective	Ash, 'Rosehill' (RH)	70	16	45	90	Crown Clean High	Grate Lift	Trunk Wound									$1,824 04
9	Single-species allees		09RH0855					855	Missing	Ash, 'Rosehill' (RH)	70	6	80	90	Corrective Prune											$456.01
9	Single-species allees		09RH0856					856	Missing	Ash, 'Rosehill' (RH)	70	13	65	90	Crown Clean High											$1,739 33
9	Single-species allees		09RH0857					857	Missing	Ash, 'Rosehill' (RH)	70	10	75	90	Crown Lifting											$1,187 52
9	Single-species allees		09RH0858					858	Missing	Ash, 'Rosehill' (RH)	70	12	65	90	Crown Clean High	Grate Lift										$1,482 03
9	Single-species allees		09RH0859					859	Missing	Ash, 'Rosehill' (RH)	70	11	65	90	Crown Lifting	Crown Clean High	Trunk Wound									$1,245 32
9	Single-species allees		09RH0860					860	Missing	Ash, 'Rosehill' (RH)	70	18	55	90	Crown Clean High	Grate Lift	Storm Damage									$2,821 56
9	Single-species allees	09RH0861	09RH0861	X				861		Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0862					862	Missing	Ash, 'Rosehill' (RH)	70	14	70	90	Grate Lift											$2,172 38
9	Single-species allees	09RH0863	09RH0863	X				863		Ash, 'Rosehill' (RH)	70			90												$0.00
9	Single-species allees		09RH0864					864	Missing	Ash, 'Rosehill' (RH)	70	15	75	90	Grate Lift											$2,671 93
9	Single-species allees		09RH0866					866	Missing	Ash, 'Rosehill' (RH)	70	4	60	90	Corrective Prune											$240.00
9	Single-species allees	09RH0867	09RH0867			X		867		Ash, 'Rosehill' (RH)	70	20	55	90	Crown Clean High											$3,483.41
9	Single-species allees		09RH0868					868	Missing	Ash, 'Rosehill' (RH)	70	20	75	90	Grate Lift		Forked									$4,750.10
9	Single-species allees		09RH0869					869	Missing	Ash, 'Rosehill' (RH)	70	18	60	90	Crown Clean High											$3,078 06
9	Single-species allees		09RH0870	X				870	Missing	Ash, 'Rosehill' (RH)	70			70												$0.00
9	Single-species allees		09RH0871					871	Missing	Ash, 'Rosehill' (RH)	70	17	45	70	Crown Clean High		Girdling Root									$1,601 58
9	Single-species allees		09RH0872					872	Missing	Ash, 'Rosehill' (RH)	70	11	60	70			Forked									$894.07
9	Single-species allees		09RH0873					873	Missing	Ash, 'Rosehill' (RH)	70	14	60	70	Crown Clean High											$1,448 25
9	Single-species allees		09RH0874					874	Missing	Ash, 'Rosehill' (RH)	70	15	50	70	Crown Clean High		Forked									$1,385.45
9	Single-species allees		09RH0875			X		875	Missing	Ash, 'Rosehill' (RH)	70	16	55	70	Crown Clean High		Girdling Root									$1,733 96
9	Single-species allees		09RH0876	X				876	Missing	Ash, 'Rosehill' (RH)	70			70												$0.00
9	Single-species allees		09RH0877					877	Missing	Ash, 'Rosehill' (RH)	70	3	75	70	Corrective Prune											$225.00
9	Single-species allees		09RH0878					878	Missing	Ash, 'Rosehill' (RH)	70	3	75	70	Corrective Prune											$225.00
9	Single-species allees		09RH0879					879	Missing	Ash, 'Rosehill' (RH)	70	3	75	70	Corrective Prune											$225.00
9	Single-species allees		09RH0886					886	Missing	Ash, 'Rosehill' (RH)	70	3	65	70	Crown Clean Low											$195.00
9	Single-species allees		09RH0888					888	Missing	Ash, 'Rosehill' (RH)	70	3	70	70	Crown Lifting	Corrective Prune										$210.00
9	Single-species allees		09RH0889	X				889	Missing	Ash, 'Rosehill' (RH)	70			70												$0.00
9	Single-species allees	09RH0890	09RH0890					890		Ash, 'Rosehill' (RH)	70	18	60	70	Crown Clean High		Vines									$2,394 05
9	Single-species allees		09RH0891					891	Missing	Ash, 'Rosehill' (RH)	70	19	65	70	Crown Clean High											$2,889.73
9	Single-species allees	9RH892	09RH0892					892		Ash, 'Rosehill' (RH)	70	15	55	70	Crown Clean High		Trunk Wound									$1,523 99
9	Single-species allees		09RH0893					893	Missing	Ash, 'Rosehill' (RH)	70	16	60	70	Crown Clean High	Crown Lifting										$1,891 60
9	Single-species allees		09RH0894					894	Missing	Ash, 'Rosehill' (RH)	70	9	60	70	Crown Clean High		Forked									$598.51
9	Single-species allees		09RH0895	X				895	Missing	Ash, 'Rosehill' (RH)	70			70												$0.00
9	Single-species allees		09RH0899					899	Missing	Ash, 'Rosehill' (RH)	70	15	55	70	Crown Clean High		Trunk Wound									$1,523 99
9	Single-species allees		09RH0900					900	Missing	Ash, 'Rosehill' (RH)	70	19	55	70	Crown Clean High	Crown Lifting										$2,445.16
9	Single-species allees		09RH0903					903	Missing	Ash, 'Rosehill' (RH)	70	15	50	70	Crown Lifting	Crown Clean High	Mower Damage									$1,385.45

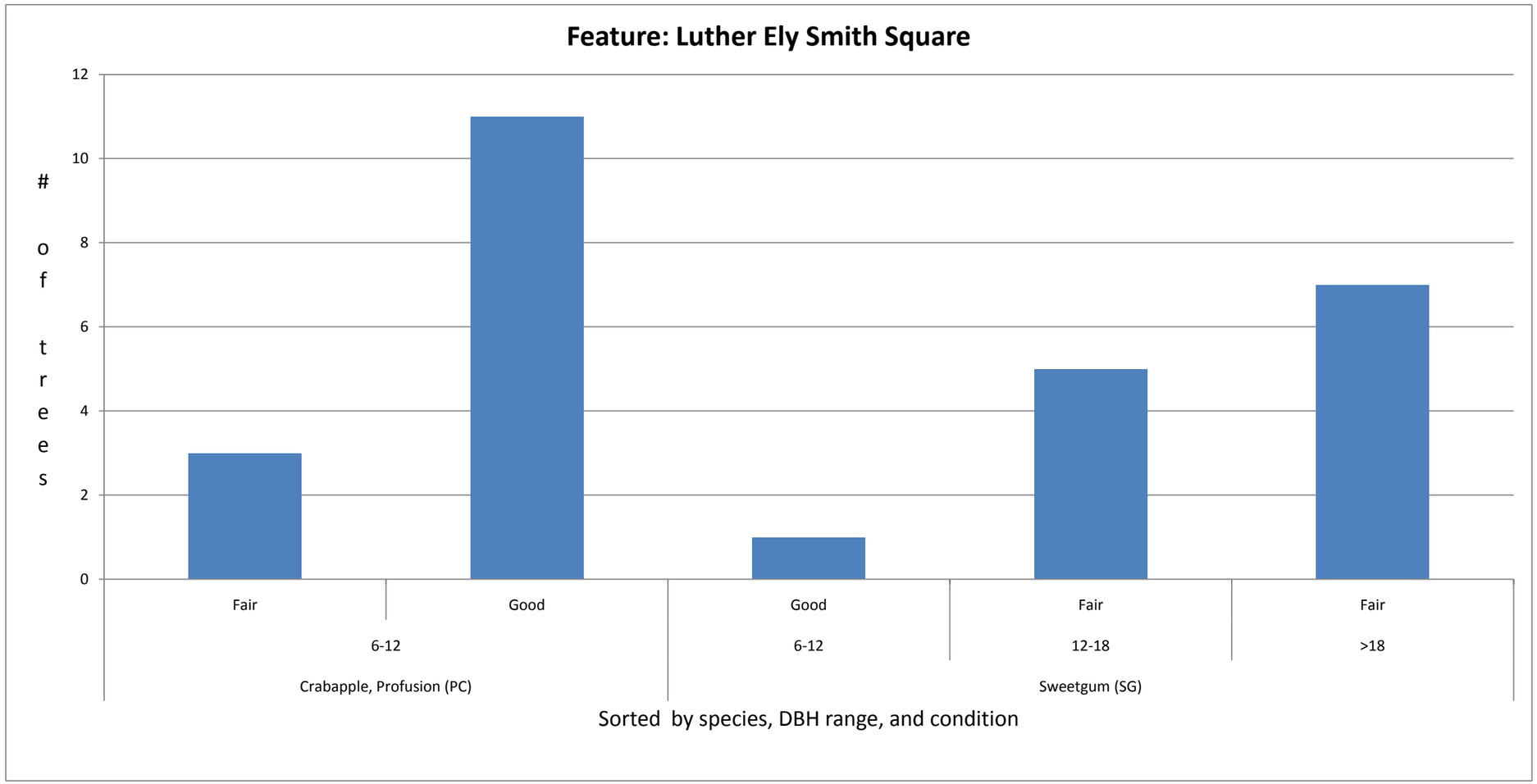
Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
9	Single-species allees		09RH0905					905	Missing	Ash, 'Rosehill' (RH)	70	17	60	70	Crown Clean High		Trunk Wound									$2,135.43
9	Single-species allees		09RH0906					906	Missing	Ash, 'Rosehill' (RH)	70	20	55	70	Crown Clean High		Mower Damage									$2,709 32
9	Single-species allees		09RH0907					907	Missing	Ash, 'Rosehill' (RH)	70	16	55	70	Crown Clean High		Mower Damage									$1,733 96
9	Single-species allees		09RH0908					908	Missing	Ash, 'Rosehill' (RH)	70	15	55	70	Crown Clean High		Trunk Wound									$1,523 99
9	Single-species allees		09RH0909					909	Missing	Ash, 'Rosehill' (RH)	70	15	60	70	Crown Clean High											$1,662 53
9	Single-species allees		09RH0910					910	Missing	Ash, 'Rosehill' (RH)	70	6	55	70			Forked									$243.84
9	Single-species allees		09RH0912					912	Missing	Ash, 'Rosehill' (RH)	70	18	40	70	Crown Clean High		Storm Damage									$1,596 03
9	Single-species allees		09RH0913					913	Missing	Ash, 'Rosehill' (RH)	70	8	60	70	Crown Lifting		Forked									$472.90
9	Single-species allees		09RH0915					915	Missing	Ash, 'Rosehill' (RH)	70	10	60	70	Crown Clean Low											$738.90
9	Single-species allees		09RH0923					923	Missing	Ash, 'Rosehill' (RH)	70	11	65	70	Crown Lifting											$968.58
9	Single-species allees		09RH0924					924	Missing	Ash, 'Rosehill' (RH)	70	10	70	70	Crown Clean Low		Forked									$862.06
9	Single-species allees		09RH0925					925	Missing	Ash, 'Rosehill' (RH)	70	10	60	70	Crown Clean Low		Forked									$738.90
9	Street Tree	09BC0033	09BC0033					33		Baldcypress (BC)	100	16	75	70			7X7 Cut out									$3,377 85
9	North East Side Slope		09BC0034					34	Missing	Baldcypress (BC)	100	18	70	70			Trunk Wound									$3,990 08
9	North East Side Slope	09BC0038	09BC0038					38		Baldcypress (BC)	100	15	70	70												$2,770 89
9	North East Side Slope	09BC0039	09BC0039					39		Baldcypress (BC)	100	21	85	70												$6,594.72
9	Street Tree		09BC0040					40	Missing	Baldcypress (BC)	100	17	75	70			7X7 Cut out									$3,813 27
9	North East Side Slope		09BC0047					47	Missing	Baldcypress (BC)	100	19	75	70												$4,763 29
9	Street Tree		09BC0055					55	Missing	Baldcypress (BC)	100	16	75	70			7X7 Cut out									$3,377 85
9	North East Side Slope		09BC0056					56	Missing	Baldcypress (BC)	100	17	80	70												$4,067.49
9	North East Side Slope	09BC0057	09BC0057					57		Baldcypress (BC)	100	18	75	70			Girdling Root	Mower Damage								$4,275 09
9	North East Side Slope	09BC0058	09BC0058					58		Baldcypress (BC)	100	21	80	70												$6,206 80
9	Street Tree	09BC0059	09BC0059					59		Baldcypress (BC)	100	14	75	70			7X7 Cut out									$2,586.17
9	North East Side Slope		09BC0071					71	Missing	Baldcypress (BC)	100	15	70	70												$2,770 89
9	North East Side Slope		09BC0072					72	Missing	Baldcypress (BC)	100	18	80	70												$4,560.10
9	North East Side Slope	09BC0073	09BC0073					73		Baldcypress (BC)	100	22	80	70	Crown Lifting											$6,811 99
9	Street Tree	09BC0074	09BC0074					74		Baldcypress (BC)	100	16	70	70			7X7 Cut out									$3,152 66
9	Street Tree	09BC0080	09BC0080					80		Baldcypress (BC)	100	15	75	70			7X7 Cut out									$2,968 81
9	Street Tree	09BC0092	09BC0092					92		Baldcypress (BC)	100	15	75	70			7X7 Cut out									$2,968 81
9	Street Tree		09BC0103					103	Missing	Baldcypress (BC)	100	10	65	70	Crown Lifting		7X7 Cut out									$1,143 54
9	Street Tree	09BC0104	09BC0104					104		Baldcypress (BC)	100	18	75	70			7X7 Cut out	Girdling Root								$4,275 09
9	Street Tree		09BC0105					105	Missing	Baldcypress (BC)	100	10	70	70	Crown Lifting		7X7 Cut out									$1,231 51
9	North East Side Slope		09HB0025					25	Missing	Birch, River 'Heritage' (HB)	80	10	60	70	Crown Lifting		Forked	Girdling Root								$844.46
9	North East Side Slope		09HB0026					26	Missing	Birch, River 'Heritage' (HB)	80	8	65	70	Crown Lifting		Girdling Root									$585.49
9	North East Side Slope		09HB0030					30	Missing	Birch, River 'Heritage' (HB)	80	9	65	70	Crown Lifting		Forked									$741.02
9	North East Side Slope		09HB0031					31	Missing	Birch, River 'Heritage' (HB)	80	9	70	70	Crown Lifting											$798.02
9	North East Side Slope		09HB0045					45	Missing	Birch, River 'Heritage' (HB)	80	9	65	70	Crown Lifting		Forked	Trunk Wound								$741.02
9	North East Side Slope		09HB0048					48	Missing	Birch, River 'Heritage' (HB)	80	8	70	70	Crown Lifting											$630.53
9	North East Side Slope		09HB0054					54	Missing	Birch, River 'Heritage' (HB)	80	7	80	70												$551.72
9	North East Side Slope		09HB0062					62	Missing	Birch, River 'Heritage' (HB)	80	8	70	70	Crown Lifting											$630.53
9	North East Side Slope		09HB0063					63	Missing	Birch, River 'Heritage' (HB)	80	8	70	70												$630.53
9	North East Side Slope		09BG0027					27	Missing	Blackgum (BG)	100	3	70	70	Crown Lifting											$210.00
9	North East Side Slope		09BG0044					44	Missing	Blackgum (BG)	100	4	70	70	Crown Lifting											$280.00
9	North East Side Slope		09BG0250					250	Missing	Blackgum (BG)	100	4	50	70	Crown Lifting		Trunk Wound									$200.00
9	North East Side Slope		09RC0155	X				155	Missing	Crabapple, Radiant (RC)	70			70												$0.00
9	North East Side Slope		09SD0066					66	Missing	Crabapple, Snowdrift (SD)	70	9	70	70												$698.26
9	North East Side Slope		09MV0227					227	Missing	Magnolia, Sweetbay (MV)	90	2	55	70			Forked	Vines								$110.00
9	North East Side Slope		09SW0032					32	Missing	Oak, Swamp White (SW)	100	8	70	70	Crown Clean Low											$788.16
9	North East Side Slope		09JB0029					29	Missing	Pine, Japanese Black (JB)	50	9	55	70	Crown Clean Low		Storm Damage									$391.88
9	North East Side Slope		09JB0060					60	Missing	Pine, Japanese Black (JB)	50	8	55	70	Crown Clean Low											$309.64
9	North East Side Slope		09JB0064					64	Missing	Pine, Japanese Black (JB)	50	5	45	70												$98 96
9	North East Side Slope		09JB0107					107	Missing	Pine, Japanese Black (JB)	50	10	45	70			Vines	Insect/Disease/Stress								$395.84
9	North East Side Slope		09JB0122					122	Missing	Pine, Japanese Black (JB)	50	10	55	70	Crown Clean Low		Insect/disease/stress									$483.81
9	North East Side Slope		09JB0141	X				141	Defective	Pine, Japanese Black (JB)	50			70												$0.00
9	North East Side Slope		09JB0152					152	Missing	Pine, Japanese Black (JB)	50	10	65	70												$571.77
9	North East Side Slope		09JB0172					172	Missing	Pine, Japanese Black (JB)	50	6	55	70			Multi-stem									$174.17
9	North East Side Slope		09JB0173					173	Missing	Pine, Japanese Black (JB)	50	9	60	70												$427.51
9	North East Side Slope	09JB0176	09JB0176					176		Pine, Japanese Black (JB)	50	8	55	70			Trunk Wound									$309.64
9	North East Side Slope		09JB0188					188	Missing	Pine, Japanese Black (JB)	50	10	50	70			Trunk Wound									$439.82
9	North East Side Slope		09JB0190					190	Missing	Pine, Japanese Black (JB)	50	12	50	70			Vines									$633.35
9	North East Side Slope		09RP0207					207	Missing	Pine, Red (RP)	70	4	50	70												$200.00
9	North East Side Slope	9RP208	09RP0208					208	Defective	Pine, Red (RP)	70	4	45	70	Crown Clean Low											$180.00
9	North East Side Slope		09RP0209					209	Missing	Pine, Red (RP)	70	5	50	70	Crown Clean Low											$153.94
9	North East Side Slope		09RB0067					67	Missing	Redbud, Eastern (RB)	80	9	80	70	Hazard Tree		Ganaderma at Base		3=High	3	2=7-18"	2	1=Occassional	1	6	
9	North East Side Slope		09RB0075					75	Missing	Redbud, Eastern (RB)	80	9	65	70	Crown Clean Low		Mower Damage									$741.02
9	North East Side Slope		09RB0079					79	Missing	Redbud, Eastern (RB)	80	8	80	70	Crown Lifting		Mower Damage									$720.61
9	North East Side Slope		09RB0108					108	Missing	Redbud, Eastern (RB)	80	12	45	70	Crown Clean High		Vines									$912.02
9	North East Side Slope		09RB0112					112	Missing	Redbud, Eastern (RB)	80	7	50	70			Vines	Forked								$344.82
9	North East Side Slope		09RB0113					113	Missing	Redbud, Eastern (RB)	80	11	55	70	Crown Clean Low		Mower Damage									$936.65
9	North East Side Slope		09RB0121					121	Missing	Redbud, Eastern (RB)	80	8	50	70			Mower Damage	Trunk Wound								$450.38
9	North East Side Slope		09RB0124					124	Missing	Redbud, Eastern (RB)	80	9	55	70	Crown Clean Low		Forked									$627.01
9	North East Side Slope		09RB0133	X				133	Missing	Redbud, Eastern (RB)	80			70												$0.00
9	North East Side Slope		09RB0142					142	Missing	Redbud, Eastern (RB)	80	6	60	70			Mower Damage									$304.01

