

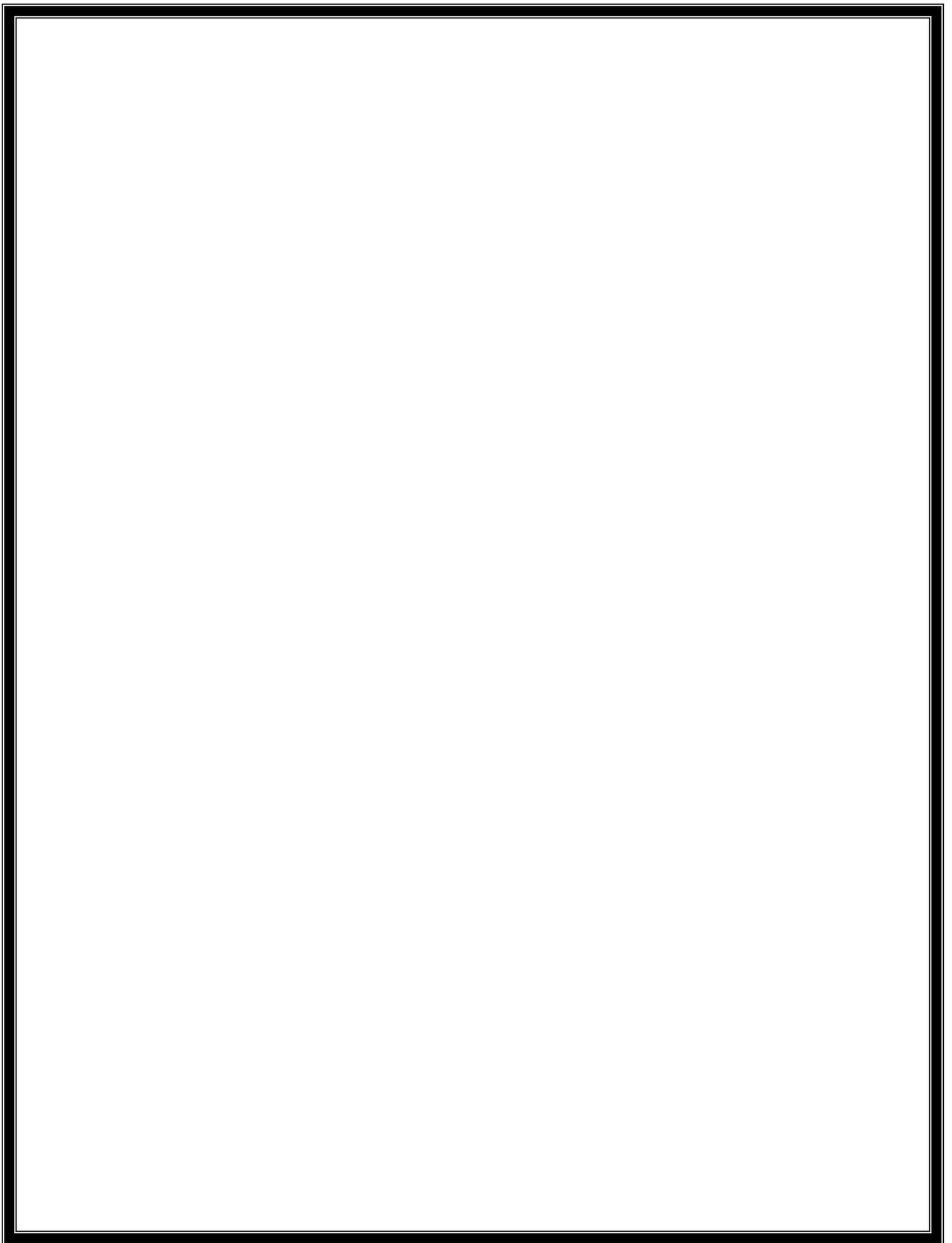


CITY OF WOODINVILLE

TREE BOARD PACKET

September 14, 2011

*CITY HALL COUNCIL CHAMBERS
17301 133RD AVENUE NE
WOODINVILLE, WASHINGTON 98072*





CITY OF WOODINVILLE
17301 133rd Avenue NE
WOODINVILLE, WA 98072
(425) 489-2700 FAX (425) 489-2705

NOTICE OF TREE BOARD MEETING
CANCELLATION

PURPOSE: The Woodinville Tree Board has cancelled its meeting of
Wednesday, September 14, 2011, 4:30 p.m.

The next scheduled regular meeting is Wednesday, January
18, 2012

LOCATION: Woodinville City Hall
Council Chambers
17301 133rd Avenue NE
Woodinville, WA 98072

DATED this 14th Day of September, 2011.