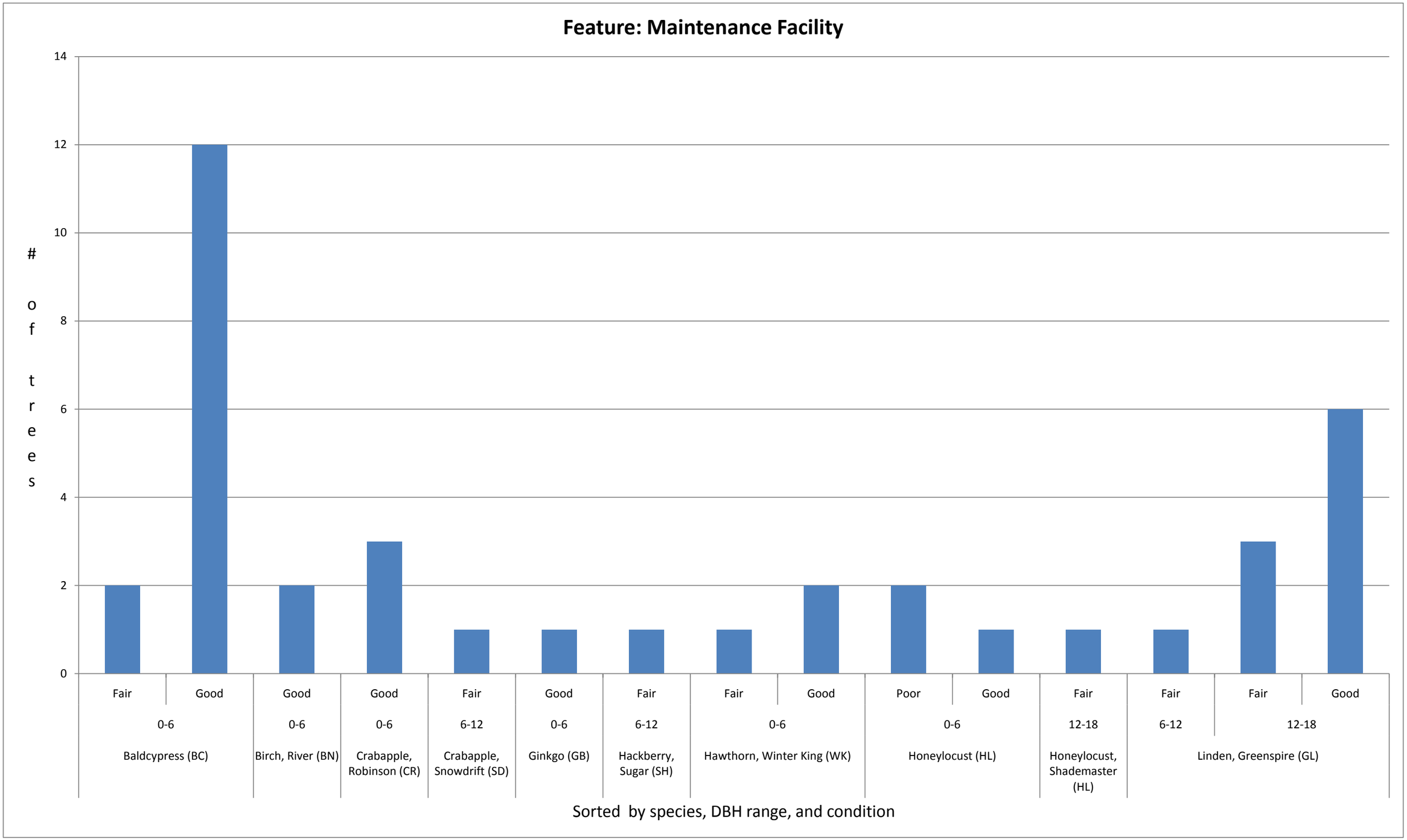
Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
9	North East Side Slope		09RB0157					157	Missing	Redbud, Eastern (RB)	80	2	45	70			Multi-stem	Trunk Wound								$90 00
9	North East Side Slope		09RB0171					171	Missing	Redbud, Eastern (RB)	80	8	65	70			Mower Damage									$585.49
9	North East Side Slope		09RB0174	X				174	Missing	Redbud, Eastern (RB)	80			70											0	
9	North East Side Slope		09RB0178					178	Missing	Redbud, Eastern (RB)	80	15	50	70	Crown Clean Low		Mower Damage									$1,583 37
9	North East Side Slope		09RB0182	X				182	Missing	Redbud, Eastern (RB)	80			70												$0.00
9	North East Side Slope	9RB203	09RB0203					203		Redbud, Eastern (RB)	80	13	55	70			Girdling Root	Mower Damage								$1,308 21
9	North East Side Slope		09RB0210					210	Missing	Redbud, Eastern (RB)	80	9	45	70	Crown Clean Low		Girdling Root	Trunk Wound								$513.01
9	North East Side Slope		09RB0213	X				213	Missing	Redbud, Eastern (RB)	80			70												$0.00
9	North East Side Slope	9RB215	09RB0215					215		Redbud, Eastern (RB)	80	11	50	70	Crown Clean Low		Mower Damage	Girdling Root								$851.50
9	North East Side Slope		09RB0234					234	Missing	Redbud, Eastern (RB)	80	9	75	70			Mower Damage									$855.02
9	North East Side Slope		09RB0274					274	Missing	Redbud, Eastern (RB)	80	16	40	70	Crown Clean Low		Vines	Insect/Disese/Stress								$1,441 22
10	Single-species allees		10RH0931					931	Missing	Ash, 'Rosehill' (RH)	70	3	55	70			Trunk Wound									$165.00
10	Single-species allees		10RH0932					932	Missing	Ash, 'Rosehill' (RH)	70	9	45	70	Crown Lifting		Insect/disease/stress									$448.88
10	Single-species allees	516RH946	10RH0933					933	Defective	Ash, 'Rosehill' (RH)	70	15	30	70	Grate Lift	Crown Lifting	Forked, Groot	Tag reads 516RH946								$831.27
10	Single-species allees		10RH0934					934	Missing	Ash, 'Rosehill' (RH)	70	6	60	90	Grate Lift	Crown Lifting	Forked									$342.01
10	Single-species allees		10RH0935					935	Missing	Ash, 'Rosehill' (RH)	70	6	60	90	Crown Lifting		Forked	Trunk Wound								$342.01
10	Single-species allees		10RH0936					936	Missing	Ash, 'Rosehill' (RH)	70	11	55	90	Grate Lift		Forked									$1,053.73
10	Single-species allees		10RH0937					937	Missing	Ash, 'Rosehill' (RH)	70	15	65	90	Grate Lift	Crown Clean High										$2,315 67
10	Single-species allees	16RH0938	10RH0938					938	Defective	Ash, 'Rosehill' (RH)	70	12	65	90	Grate Lift		Tag reads 16RH0938									$1,482 03
10	Single-species allees	16RH0939	10RH0939					939	Defective	Ash, 'Rosehill' (RH)	70	14	65	90			Tag reads 16RH0939									$2,017 21
10	Single-species allees		10RH0940					940	Missing	Ash, 'Rosehill' (RH)	70	9	60	90	Grate Lift		Trunk Wound									$769.52
10	Single-species allees	16RH0941	10RH0941					941	Defective	Ash, 'Rosehill' (RH)	70	9	55	90	Crown Lifting		Tag reads 16RH0941									$705.39
10	Single-species allees		10RH0942					942	Missing	Ash, 'Rosehill' (RH)	70	13	60	90												$1,605 53
10	Single-species allees		10RH0943					943	Missing	Ash, 'Rosehill' (RH)	70	12	60	90												$1,368 03
10	Single-species allees	16RH0944	10RH0944					944	Defective	Ash, 'Rosehill' (RH)	70	14	65	90	Grate Lift		Tag reads 16RH0944									$2,017 21
10	Single-species allees		10RH0945	X				945	Missing	Ash, 'Rosehill' (RH)	70			90												$0.00
10	Single-species allees		10RH0946					946	Ineffective	Ash, 'Rosehill' (RH)	70	5	70	90			Trunk Wound									$277.09
10	Single-species allees	16RH0947	10RH0947	X				947	Defective	Ash, 'Rosehill' (RH)	70			90												$0.00
10	Single-species allees	16RH0948	10RH0948					948	Defective	Ash, 'Rosehill' (RH)	70	14	65	90	Crown Clean High		Tag reads 16RH0948									$2,017 21
10	Single-species allees		10RH0949					949	Missing	Ash, 'Rosehill' (RH)	70	6	60	90	Corrective Prune											$342.01
10	Single-species allees		10RH0950					950	Missing	Ash, 'Rosehill' (RH)	70	14	75	90	Crown Lifting		Forked									$2,327 55
10	Single-species allees	16RH0951	10RH0951					951	Defective	Ash, 'Rosehill' (RH)	70	14	70	90			Tag reads 16RH0951	Forked								$2,172 38
10	Single-species allees	16RH0952	10RH0952					952	Defective	Ash, 'Rosehill' (RH)	70	16	65	90	Crown Clean High		Tag reads 16RH0952									$2,634.72
10	Single-species allees	16RH0953	10RH0953					953	Defective	Ash, 'Rosehill' (RH)	70	15	55	90	Grate Lift	Crown Clean High	Tag reads 16RH0953	Trunk Wound								$1,959.42
10	Single-species allees		10RH0954					954	Missing	Ash, 'Rosehill' (RH)	70	15	55	90	Grate Lift	Crown Clean High										$1,959.42
10	Single-species allees		10RH0955					955	Missing	Ash, 'Rosehill' (RH)	70	4	60	90	Corrective Prune		Trunk Wound	Girdling Root								$240.00
10	Single-species allees		10RH0956					956	Missing	Ash, 'Rosehill' (RH)	70	14	55	90	Crown Clean High		Forked									$1,706 87
10	Single-species allees		10RH0957					957	Missing	Ash, 'Rosehill' (RH)	70	18	55	90	Crown Clean High	Grate Lift	Trunk Wound	Forked								$2,821 56
10	Single-species allees		10RH0958					958	Missing	Ash, 'Rosehill' (RH)	70	3	80	90												$240.00
10	Single-species allees		10RH0959					959	Ineffective	Ash, 'Rosehill' (RH)	70	19	60	90	Crown Clean High		Forked									$3,429 57
10	Single-species allees		10RH0960					960	Missing	Ash, 'Rosehill' (RH)	70	12	50	90	Crown Lifting		Trunk Wound	Forked								$1,140 02
10	Single-species allees		10RH0961					961	Missing	Ash, 'Rosehill' (RH)	70	15	60	90	Crown Lifting											$2,137 54
10	Single-species allees		10RH0962					962	Missing	Ash, 'Rosehill' (RH)	70	17	70	90	Crown Clean High		No Grate									$3,203.15
10	Single-species allees		10RH0963					963	Missing	Ash, 'Rosehill' (RH)	70	16	75	90	Crown Lifting											$3,040 06
10	Single-species allees		10RH0964					964	Missing	Ash, 'Rosehill' (RH)	70	15	50	90			Trunk Wound									$1,781 29
10	Washington Ave; Parking Garage		10BN0105					105	Missing	Birch, River (BN)	80	2	75	70			Multi-stem									$150.00
10	Washington Ave; Parking Garage		10BN0106					106	Missing	Birch, River (BN)	80	2	75	70			Multi-stem									$150.00
10	Washington Ave; Parking Garage		10BN0111					111	Missing	Birch, River (BN)	80	2	70	70			Multi-stem									$140.00
10	Washington Ave; Parking Garage	10RC29	10RC0029					29		Crabapple, Radiant (RC)	70	6	50	70			Forked									$221.67
10	Washington Ave; Parking Garage	10RC30	10RC0030					30		Crabapple, Radiant (RC)	70	6	45	70	Crown Clean Low		Trunk Wound									$199.50
10	Washington Ave; Parking Garage	10RC34	10RC0034					34		Crabapple, Radiant (RC)	70	8	55	70			Forked	Mower Damage								$433.49
10	Washington Ave; Parking Garage	10RC39	10RC0039					39		Crabapple, Radiant (RC)	70	9	55	70	Crown Clean Low		Forked									$548.64
10	Washington Ave; Parking Garage	10RC40	10RC0040					40		Crabapple, Radiant (RC)	70	8	55	70	Crown Clean Low		Forked									$433.49
10	Washington Ave; Parking Garage		10RC0041					41	Missing	Crabapple, Radiant (RC)	70	10	60	70			Forked									$738.90
10	Washington Ave; Parking Garage		10RC0046					46	Missing	Crabapple, Radiant (RC)	70	10	50	70	Crown Lifting		Forked									$615.75
10	Washington Ave; Parking Garage		10RC0048					48	Missing	Crabapple, Radiant (RC)	70	12	50	70	Crown Lifting		Forked									$886.69
10	Washington Ave; Parking Garage	10RC65	10RC0065					65		Crabapple, Radiant (RC)	70	4	60	70	Crown Repair		Mower Damage	Storm Damage								$240.00
10	Washington Ave; Parking Garage	10RC68	10RC0068					68		Crabapple, Radiant (RC)	70	10	35	70	Crown Clean Low		Insect/disease/stress									$431.03

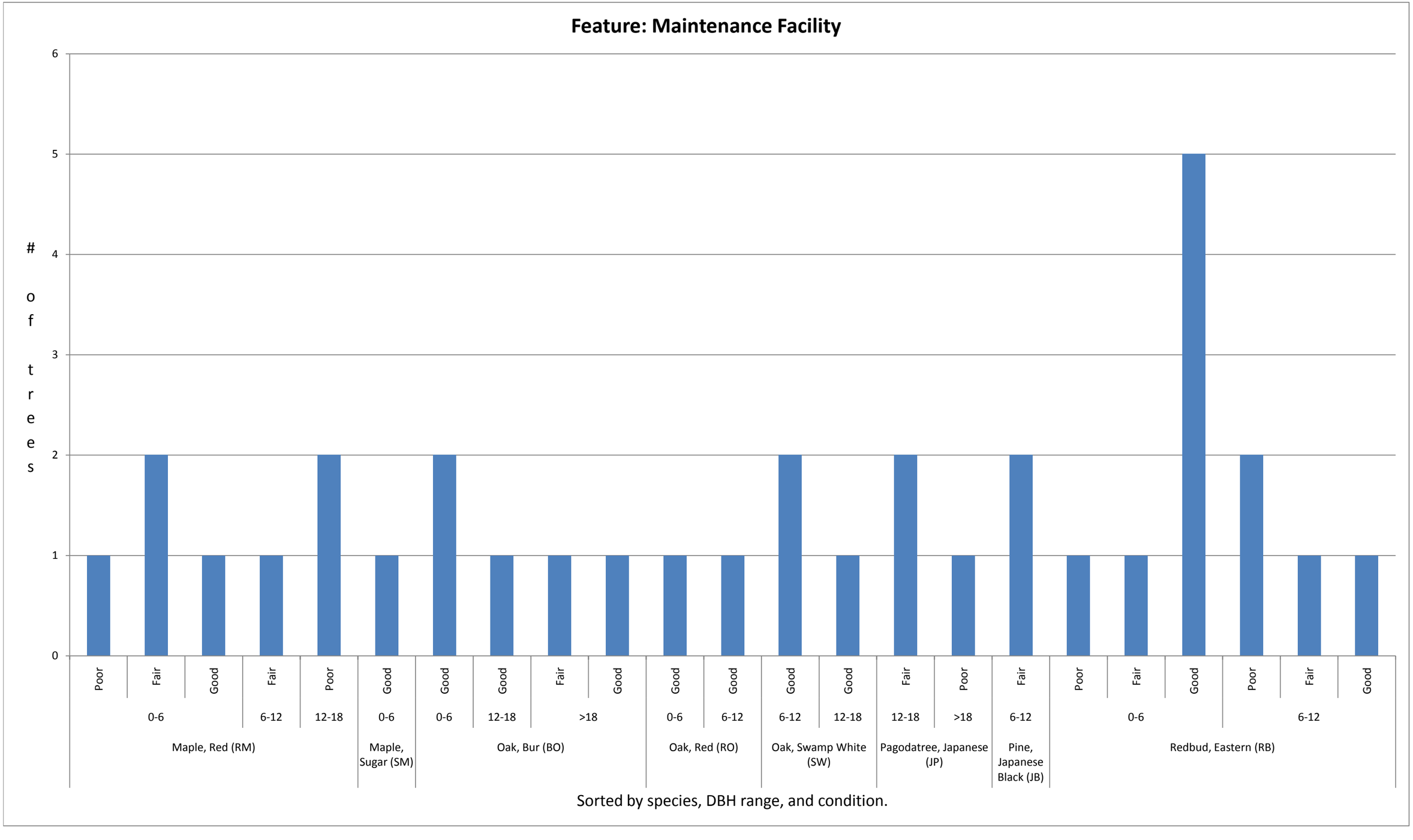
Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
10	Washington Ave; Parking Garage	10RC74	10RC0074					74		Crabapple, Radiant (RC)	70	6	55	70			Trunk Wound									$243.84
10	Washington Ave; Parking Garage		10RC0080	X				80	Missing	Crabapple, Radiant (RC)	70			70												$0.00
10	Washington Ave; Parking Garage	10RC85	10RC0085					85		Crabapple, Radiant (RC)	70	3	50	70			Forked									$150.00
10	Washington Ave; Parking Garage	10RC96	10RC0096					96		Crabapple, Radiant (RC)	70	8	45	70	Crown Clean Low		Trunk Wound	Forked								$354.67
10	Washington Ave; Parking Garage		10CR0101					101	Missing	Crabapple, Robinson (CR)	70	3	75	70												$225.00
10	Washington Ave; Parking Garage		10CR0102					102	Missing	Crabapple, Robinson (CR)	70	3	75	70												$225.00
10	Washington Ave; Parking Garage		10CR0108					108	Missing	Crabapple, Robinson (CR)	70	3	75	70												$225.00
10	Washington Ave; Parking Garage		10CR0117					117	Missing	Crabapple, Robinson (CR)	70	2	60	70			Container	Trunk Wound								$120.00
10	Washington Ave; Parking Garage		10CR0118					118	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0119					119	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0120					120	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0121					121	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0122					122	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0123					123	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0124					124	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0125					125	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0126					126	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0127					127	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0128					128	Missing	Crabapple, Robinson (CR)	70	2	70	70			Container									$140.00
10	Washington Ave; Parking Garage		10CR0129					129	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0130					130	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0131					131	Missing	Crabapple, Robinson (CR)	70	2	45	70			Container	Trunk Wound								$90 00
10	Washington Ave; Parking Garage		10CR0132					132	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0133					133	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0134					134	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0135					135	Missing	Crabapple, Robinson (CR)	70	2	65	70			Container									$130.00
10	Washington Ave; Parking Garage		10CR0136					136	Missing	Crabapple, Robinson (CR)	70	2	60	70			Container									$120.00
10	Washington Ave; Parking Garage		10PD0142	X				142	Missing	Dogwood, Pagoda (PD)	90			70												$0.00
10	Washington Ave; Parking Garage		10PD0143	X				143	Missing	Dogwood, Pagoda (PD)	90			70												$0.00
10	Washington Ave; Parking Garage; North Overlook		10PD0144	X				144	Missing	Dogwood, Pagoda (PD)	90			70												$0.00
10	Washington Ave; Parking Garage; North Overlook	10MS37	10MS0037					37		Magnolia, Saucer (MS)	80	4	55	70	Crown Clean Low		Forked	Trunk Wound								$220.00
10	Washington Ave; Parking Garage; North Overlook	10MS38	10MS0038					38		Magnolia, Saucer (MS)	80	5	70	70			Forked									$246.30
10	Washington Ave; Parking Garage; North Overlook	10MS44	10MS0044					44		Magnolia, Saucer (MS)	80	6	70	70			Forked									$354.67
10	Washington Ave; Parking Garage; North Overlook	10MS45	10MS0045					45		Magnolia, Saucer (MS)	80	6	60	70												$304.01
10	Washington Ave; Parking Garage; North Overlook	10MS54	10MS0054					54		Magnolia, Saucer (MS)	80	3	70	70	Crown Clean Low		Multi-stem									$210.00
10	Washington Ave; Parking Garage; North Overlook	10MS55	10MS0055					55		Magnolia, Saucer (MS)	80	4	80	70			Multi-stem									$320.00
10	Washington Ave; Parking Garage; North Overlook	10MS56	10MS0056					56		Magnolia, Saucer (MS)	80	4	80	70			Multi-stem									$320.00
10	Washington Ave; Parking Garage; North Overlook	10MS57	10MS0057					57		Magnolia, Saucer (MS)	80	3	75	70			Multi-stem									$225.00
10	Washington Ave; Parking Garage; North Overlook		10MS0059					59	Missing	Magnolia, Saucer (MS)	80	2	60	70			Multi-stem									$120.00
10	Washington Ave; Parking Garage; North Overlook		10MS0060		X			60	Missing	Magnolia, Saucer (MS)	80	2		70			REPLANTED W MV 09/09									$0.00

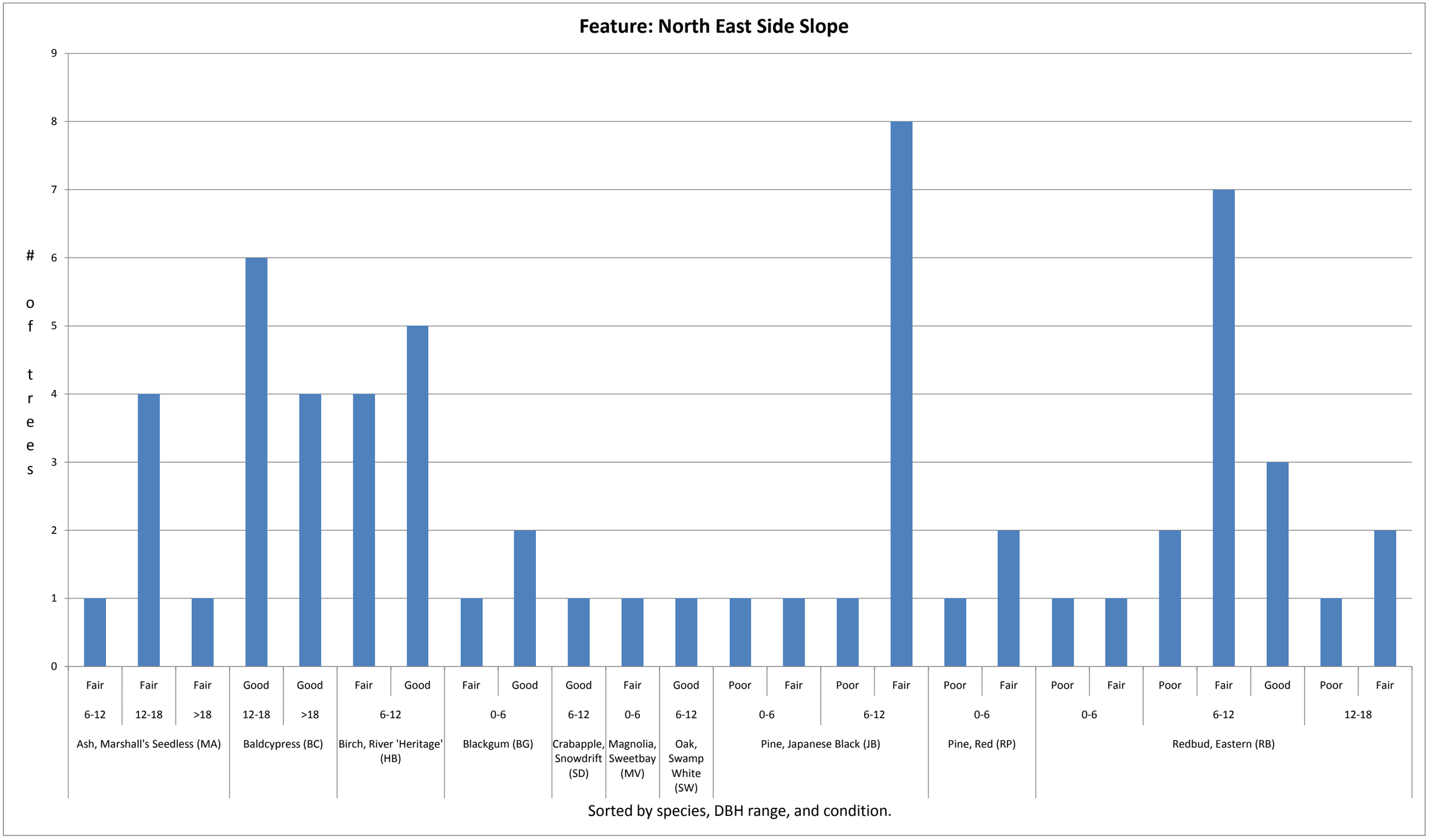
Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
10	Washington Ave; Parking Garage; North Overlook	10MS61	10MS0061		X			61		Magnolia, Saucer (MS)	80	2		70			REPLANTED W MV 09/09									$0.00
10	Washington Ave; Parking Garage; North Overlook	10MS71	10MS0071	X				71		Magnolia, Saucer (MS)	80			70												$0.00
10	Washington Ave; Parking Garage; North Overlook	10MS76	10MS0076					76		Magnolia, Saucer (MS)	80	4	65	70	Crown Clean Low											$260.00
10	Washington Ave; Parking Garage; North Overlook		10MS0082					82	Defective	Magnolia, Saucer (MS)	80	3	65	70			Multi-stem, vines	Tag says 10MS85							$195.00
10	Washington Ave; Parking Garage; North Overlook	10MS87	10MS0087					87		Magnolia, Saucer (MS)	80	3	60	70	Crown Clean Low		Forked	Mower Damage								$180.00
10	Washington Ave; Parking Garage; North Overlook	10MS94	10MS0094					94		Magnolia, Saucer (MS)	80	3	50	70			Mower Damage									$150.00
10	Washington Ave; Parking Garage; North Overlook		10MV0027					27	Missing	Magnolia, Sweetbay (MV)	90	2	70	70			Multi-stem									$140.00
10	Washington Ave; Parking Garage; North Overlook		10BP0031					31	Missing	Pear, Bradford (BP)	60	14	65	70												$1,344 81
10	Washington Ave; Parking Garage; North Overlook	10BP35	10BP0035					35		Pear, Bradford (BP)	60	10	55	70	Crown Clean Low											$580.57
10	Washington Ave; Parking Garage; North Overlook		10BP0036					36	Missing	Pear, Bradford (BP)	60	13	65	70												$1,159 55
10	Washington Ave; Parking Garage; North Overlook	10BP42	10BP0042					42		Pear, Bradford (BP)	60	12	60	70			Forked	Girdling Root								$912.02
10	Washington Ave; Parking Garage; North Overlook		10BP0043					43	Missing	Pear, Bradford (BP)	60	14	20	70	Hazard Tree		Trunk Wound		4=severe	4	2=7-18"	2	1=Occassional	1	7	
10	Washington Ave; Parking Garage; North Overlook	10BP51	10BP0051					51		Pear, Bradford (BP)	60	14	55	70	Crown Lifting		Forked									$1,137 91
10	Washington Ave; Parking Garage; North Overlook	10BP53	10BP0053					53		Pear, Bradford (BP)	60	16	60	70	Safety Prune, Light		Forked									$1,621 37
10	Washington Ave; Parking Garage	10BP62	10BP0062	X				62		Pear, Bradford (BP)	60			70												$0.00
10	Washington Ave; Parking Garage		10BP0063	X				63	Missing	Pear, Bradford (BP)	60			70												$0.00
10	Washington Ave; Parking Garage	10BP66	10BP0066	X				66		Pear, Bradford (BP)	60			70											0	
10	Washington Ave; Parking Garage	10BP67	10BP0067					67		Pear, Bradford (BP)	60	15	55	70			Forked									$1,306 28
10	Washington Ave; Parking Garage	10BP70	10BP0070					70		Pear, Bradford (BP)	60	14	30	70	Hazard Tree		Trunk Wound		3=High	3	2=7-18"	2	3=Frequent	3	8	
10	Washington Ave; Parking Garage		10BP0078	X				78	Missing	Pear, Bradford (BP)	60			70											0	$0.00
10	Washington Ave; Parking Garage		10BP0079	X				79	Missing	Pear, Bradford (BP)	60			70												
10	Washington Ave; Parking Garage	10BP88	10BP0088	X				88		Pear, Bradford (BP)	60			70												$0.00
10	Washington Ave; Parking Garage	10BP89	10BP0089					89		Pear, Bradford (BP)	60	9	50	70			Forked									$427.51
10	Washington Ave; Parking Garage		10CR0110					110	Missing	Pear, Bradford (BP)	60	17	20	70	Hazard Tree		Trunk Wound	Forked	3=High	3	2=7-18"	2	2=Intermediate	2	7	
10	Washington Ave; Parking Garage	10RS32	10RS0032					32		Pear, Redspire (RS)	65	5	55	70												$157.24
10	Washington Ave; Parking Garage	10RS72	10RS0072	X				72		Pear, Redspire (RS)	65			70												$0.00
10	Washington Ave; Parking Garage		10RS0141					141	Missing	Pear, Redspire (RS)	65	8	65	70			Forked									$475.71
10	Washington Ave; Parking Garage		10RB0099					99	Missing	Redbud, Eastern (RB)	80	3	65	70	Crown Repair		Storm Damage									$195.00
10	Washington Ave; Parking Garage		10RB0145					145	Missing	Redbud, Eastern (RB)	80	4	75	70												$300.00
11	Luther Ely Smith Square		11SG0017					17	Missing	Crabapple, Profusion (PC)	70	11	65	70			Sapsuckers	Girdling Root								$968.58
11	Luther Ely Smith Square		11SG0018					18	Missing	Crabapple, Profusion (PC)	70	10	55	70			Sapsuckers	Trunk Wound								$677.33
11	Luther Ely Smith Square		11SG0019					19	Missing	Crabapple, Profusion (PC)	70	9	70	70			Sapsuckers	Girdling Root								$698.26
11	Luther Ely Smith Square		11SG0020					20	Missing	Crabapple, Profusion (PC)	70	9	70	70			Girdling Root									$698.26
11	Luther Ely Smith Square		11SG0021					21	Missing	Crabapple, Profusion (PC)	70	11	70	70												$1,043 09
11	Luther Ely Smith Square		11SG0022					22	Missing	Crabapple, Profusion (PC)	70	10	70	70												$862.06
11	Luther Ely Smith Square		11SG0023					23	Missing	Crabapple, Profusion (PC)	70	12	70	70												$1,241 36
11	Luther Ely Smith Square		11SG0024					24	Missing	Crabapple, Profusion (PC)	70	10	75	70												$923.63
11	Luther Ely Smith Square		11SG0025					25	Missing	Crabapple, Profusion (PC)	70	9	75	70												$748.14
11	Luther Ely Smith Square		11SG0026					26	Missing	Crabapple, Profusion (PC)	70	10	55	70			Trunk Wound									$677.33
11	Luther Ely Smith Square		11SG0027					27	Missing	Crabapple, Profusion (PC)	70	9	70	70			Girdling Root									$698.26
11	Luther Ely Smith Square		11SG0028					28	Missing	Crabapple, Profusion (PC)	70	10	70	70			Girdling Root									$862.06
11	Luther Ely Smith Square		11SG0029					29	Missing	Crabapple, Profusion (PC)	70	9	70	70			Girdling Root	Mower Damage								$698.26
11	Luther Ely Smith Square		11SG0030					30	Missing	Crabapple, Profusion (PC)	70	9	75	70												$748.14
11	Luther Ely Smith Square		11SG0001					1	Missing	Sweetgum (SG)	75	22	60	70												$3,831.75
11	Luther Ely Smith Square		11SG0002					2	Missing	Sweetgum (SG)	75	19	60	70												$2,857 98
11	Luther Ely Smith Square		11SG0003					3	Missing	Sweetgum (SG)	75	21	60	70	Safety Prune, Light		Girdling Root									$3,491 32
11	Luther Ely Smith Square		11SG0004					4	Missing	Sweetgum (SG)	75	15	65	70												$1,929.73
11	Luther Ely Smith Square		11SG0005					5	Missing	Sweetgum (SG)	75	19	65	70												$3,096.14
11	Luther Ely Smith Square		11SG0006					6	Missing	Sweetgum (SG)	75	16	60	70			Girdling Root									$2,026.71
11	Luther Ely Smith Square		11SG0007					8	Missing	Sweetgum (SG)	75	16	60	70			Forked									$2,026.71
11	Luther Ely Smith Square		11SG0008					9	Missing	Sweetgum (SG)	75	16	65	70			Girdling Root									$2,195 60

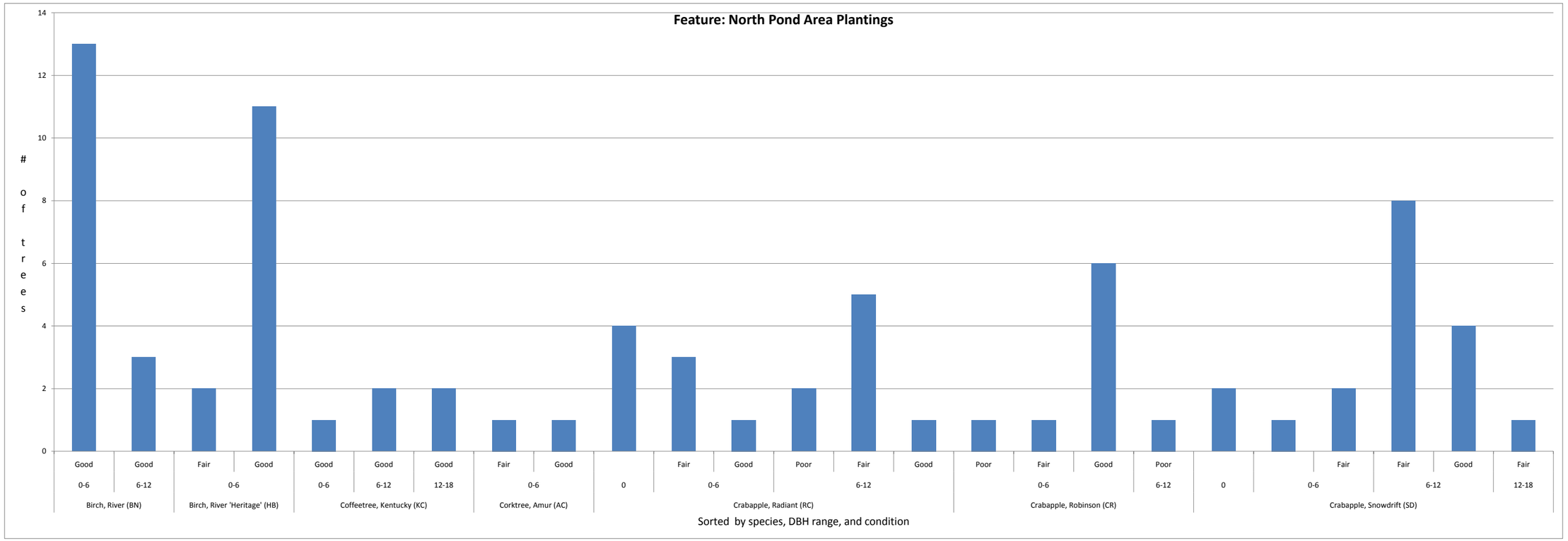
Inventory Zone	Feature Name	TAG ID#	Complete Tree #	Tree Missing 2009	Tree Replanted 2009	Tree Decline 2009	BLS 2009	Tree #	Tag Status	Species	species factor (%)	Diameter (inches)	Condition factor (%)	Location factor	Requirement 1	Requirement 2	Comment 1	Comment 2	Failure Potential	fp	Size of Part	sp	Target Rating	tr	Hazard Rating Total	Value
11	Luther Ely Smith Square		11SG0009					10	Missing	Sweetgum (SG)	75	18	55	70			Girdling Root	Mower Damage								$2,351 30
11	Luther Ely Smith Square		11SG0010					11	Missing	Sweetgum (SG)	75	24	50	70	Hazard Limb High		Girdling Root	Storm Damage	4=severe	4	2=7-18"	2	3=Frequent	3	9	$3,800 08
11	Luther Ely Smith Square		11SG0011					12	Missing	Sweetgum (SG)	75	24	50	70	Hazard Limb High	Crown Clean High	Insect/disease/stress		2=Medium	2	2=7-18"	2	3=Frequent	3	7	$3,800 08
11	Luther Ely Smith Square		11SG0012					13	Missing	Sweetgum (SG)	75	12	70	70	Crown Lifting											$1,330 03
11	Luther Ely Smith Square		11SG0013					14	Missing	Sweetgum (SG)	75	25	55	70	Crown Lifting	Crown Clean High										$4,535 69
9	North East Side Slope		09BN0030			X				Birch, River				70												
2	South East Side Slopes		02BN0317							Birch, River (BN)		2		70			NEW PLANTED 01/09									
7	North Pond Area Plantings		07SD0001		X					Crabapple, Snowdrift (SD)	70	2		70			REPLACED 04 09									
5	South Pond Area Plantings; South Service Area		05GL0115	X						Linden, Greenspire (GL)	80															
7	North Pond Area Plantings		07RM0177	X						Maple, Red (RM)	90															
7	North Pond Area Plantings		07BP0325		X					Pear, Bradford (BP)		2					REPLANTED W CP 04 09									
2	South East Side Slopes		02RB0322	X						Redbud, Eastern (RB)																
2	South East Side Slopes		02RB0315		new					Redbud, Eastern (RB)		2		70			NEW PLANTED	adj to BN317								
2	South East Side Slopes		02RB0082		X					Redbud, Eastern (RB)	80	2		70			REPLANTED 5/09									
2	South East Side Slopes		02RB0087		X					Redbud, Eastern (RB)	80	2		70			REPLANTED 5/09									
7	North Pond Area Plantings		07AH0112		NEW							2					NEW AH west of BP111 by n Pond									

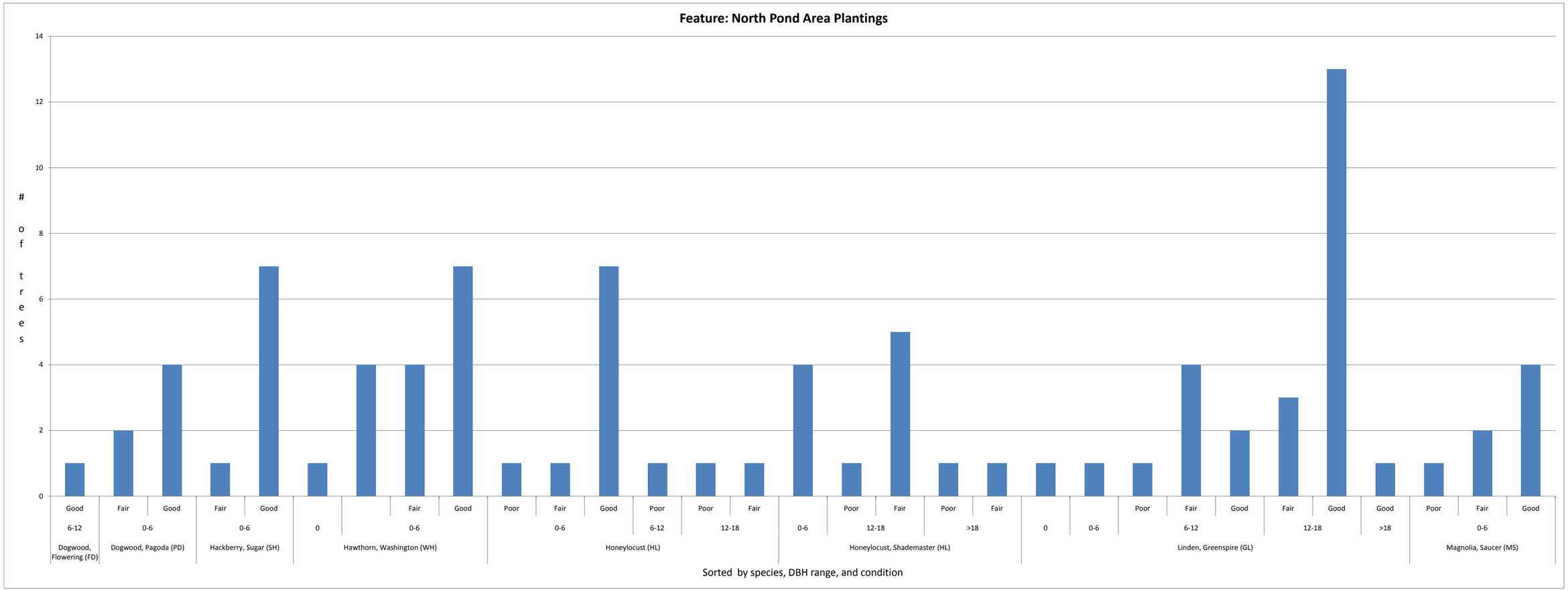

Feature: Luther Ely Smith Square
of trees
12
10
8
6
4
2
0
Fair
Good
Good
Fair
Fair
6-12
6-12
12-18
>18
Crabapple, Profusion (PC)
Sweetgum (SG)
Sorted by species, DBH range, and condition

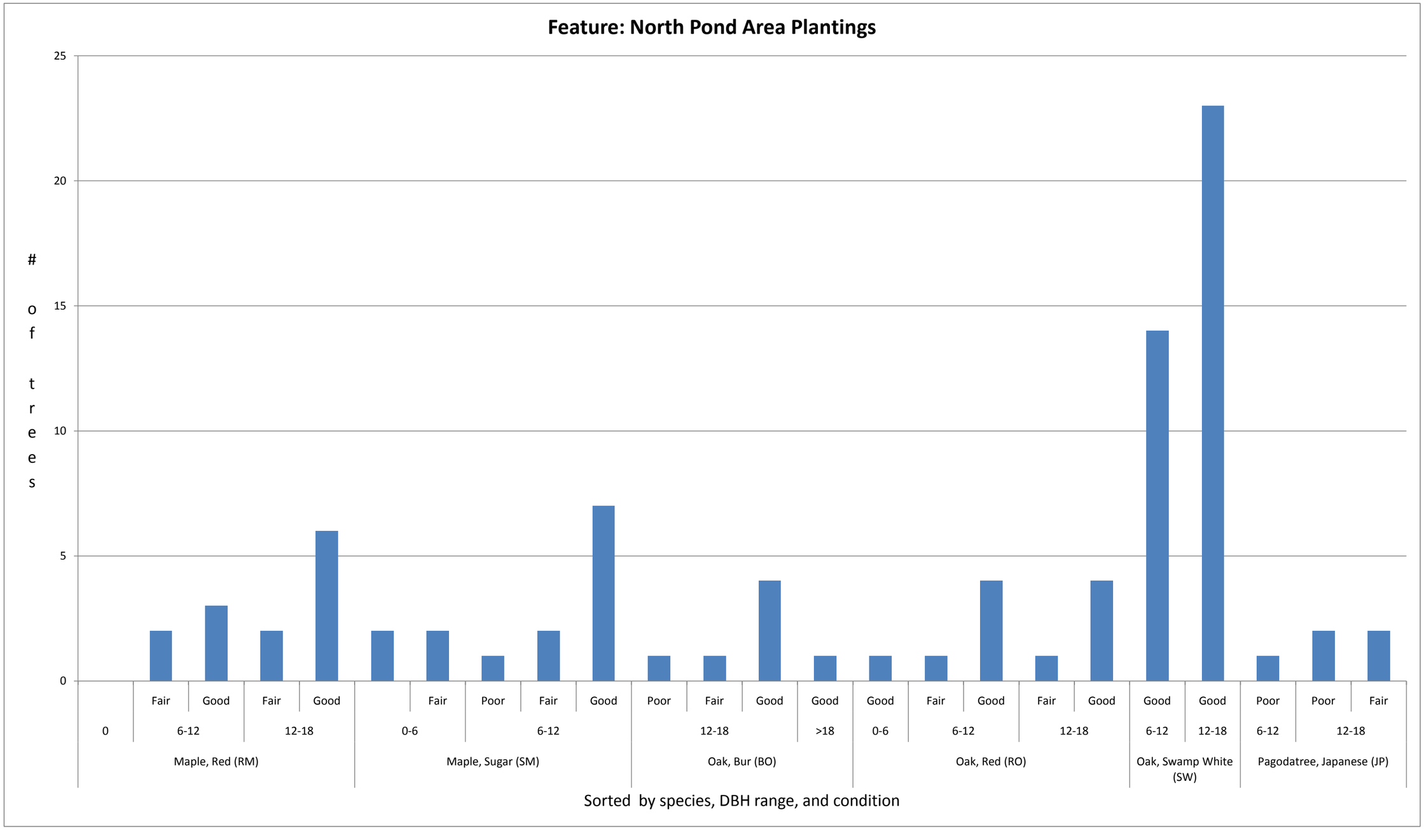

Feature: Maintenance Facility
of trees
14
12
10
8
6
4
2
0
Fair
Good
Good
Good
Fair
Good
Fair
Fair
Good
Poor
Good
Fair
Fair
Fair
Good
0-6
0-6
0-6
6-12
0-6
6-12
0-6
0-6
12-18
6-12
12-18
Baldcypress (BC)
Birch, River (BN)
Crabapple, Robinson (CR)
Crabapple, Snowdrift (SD)
Ginkgo (GB)
Hackberry, Sugar (SH)
Hawthorn, Winter King (WK)
Honeylocust (HL)
Honeylocust, Shademaster (HL)
Linden, Greenspire (GL)
Sorted by species, DBH range, and condition

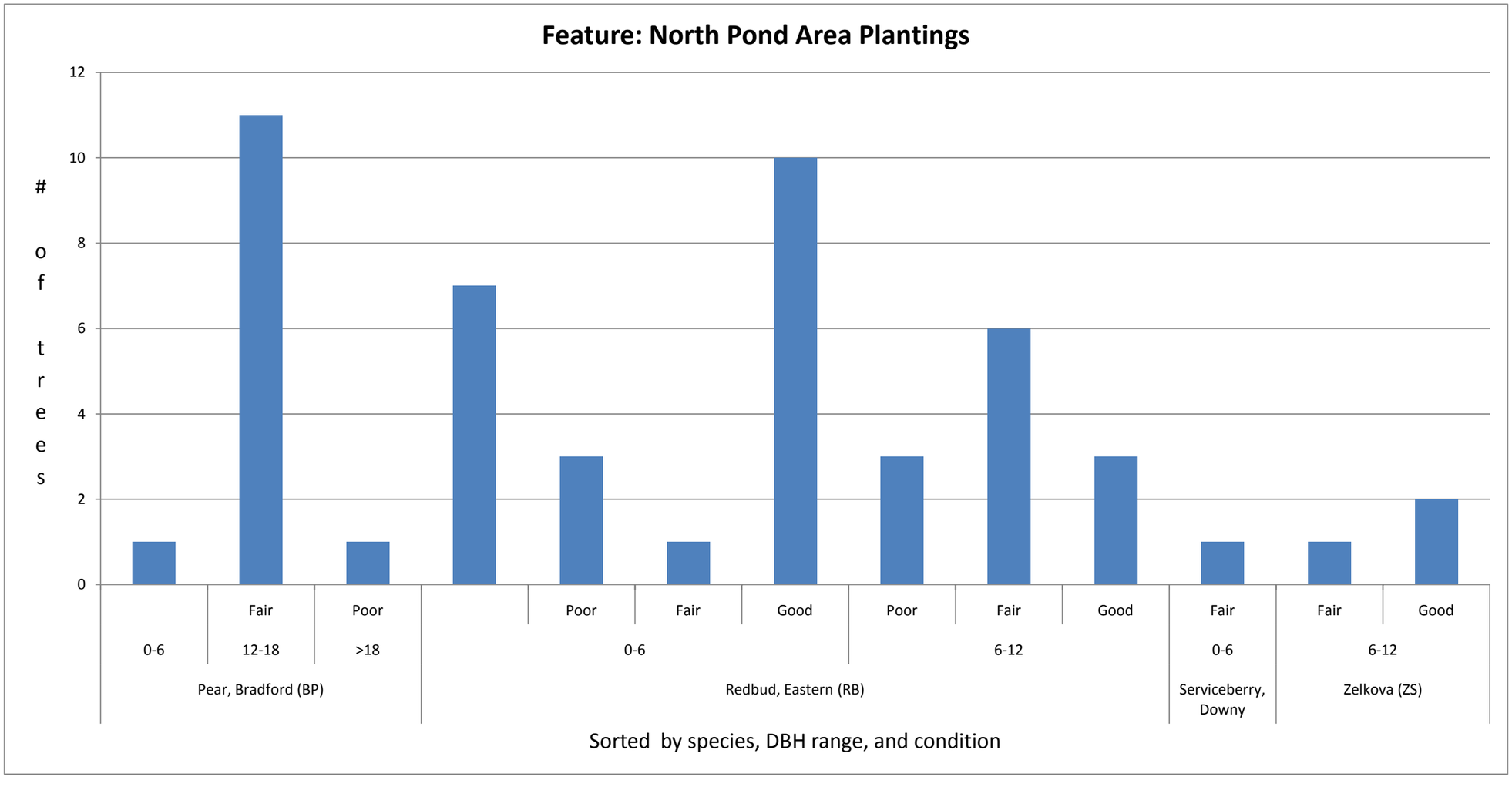

Feature: Maintenance Facility
of trees
6
5
4
3
2
1
0
Poor
Fair
Good
Fair
Poor
Good
Good
Good
Fair
Good
Good
Good
Good
Good
Good
Fair
Poor
Fair
Poor
Fair
Good
Poor
Fair
Good
0-6
6-12
12-18
0-6
0-6
12-18
>18
0-6
6-12
6-12
12-18
12-18
>18
6-12
0-6
6-12
Maple, Red (RM)
Maple, Sugar (SM)
Oak, Bur (BO)
Oak, Red (RO)
Oak, Swamp White (SW)
Pagodatree, Japanese (JP)
Pine, Japanese Black (JB)
Redbud, Eastern (RB)
Sorted by species, DBH range, and condition.

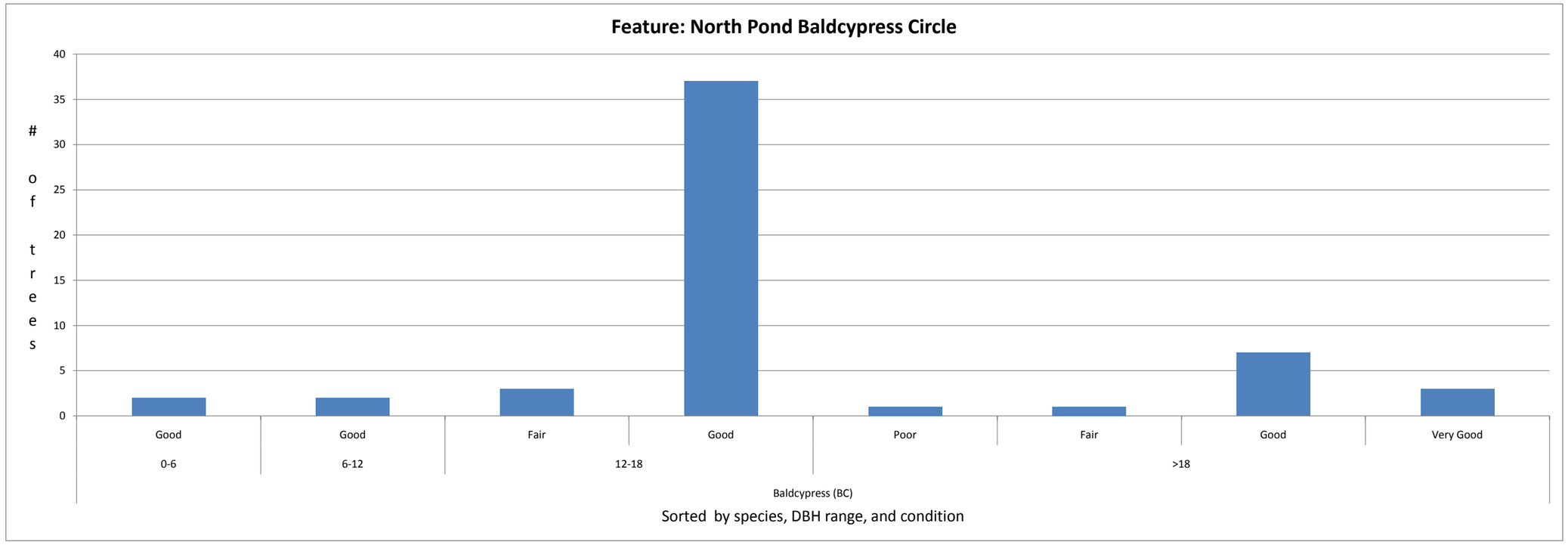

Feature: North East Side Slope
of trees
0
1
2
3
4
5
6
7
8
9
Fair 6-12
Fair 12-18
Fair >18
Good 12-18
Good >18
Fair 6-12
Good 6-12
Fair 0-6
Good 0-6
Good 6-12
Fair 0-6
Good 6-12
Poor 0-6
Fair 0-6
Poor 6-12
Fair 6-12
Poor 0-6
Fair 0-6
Poor 0-6
Fair 0-6
Poor 6-12
Fair 6-12
Good 6-12
Poor 12-18
Fair 12-18
Ash, Marshall's Seedless (MA)
Baldcypress (BC)
Birch, River 'Heritage' (HB)
Blackgum (BG)
Crabapple, Snowdrift (SD)
Magnolia, Sweetbay (MV)
Oak, Swamp White (SW)
Pine, Japanese Black (JB)
Pine, Red (RP)
Redbud, Eastern (RB)
Sorted by species, DBH range, and condition.

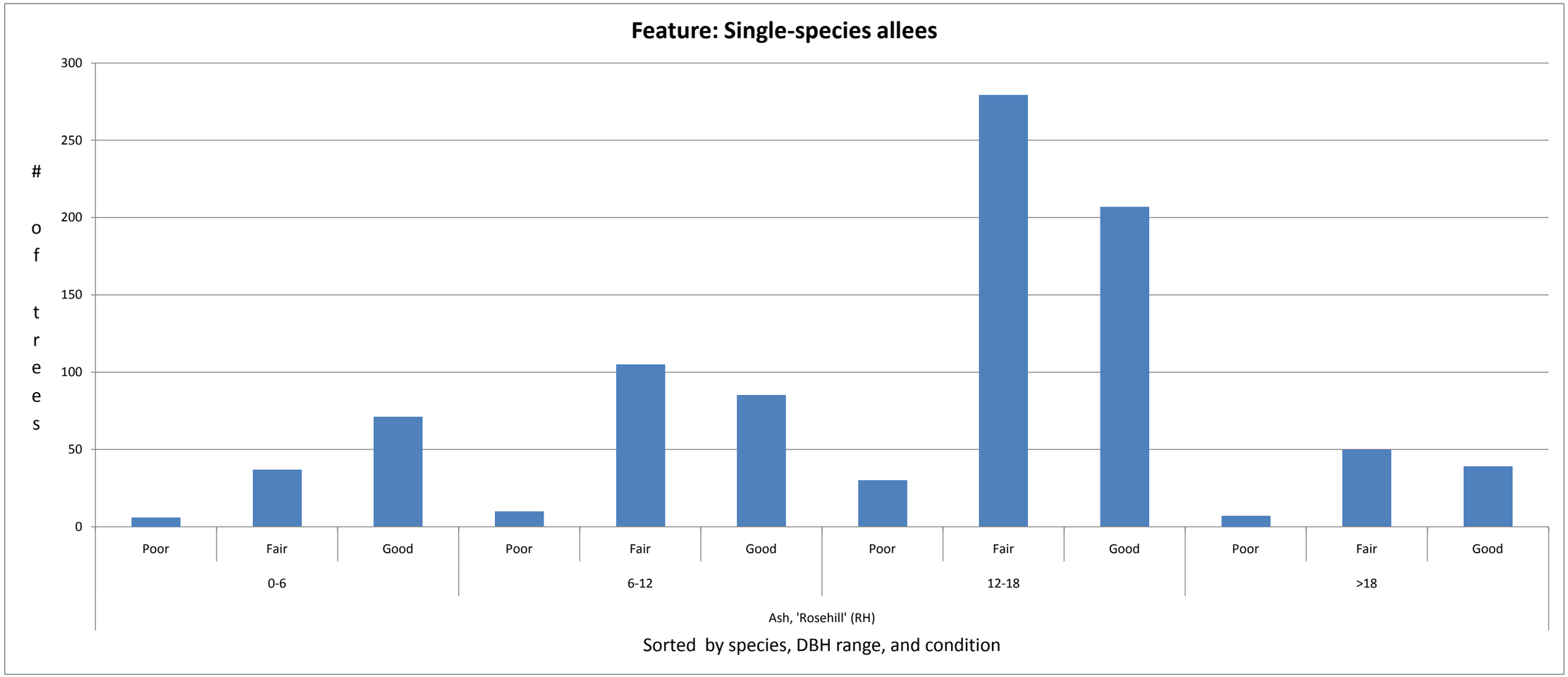

Feature: North Pond Area Plantings
of trees
14
12
10
8
6
4
2
0
Good 0-6 Birch, River (BN)
Good 6-12 Birch, River (BN)
Fair 0-6 Birch, River 'Heritage' (HB)
Good 0-6 Birch, River 'Heritage' (HB)
Good 0-6 Coffeetree, Kentucky (KC)
Good 6-12 Coffeetree, Kentucky (KC)
Good 12-18 Coffeetree, Kentucky (KC)
Fair 0-6 Corktree, Amur (AC)
Good 0-6 Corktree, Amur (AC)
0 Crabapple, Radiant (RC)
Fair 0-6 Crabapple, Radiant (RC)
Good 0-6 Crabapple, Radiant (RC)
Poor 6-12 Crabapple, Radiant (RC)
Fair 6-12 Crabapple, Radiant (RC)
Good 6-12 Crabapple, Radiant (RC)
Poor 0-6 Crabapple, Robinson (CR)
Fair 0-6 Crabapple, Robinson (CR)
Good 0-6 Crabapple, Robinson (CR)
Poor 6-12 Crabapple, Robinson (CR)
0 Crabapple, Snowdrift (SD)
Fair 0-6 Crabapple, Snowdrift (SD)
Fair 6-12 Crabapple, Snowdrift (SD)
Good 6-12 Crabapple, Snowdrift (SD)
Fair 12-18 Crabapple, Snowdrift (SD)
Sorted by species, DBH range, and condition

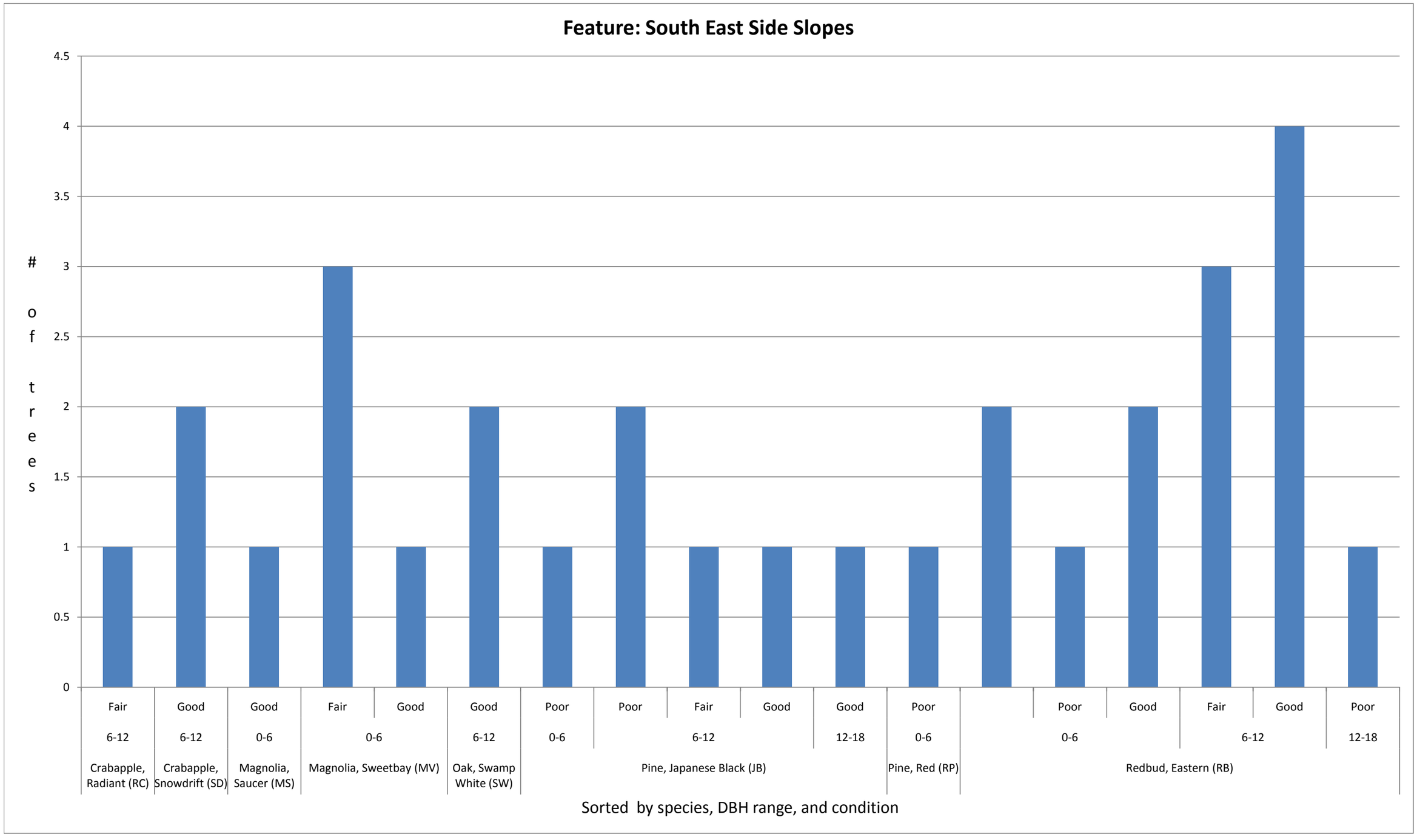

Feature: North Pond Area Plantings
of trees
0
2
4
6
8
10
12
14
Good
6-12
Dogwood, Flowering (FD)
Fair
Good
0-6
Dogwood, Pagoda (PD)
Fair
Good
0-6
Hackberry, Sugar (SH)
0
Fair
Good
0-6
Hawthorn, Washington (WH)
Poor
Fair
Good
0-6
Honeylocust (HL)
Poor
6-12
Poor
12-18
Fair
12-18
0-6
Poor
Fair
12-18
Honeylocust, Shademaster (HL)
Poor
>18
Fair
>18
0
0-6
Poor
Fair
6-12
Good
Fair
12-18
Good
Good
>18
Linden, Greenspire (GL)
Poor
Fair
0-6
Good
Magnolia, Saucer (MS)
Sorted by species, DBH range, and condition

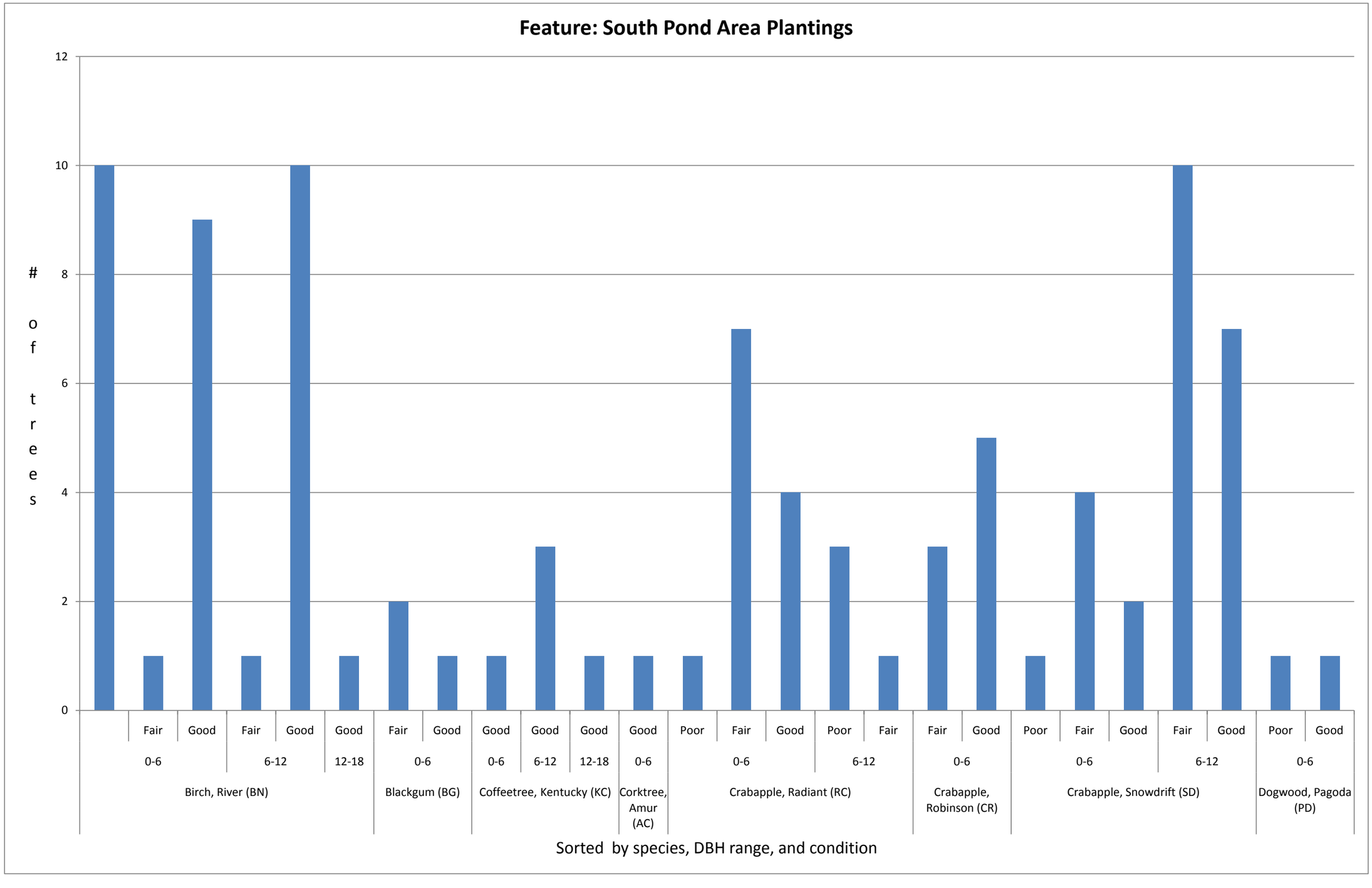

Feature: North Pond Area Plantings
of trees
25
20
15
10
5
0
Fair
Good
Fair
Good
Fair
Poor
Fair
Good
Poor
Fair
Good
Good
Good
Fair
Good
Fair
Good
Good
Good
Poor
Poor
Fair
0
6-12
12-18
0-6
6-12
12-18
>18
0-6
6-12
12-18
6-12
12-18
6-12
12-18
Maple, Red (RM)
Maple, Sugar (SM)
Oak, Bur (BO)
Oak, Red (RO)
Oak, Swamp White (SW)
Pagodatree, Japanese (JP)
Sorted by species, DBH range, and condition

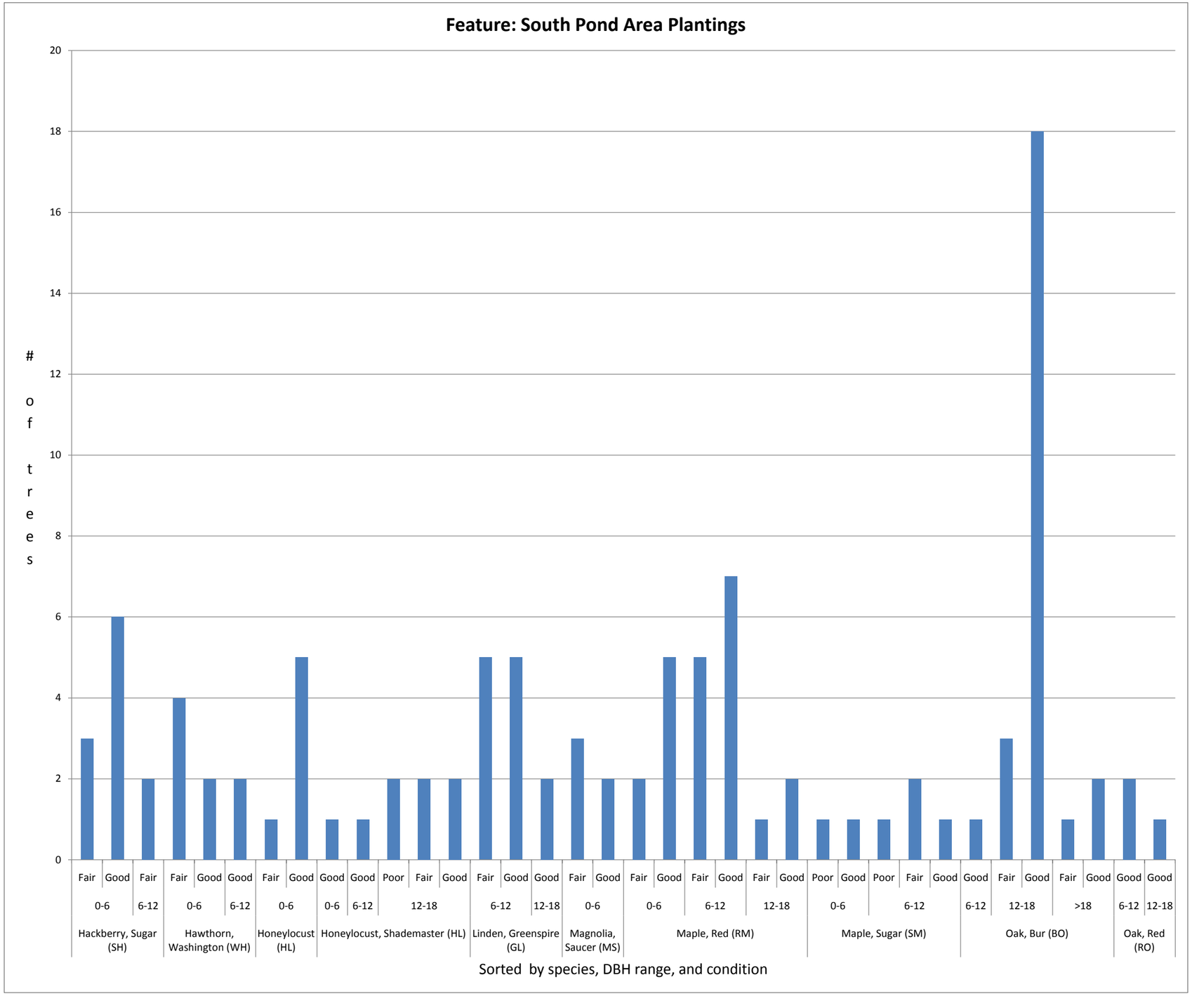

Feature: North Pond Area Plantings
of trees
12
10
8
6
4
2
0
Fair
Poor
Poor
Fair
Good
Poor
Fair
Good
Fair
Fair
Good
0-6
12-18
>18
0-6
6-12
0-6
6-12
Pear, Bradford (BP)
Redbud, Eastern (RB)
Serviceberry, Downy
Zelkova (ZS)
Sorted by species, DBH range, and condition

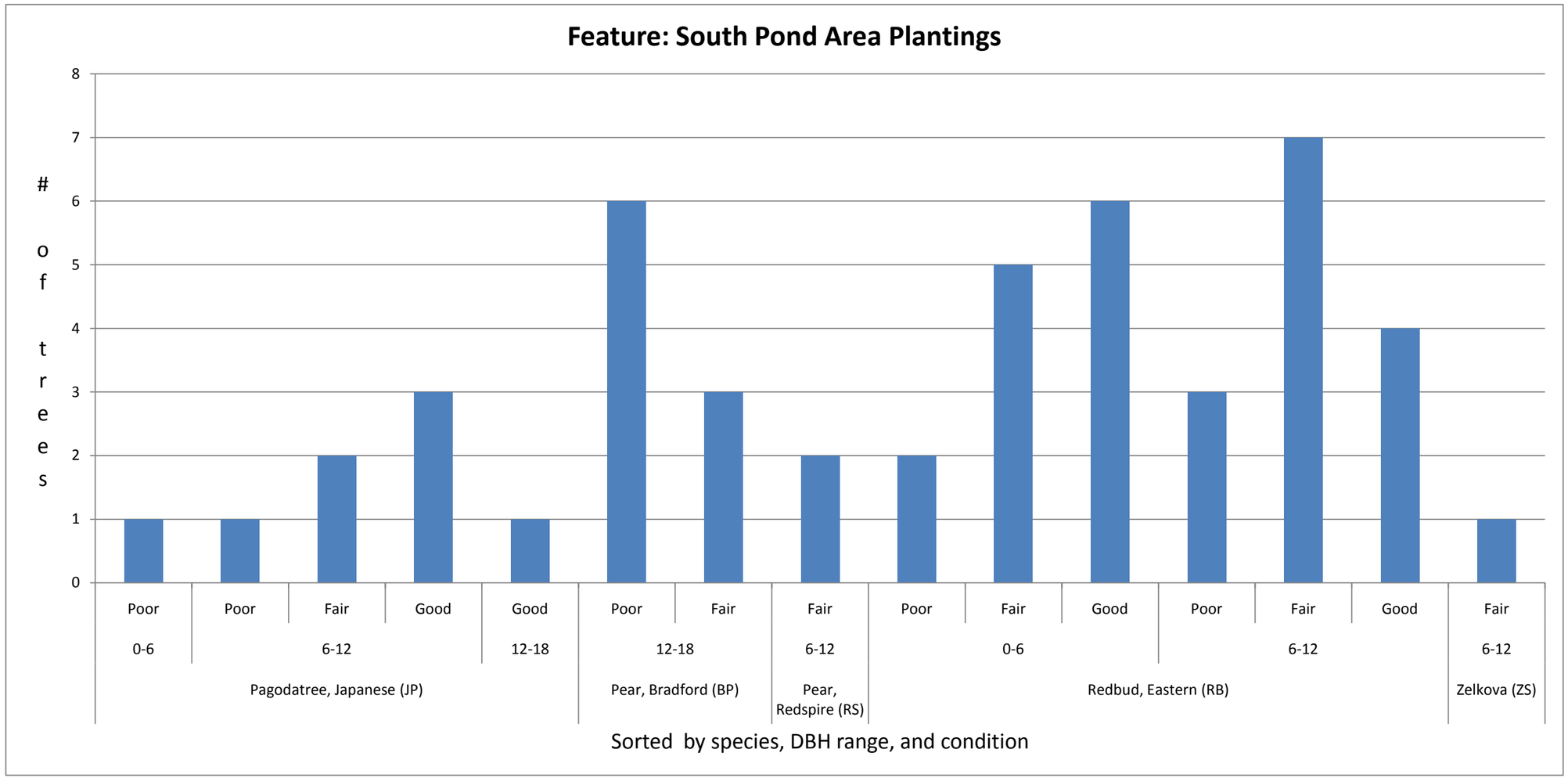

Feature: North Pond Baldcypress Circle
of trees
40
35
30
25
20
15
10
5
0
Good
0-6
Good
6-12
Fair
Good
12-18
Poor
Fair
Good
>18
Very Good
Baldcypress (BC)
Sorted by species, DBH range, and condition

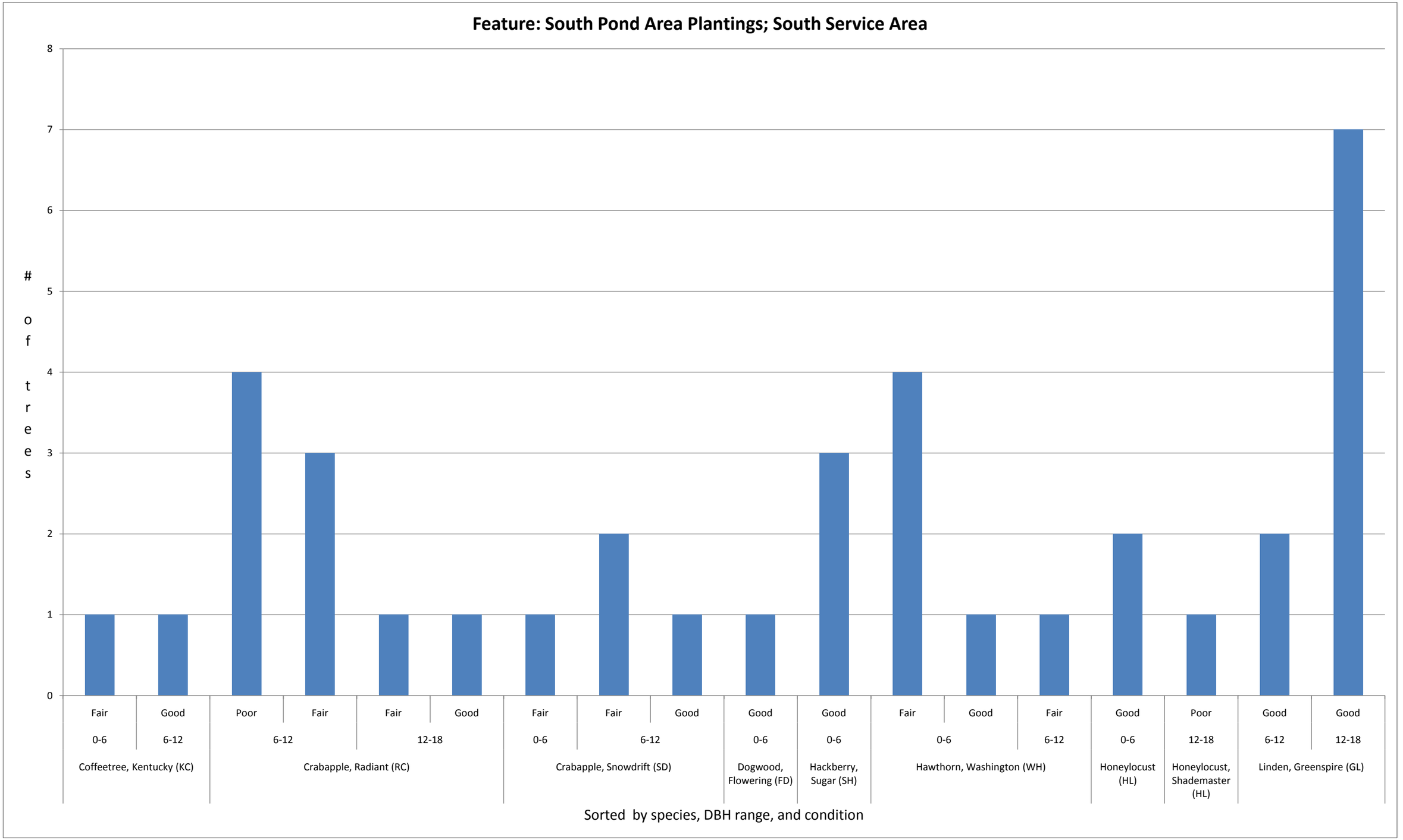

Feature: Single-species allees
of trees
300
250
200
150
100
50
0
Poor
Fair
Good
0-6
6-12
12-18
>18
Ash, 'Rosehill' (RH)
Sorted by species, DBH range, and condition

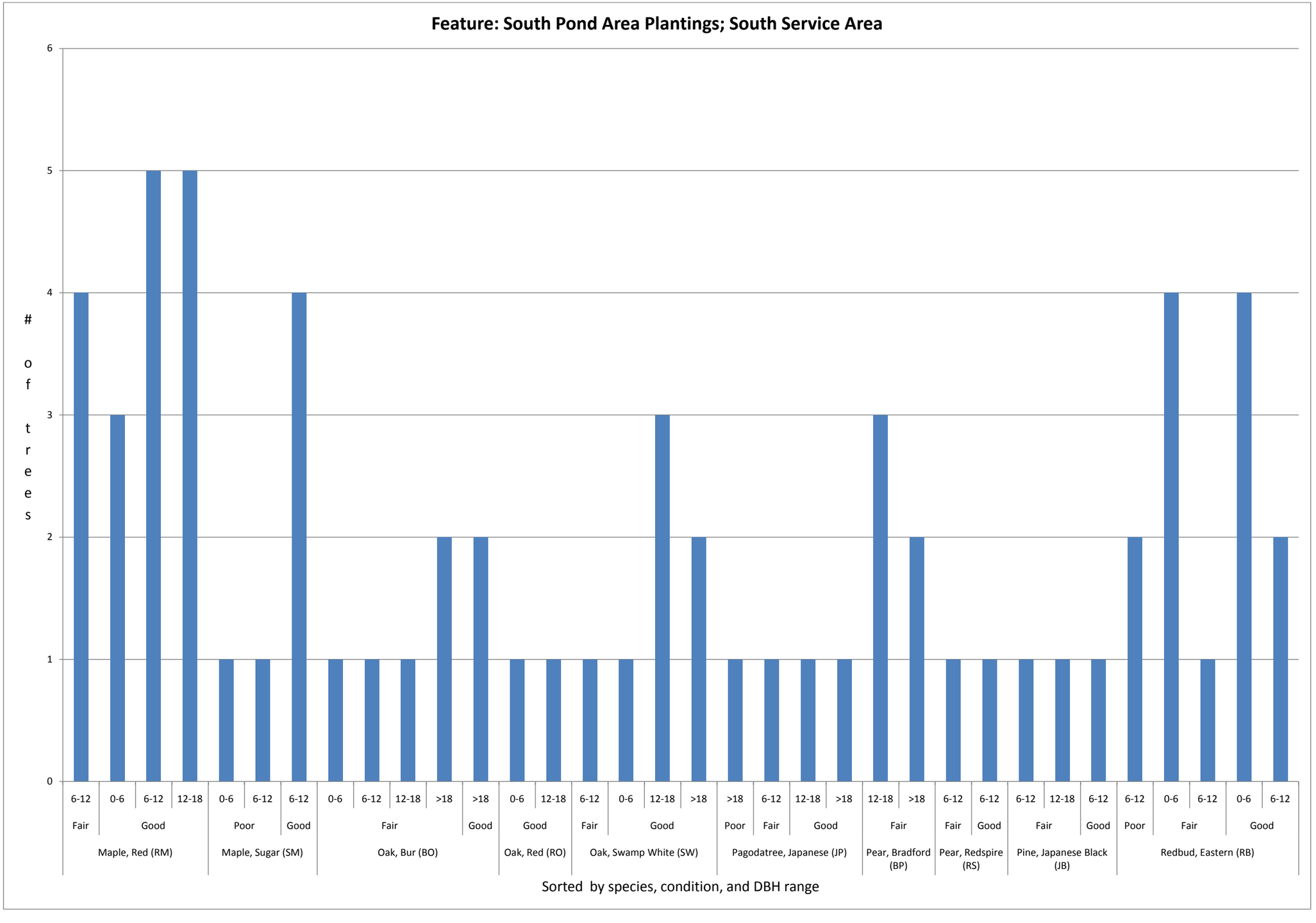

Feature: South East Side Slopes
of trees
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Fair 6-12 Crabapple, Radiant (RC)
Good 6-12 Crabapple, Snowdrift (SD)
Good 0-6 Magnolia, Saucer (MS)
Fair 0-6 Magnolia, Sweetbay (MV)
Good 0-6 Magnolia, Sweetbay (MV)
Good 6-12 Oak, Swamp White (SW)
Poor 0-6 Pine, Japanese Black (JB)
Poor 6-12 Pine, Japanese Black (JB)
Fair 6-12 Pine, Japanese Black (JB)
Good 6-12 Pine, Japanese Black (JB)
Good 12-18 Pine, Japanese Black (JB)
Poor 0-6 Pine, Red (RP)
Poor 0-6 Redbud, Eastern (RB)
Good 0-6 Redbud, Eastern (RB)
Fair 6-12 Redbud, Eastern (RB)
Good 6-12 Redbud, Eastern (RB)
Poor 12-18 Redbud, Eastern (RB)
Sorted by species, DBH range, and condition

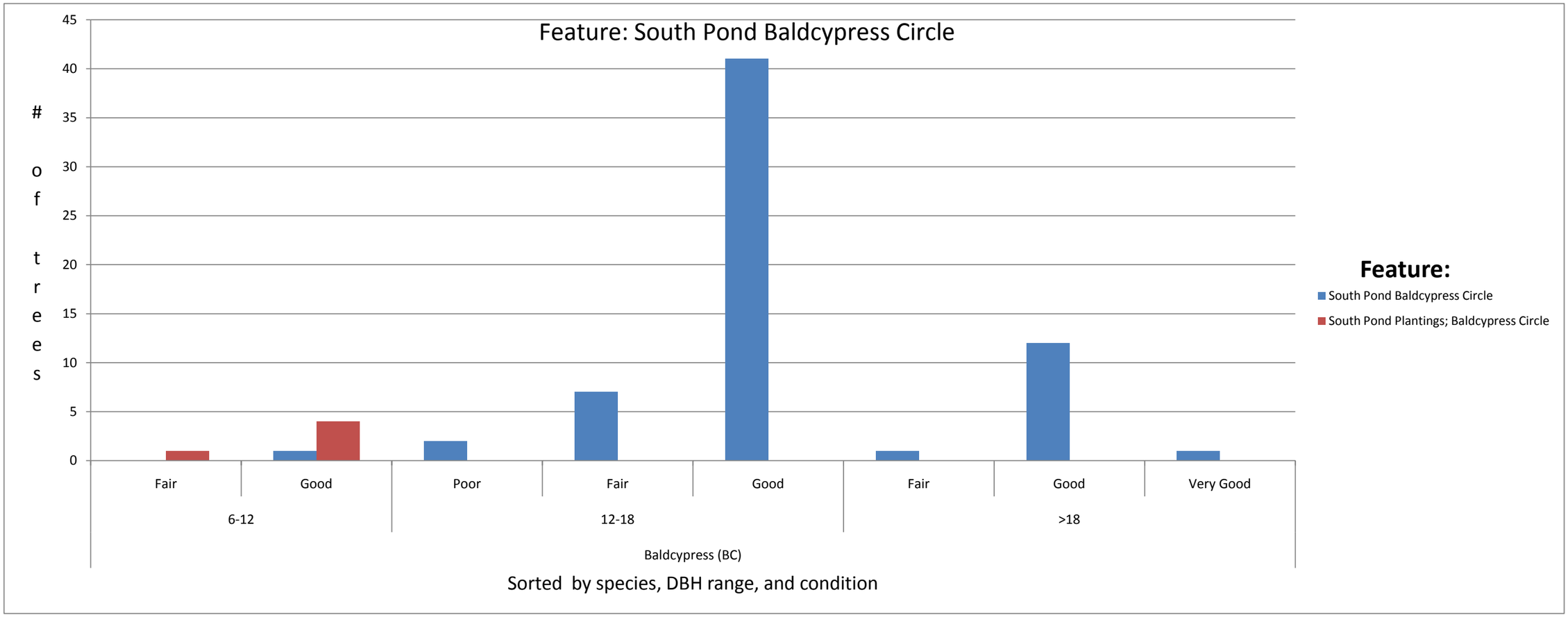

Feature: South Pond Area Plantings
of trees
12
10
8
6
4
2
0
Fair Good Fair Good Good Fair Good Good Good Good Good Poor Fair Good Poor Fair Fair Good Poor Fair Good Fair Good Poor Good
0-6 6-12 12-18 0-6 0-6 6-12 12-18 0-6 0-6 6-12 0-6 0-6 0-6 6-12
Birch, River (BN)
Blackgum (BG)
Coffeetree, Kentucky (KC)
Corktree, Amur (AC)
Crabapple, Radiant (RC)
Crabapple, Robinson (CR)
Crabapple, Snowdrift (SD)
Dogwood, Pagoda (PD)
Sorted by species, DBH range, and condition

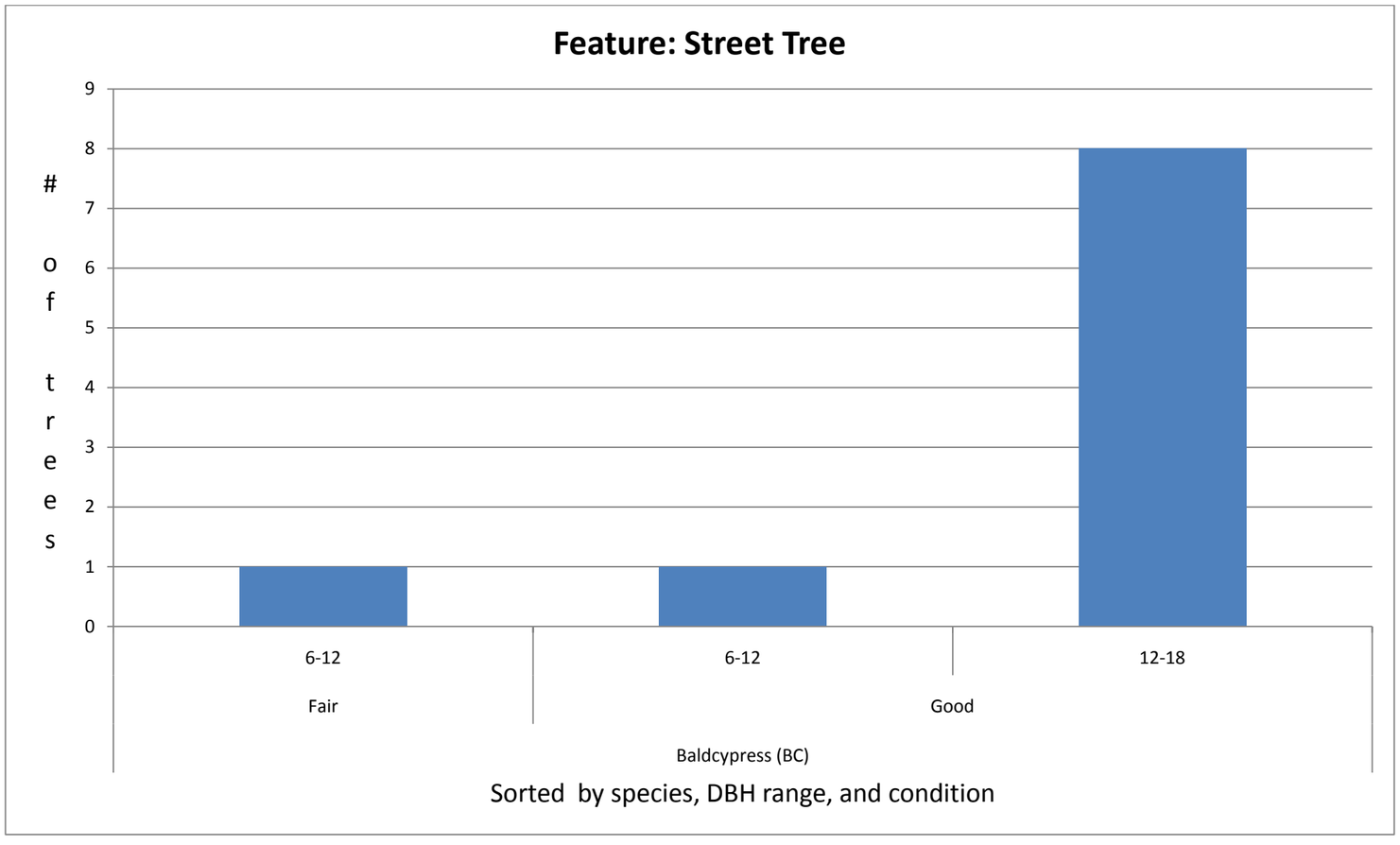

Feature: South Pond Area Plantings
of trees
20
18
16
14
12
10
8
6
4
2
0
Fair Good Fair Fair Good Good Fair Good Good Good Poor Fair Good Fair Good Good Fair Good Fair Good Fair Good Poor Good Poor Fair Good Good Fair Good Fair Good Good Good
0-6 6-12 0-6 6-12 0-6 0-6 6-12 12-18 6-12 12-18 0-6 0-6 6-12 12-18 0-6 6-12 6-12 12-18 >18 6-12 12-18
Hackberry, Sugar (SH)
Hawthorn, Washington (WH)
Honeylocust (HL)
Honeylocust, Shademaster (HL)
Linden, Greenspire (GL)
Magnolia, Saucer (MS)
Maple, Red (RM)
Maple, Sugar (SM)
Oak, Bur (BO)
Oak, Red (RO)
Sorted by species, DBH range, and condition

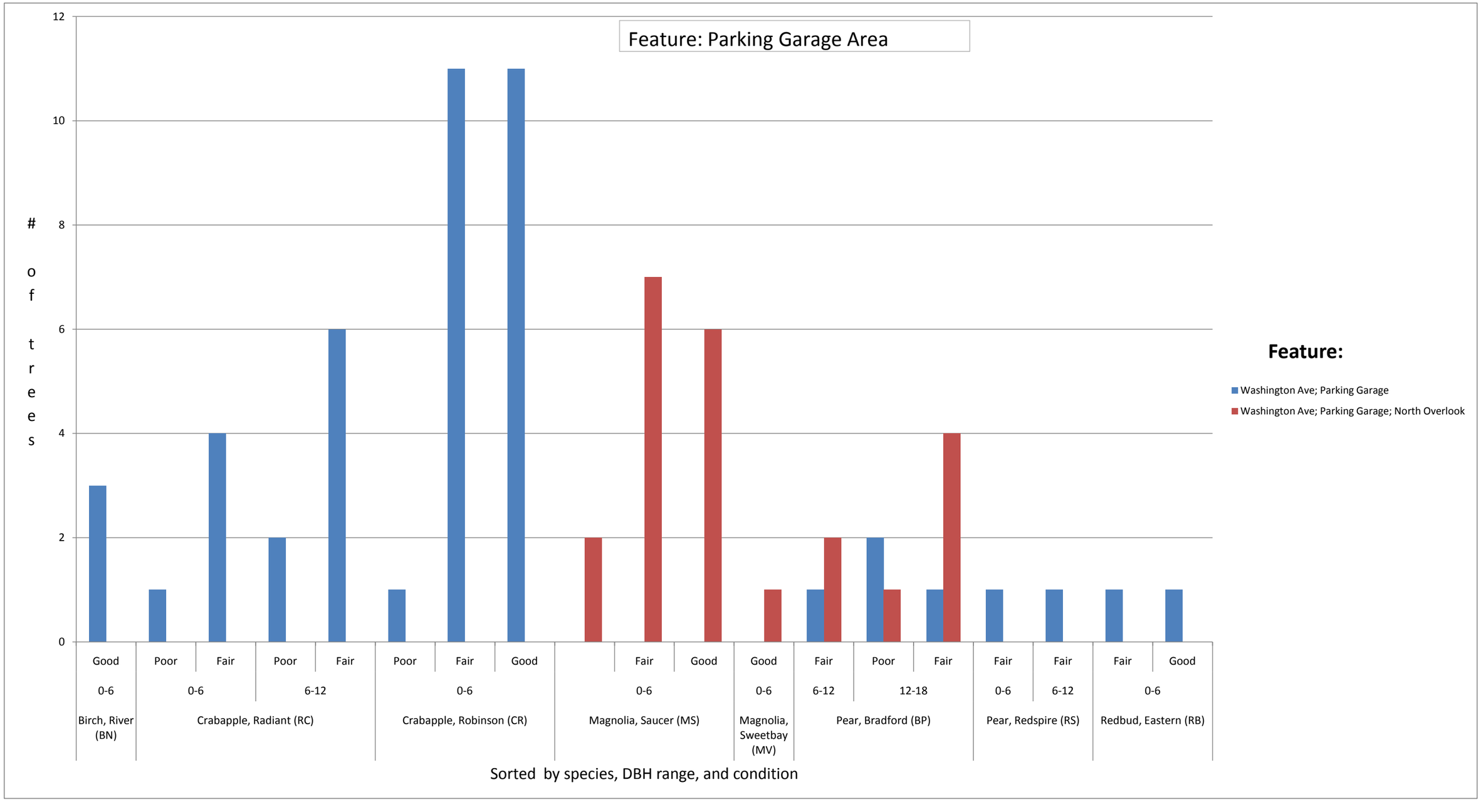

Feature: South Pond Area Plantings
of trees
8
7
6
5
4
3
2
1
0
Poor
0-6
Poor
6-12
Fair
6-12
Good
6-12
Good
12-18
Poor
12-18
Fair
12-18
Fair
6-12
Poor
6-12
Fair
0-6
Good
0-6
Poor
6-12
Fair
6-12
Good
6-12
Fair
6-12
Pagodatree, Japanese (JP)
Pear, Bradford (BP)
Pear, Redspire (RS)
Redbud, Eastern (RB)
Zelkova (ZS)
Sorted by species, DBH range, and condition


Feature: South Pond Area Plantings; South Service Area
of trees
8
7
6
5
4
3
2
1
0
Fair
Good
Poor
Fair
Fair
Good
Fair
Fair
Good
Good
Good
Fair
Good
Fair
Good
Poor
Good
Good
0-6
6-12
6-12
12-18
0-6
6-12
0-6
0-6
0-6
6-12
0-6
12-18
6-12
12-18
Coffeetree, Kentucky (KC)
Crabapple, Radiant (RC)
Crabapple, Snowdrift (SD)
Dogwood, Flowering (FD)
Hackberry, Sugar (SH)
Hawthorn, Washington (WH)
Honeylocust (HL)
Honeylocust, Shademaster (HL)
Linden, Greenspire (GL)
Sorted by species, DBH range, and condition

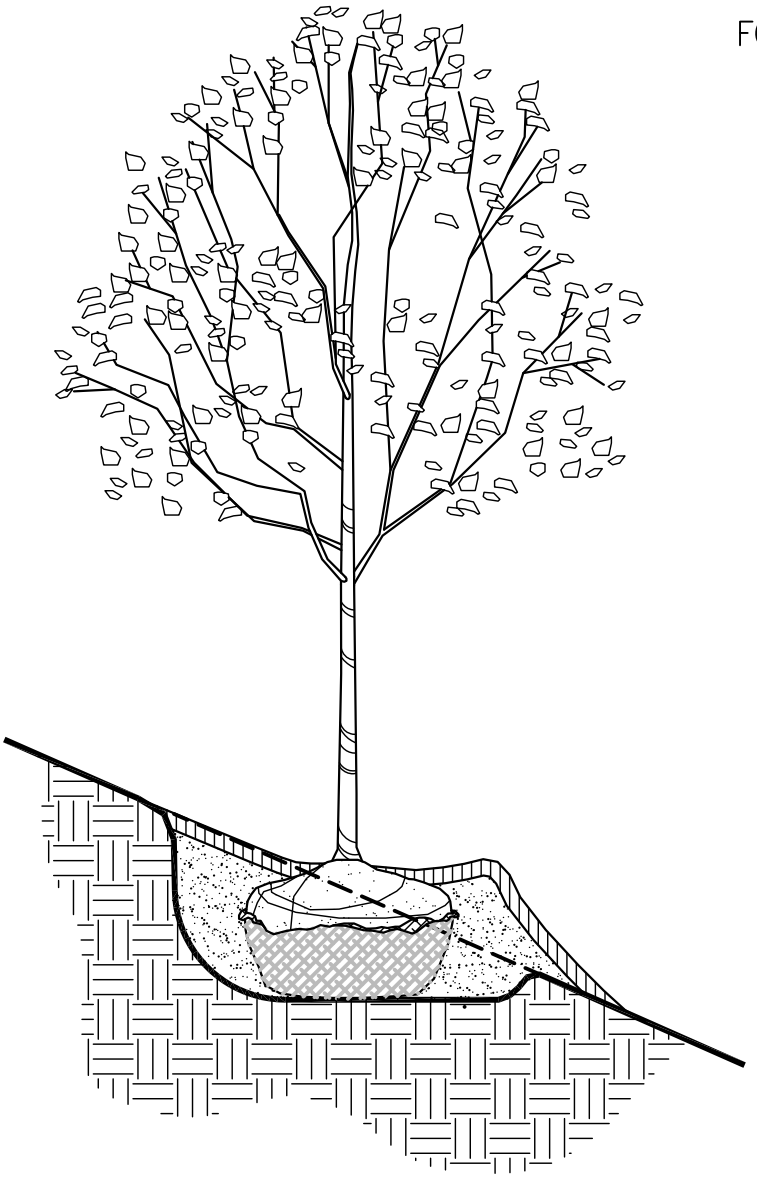

Feature: South Pond Area Plantings; South Service Area
of trees
6
5
4
3
2
1
0
6-12 Fair
0-6 Good
6-12 Good
12-18 Good
0-6 Poor
6-12 Poor
6-12 Good
0-6 Fair
6-12 Fair
12-18 Fair
>18 Fair
>18 Good
0-6 Good
12-18 Good
6-12 Fair
0-6 Good
12-18 Good
>18 Good
>18 Poor
6-12 Fair
12-18 Good
>18 Good
12-18 Fair
>18 Fair
6-12 Fair
6-12 Good
6-12 Fair
12-18 Fair
6-12 Good
6-12 Poor
0-6 Fair
6-12 Fair
0-6 Good
6-12 Good
Maple, Red (RM)
Maple, Sugar (SM)
Oak, Bur (BO)
Oak, Red (RO)
Oak, Swamp White (SW)
Pagodatree, Japanese (JP)
Pear, Bradford (BP)
Pear, Redspire (RS)
Pine, Japanese Black (JB)
Redbud, Eastern (RB)
Sorted by species, condition, and DBH range


Feature: South Pond Baldcypress Circle
of trees
45
40
35
30
25
20
15
10
5
0
Fair
Good
Poor
Fair
Good
Fair
Good
Very Good
6-12
12-18
>18
Baldcypress (BC)
Sorted by species, DBH range, and condition
Feature:
South Pond Baldcypress Circle
South Pond Plantings; Baldcypress Circle

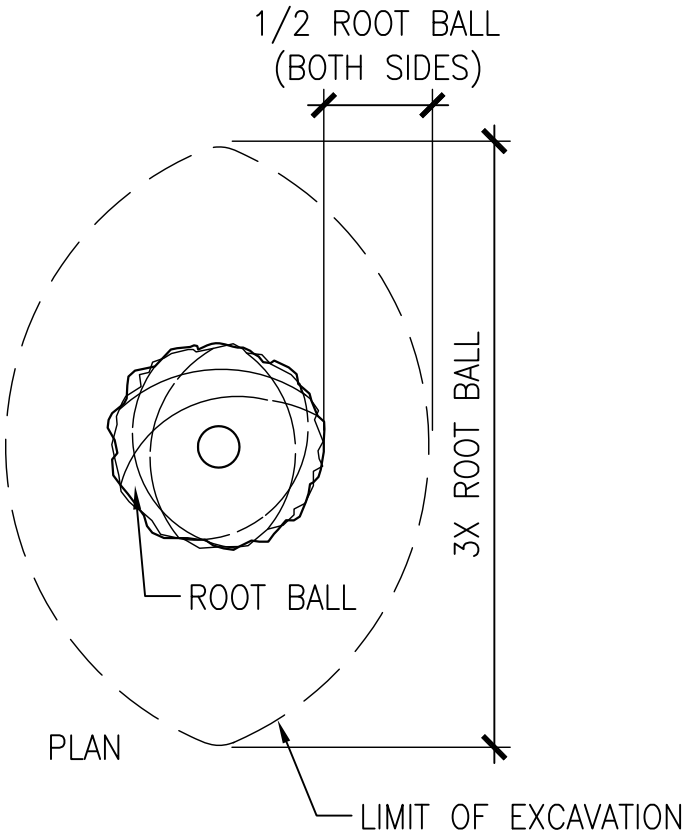

Feature: Street Tree
of trees
9
8
7
6
5
4
3
2
1
0
6-12
Fair
6-12
Good
12-18
Baldcypress (BC)
Sorted by species, DBH range, and condition


Feature: Parking Garage Area
of trees
12
10
8
6
4
2
0
Good
Poor
Fair
Poor
Fair
Poor
Fair
Good
Fair
Good
Good
Fair
Poor
Fair
Fair
Fair
Fair
Good
0-6
0-6
6-12
0-6
0-6
0-6
6-12
12-18
0-6
6-12
0-6
Birch, River (BN)
Crabapple, Radiant (RC)
Crabapple, Robinson (CR)
Magnolia, Saucer (MS)
Magnolia, Sweetbay (MV)
Pear, Bradford (BP)
Pear, Redspire (RS)
Redbud, Eastern (RB)
Sorted by species, DBH range, and condition
Feature:
Washington Ave; Parking Garage
Washington Ave; Parking Garage; North Overlook

TREE PLANTING DETAILS



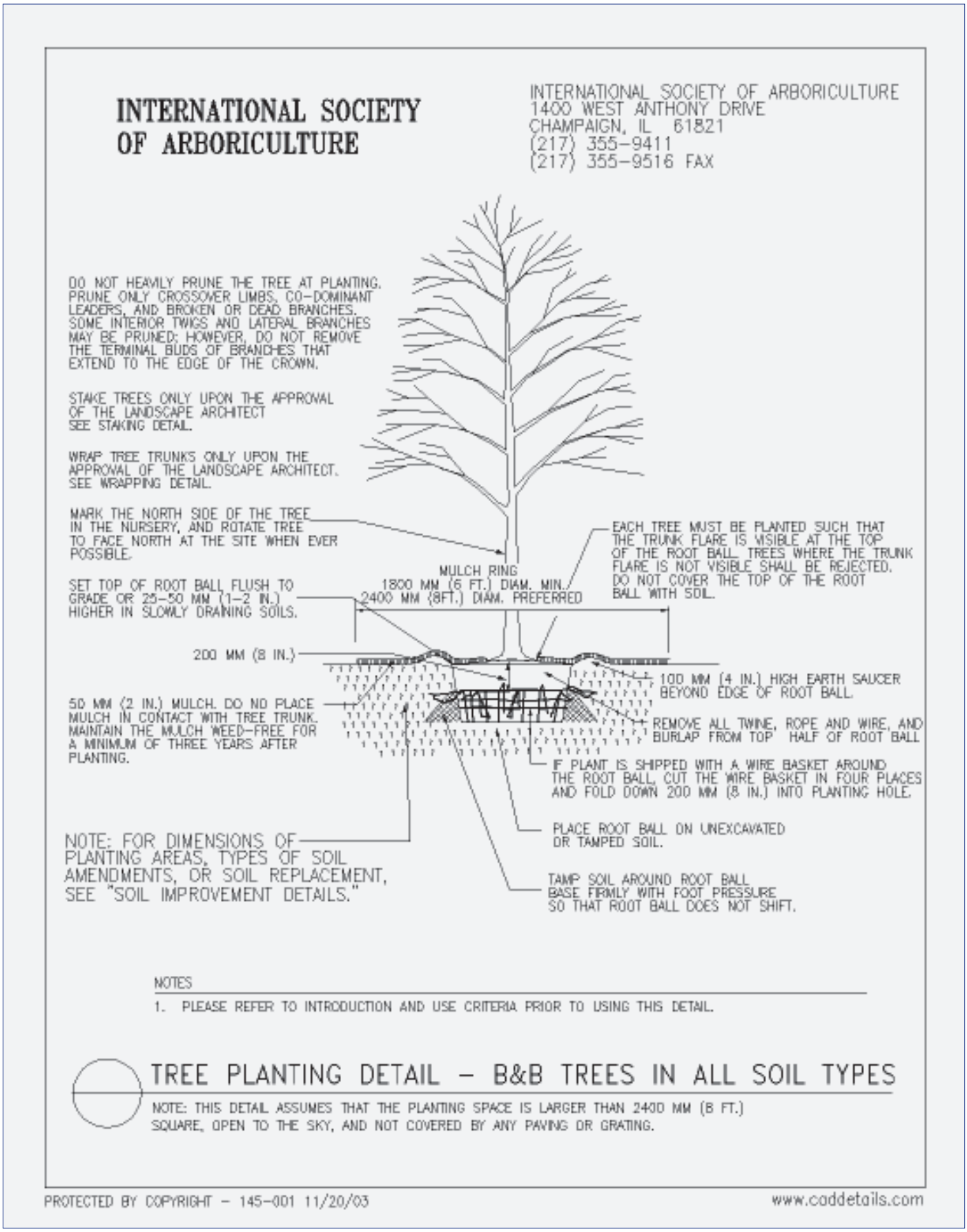
FOR SLOPES 5:1 OR GREATER



TREE PLANTING DETAIL - ON SLOPE

SCALE: N.T.S.

0-0G-Tree-Slope.dwg


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1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX
DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED; HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
STAKE TREES ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT SEE STAKING DETAIL.
WRAP TREE TRUNKS ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT. SEE WRAPPING DETAIL.
MARK THE NORTH SIDE OF THE TREE IN THE NURSERY, AND ROTATE TREE TO FACE NORTH AT THE SITE WHEN EVER POSSIBLE.
SET TOP OF ROOT BALL FLUSH TO GRADE OR 25-50 MM (1-2 IN.) HIGHER IN SLOWLY DRAINING SOILS.
200 MM (8 IN.)
50 MM (2 IN.) MULCH. DO NO PLACE MULCH IN CONTACT WITH TREE TRUNK. MAINTAIN THE MULCH WEED-FREE FOR A MINIMUM OF THREE YEARS AFTER PLANTING.
NOTE: FOR DIMENSIONS OF PLANTING AREAS, TYPES OF SOIL AMENDMENTS, OR SOIL REPLACEMENT, SEE "SOIL IMPROVEMENT DETAILS."
MULCH RING
1800 MM (6 FT.) DIAM. MIN.
2400 MM (8FT.) DIAM. PREFERRED
EACH TREE MUST BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. TREES WHERE THE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.
100 MM (4 IN.) HIGH EARTH SAUCER BEYOND EDGE OF ROOT BALL.
REMOVE ALL TWINE, ROPE AND WIRE, AND BURLAP FROM TOP HALF OF ROOT BALL
IF PLANT IS SHIPPED WITH A WIRE BASKET AROUND THE ROOT BALL, CUT THE WIRE BASKET IN FOUR PLACES AND FOLD DOWN 200 MM (8 IN.) INTO PLANTING HOLE.
PLACE ROOT BALL ON UNEXCAVATED OR TAMPED SOIL.
TAMP SOIL AROUND ROOT BALL BASE FIRMLY WITH FOOT PRESSURE SO THAT ROOT BALL DOES NOT SHIFT.
NOTES
1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.
TREE PLANTING DETAIL - B&B TREES IN ALL SOIL TYPES
NOTE: THIS DETAIL ASSUMES THAT THE PLANTING SPACE IS LARGER THAN 2400 MM (8 FT.) SQUARE, OPEN TO THE SKY, AND NOT COVERED BY ANY PAVING OR GRATING.
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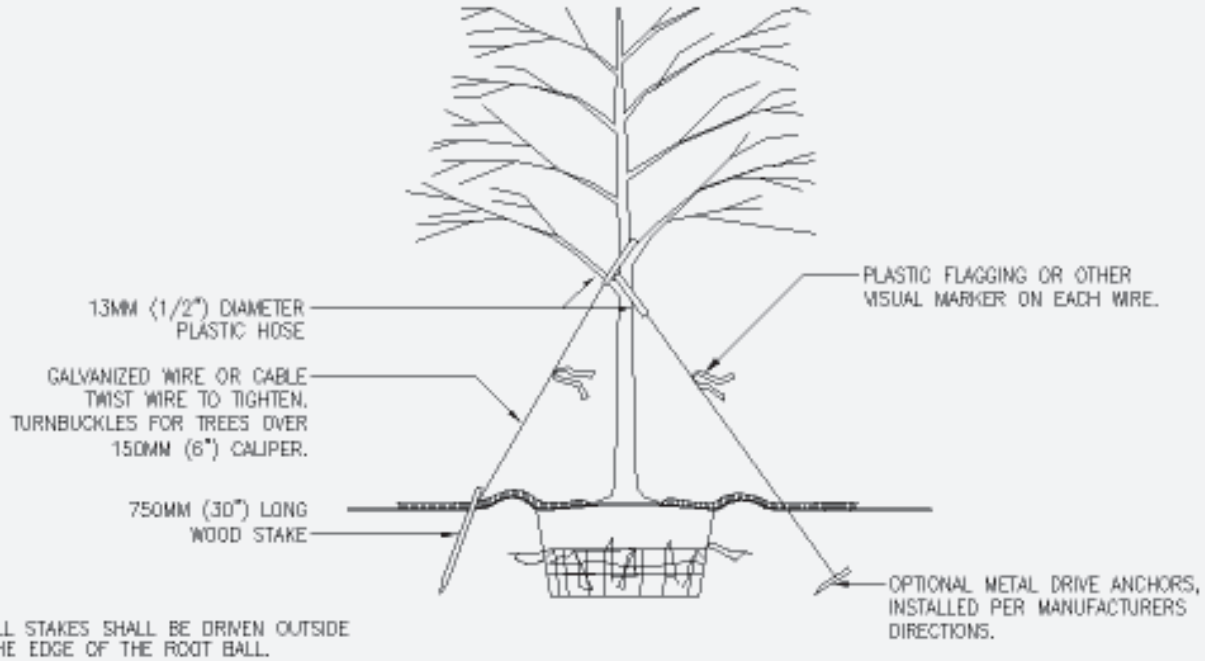
INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX

WIRE OR CABLE SIZES SHALL BE AS FOLLOWS:
TREES UP TO 65 MM (2.5 IN.) CALIPER – 14 GAUGE
TREES 65 MM (2.5 IN.) TO 75 MM (3 IN.) CALIPER – 12 GAUGE

TIGHTEN WIRE OR CABLE ONLY ENOUGH TO KEEP FROM SLIPPING. ALLOW FOR SOME TRUNK MOVEMENT. PLASTIC HOSE SHALL BE LONG ENOUGH TO ACCOMMODATE 35MM (1.5 IN.) OF GROWTH AND BUFFER ALL BRANCHES FROM THE WIRE.

TUCK ANY LOOSE ENDS OF THE WIRE OR CABLE INTO THE WIRE WRAP SO THAT NO SHARP WIRE ENDS ARE EXPOSED.

INSTALL THREE GUY WIRES PER TREE, SPACED EVENLY AROUND THE TRUNK.



ALL STAKES SHALL BE DRIVEN OUTSIDE THE EDGE OF THE ROOT BALL.

ASSURE THAT THE BEARING SURFACE OF THE PROTECTIVE COVERING OF THE WIRE OR CABLE AGAINST THE TREE TRUNK IS A MINIMUM OF 12 MM (0.5 IN.).

REMOVE ALL STAKING AS SOON AS THE TREE HAS GROWN SUFFICIENT ROOTS TO OVERCOME THE PROBLEM THAT REQUIRED THE TREE TO BE STAKED. STAKES SHALL BE REMOVED NO LATER THE END OF THE FIRST GROWING SEASON AFTER PLANTING.

TREES NORMALLY DO NOT NEED TO BE STAKED AND STAKING CAN BE HARMFUL TO THE TREE. STAKING SHOULD BE DONE ONLY WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT IF IT IS EXPECTED THAT THE TREE WILL NOT BE ABLE TO SUPPORT ITSELF. THE FOLLOWING ARE REASONS WHY TREES DO NOT REMAIN STRAIGHT.

- TREES WITH POOR-QUALITY ROOT BALLS OR ROOT BALLS THAT HAVE BEEN CRACKED OR DAMAGED. REJECT RATHER THAN STAKE.
- TREES THAT HAVE GROWN TOO CLOSE TOGETHER IN THE NURSERY, RESULTING IN WEAK TRUNKS. REJECT RATHER THAN STAKE.
- PLANTING PROCEDURES THAT DO NOT ADEQUATELY TAMP SOILS AROUND THE ROOT BALL. CORRECT THE PLANTING PROCEDURE.
- ROOT BALLS PLACED ON SOFT SOIL. TAMP SOILS UNDER ROOT BALL PRIOR TO PLANTING.
- ROOT BALLS WITH VERY SANDY SOIL OR VERY WET CLAY SOIL. STAKING ADVISABLE.
- TREES LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. STAKING ADVISABLE.

NOTES:

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.

TREE STAKING DETAIL – TREES 75MM (3 IN.) CALIPER OR LARGER

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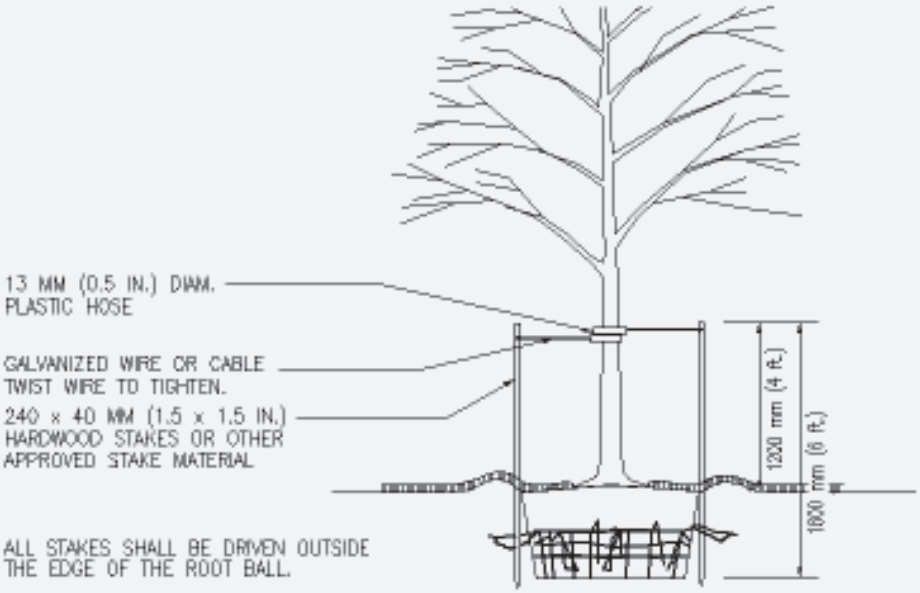
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INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX

WIRE OR CABLE SIZES SHALL BE AS FOLLOWS:
TREES UP TO 65 MM (2.5 IN.) CALIPER – 14 GAUGE
TREES 65 MM (2.5 IN.) TO 75 MM (3 IN.) CALIPER – 12 GAUGE

TIGHTEN WIRE OR CABLE ONLY ENOUGH TO KEEP FROM SLIPPING. ALLOW FOR SOME TRUNK MOVEMENT. PLASTIC HOSE SHALL BE LONG ENOUGH TO ACCOMMODATE 35MM (1.5 IN.) OF GROWTH AND BUFFER ALL BRANCHES FROM THE WIRE.

TUCK ANY LOOSE ENDS OF THE WIRE OR CABLE INTO THE WIRE WRAP SO THAT NO SHARP WIRE ENDS ARE EXPOSED.



ASSURE THAT THE BEARING SURFACE OF THE PROTECTIVE COVERING OF THE WIRE OR CABLE AGAINST THE TREE TRUNK IS A MINIMUM OF 12 MM (0.5 IN.).

REMOVE ALL STAKING AS SOON AS THE TREE HAS GROWN SUFFICIENT ROOTS TO OVERCOME THE PROBLEM THAT REQUIRED THE TREE TO BE STAKED. STAKES SHALL BE REMOVED NO LATER THE END OF THE FIRST GROWING SEASON AFTER PLANTING.

TREES NORMALLY DO NOT NEED TO BE STAKED AND STAKING CAN BE HARMFUL TO THE TREE. STAKING SHOULD BE DONE ONLY WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT IF IT IS EXPECTED THAT THE TREE WILL NOT BE ABLE TO SUPPORT ITSELF. THE FOLLOWING ARE REASONS WHY TREES DO NOT REMAIN STRAIGHT.

- TREES WITH POOR – QUALITY ROOT BALLS OR ROOT BALLS THAT HAVE BEEN CRACKED OR DAMAGED. REJECT RATHER THAN STAKE.
- TREES THAT HAVE GROWN TOO CLOSE TOGETHER IN THE NURSERY, RESULTING IN WEAK TRUNKS. REJECT RATHER THAN STAKE.
- PLANTING PROCEDURES THAT DO NOT ADEQUATELY TAMP SOILS AROUND THE ROOT BALL. CORRECT THE PLANTING PROCEDURE.
- ROOT BALLS PLACED ON SOFT SOIL. TAMP SOILS UNDER ROOT BALL PRIOR TO PLANTING.
- ROOT BALLS WITH VERY SANDY SOIL OR VERY WET CLAY SOIL. STAKING ADVISABLE.
- TREES LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. STAKING ADVISABLE.

NOTES

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.

TREE STAKING DETAIL – TREES 75MM (3 IN.) CALIPER OR LESS

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MULCH RECOMMENDATIONS AND INFORMATION