Hal H. Hart
Development Services Director

Faxed to: News Media
Emailed to: 1) City Staff, 2) Tree Board
Post: 1) In-house, 2) Post Office, & 3) Website



CITY OF WOODINVILLE
TREE BOARD AGENDA
REGULAR MEETING WEDNESDAY, SEPTEMBER 14, 2011 4:30 PM



• Johan Luchsinger, Chair • Olga Bonilla • Jey Manickam

-
- 4:30 1. **CALL TO ORDER**
- 4:32 2. **APPROVE AGENDA IN CONTENT & ORDER (INTRODUCTIONS)**
- 4:35 3. **PUBLIC COMMENTS/GUEST SPEAKER** HJK
4. **PUBLIC HEARING - None**
- 4:40 5. **PLANNING DIRECTORS REPORT**
a. Update of City Council September 13, 2011, meeting/discussion regarding Tree Board Membership (Ordinance 529)
6. **APPROVAL OF MINUTES - None**
- 4:55 7. **NEW BUSINESS**
a. Growth Management Update & Timeline
- 5:10 8. **UNFINISHED BUSINESS - None**
a) Study Session: Tree Board Work Program – Review, discussion & prioritization
b) Study Session: Urban Forestry Plan Update
- 5:50 9. **TREE BOARD SCHEDULE**
- 5:55 10. **PUBLIC COMMENTS**
- 6:00 11. **ADJOURNMENT**

(Note: The agenda may be rearranged or changed at the beginning of the meeting, with a consensus of Tree Board members present.)

Issue Date: September 9th, 2011

Staff Contact: Hal Hart, Development Services Director, halh@ci.woodinville.wa.us

Faxed to: News Media
E-mailed to: Tree Board
Publish: Not published
Post: 1) In-House, 2) Post Office & 3) Website

CITY OF WOODINVILLE, CALKINS ROOM
17301 133RD AVE. NE, WOODINVILLE, WA 98072

NEXT REGULAR MEETING JANUARY 18, 2012, 4:30 PM

Working Draft
Tree Board
Proposed Work Program 2011-2012

A. Proposed Work Program Items 2011-2012
(These Items Can be prioritized)

Priority

- _____ Create specific criteria for tree groves in various public settings. This should include drawings as well as incorporating the ideas into code/standards etc., where it would be beneficial to the City of Woodinville in the development process.
- _____ Improve and update criteria for drought tolerant planting along roadways and open space areas.
- _____ Work with the Planning Commission to develop open spaces in a natural way consistent with the Woodland Character concepts.
- _____ Create specific public advisory materials demonstrating tree groves within a public setting.
- _____ Identify and prioritize opportunities to enhance existing publically owned critical area parcels in the City of Woodinville.
- _____ Recommend that these prioritized enhancements (replanting and maintenance of existing planted areas) be made a part of the next CIP process consistent with the role of the Tree Board in code.
- _____ Prioritize and map the areas for enhancement spending of funds consistent with other plans (WRIA/Shoreline Master Program), as well as the City of Woodinville's Urban Forestry Plan.
- _____ Make recommendations for property acquisitions to implement the Comprehensive Plan goals and objectives both citywide and downtown.
- _____ Recommend professional service contract amount to achieve the above mentioned goals and objectives.

B. Other Related Issues

- _____ Review Comprehensive Plan Strategies, make recommendations as to future changes.
- _____ Review Comprehensive Plan elements for consistency with the plan and regulations governing tree protection.

C. Proposed Tree Board Citizen Outreach Program

- **Annual Arbor Day:** updated Materials/Comprehensive Plan Update Open Houses 2012;
- **Spring Annual Garden Fair:** rotation from city to city within the Sammamish Valley;
- **Annual Updating of Public Information Materials:** advisory information updated each year for distribution, including tree permit information, comprehensive urban forestry plan, and review of existing development standards within the public realm.

D. Proposed Tree Board Work Program Cycles

First Quarter

Tree City/Annual Arbor Day/Garden Fair

Second Quarter

CIP/Replanting via Critical Areas Ordinance recommendations/Street Tree review
Tree Board Spring Tour

Third Quarter

Policy issues/define/implementing measures
Tree nominations or special projects (always on call)

Fourth Quarter

Annual monitoring report/updates/proposed code amendments for the new year.
Planning Commission/Tree Board joint Fall Tour



CITY OF WOODINVILLE, WA

REPORT TO THE TREE BOARD

17301 133rd Avenue NE, Woodinville, WA 98072

WWW.CI.WOODINVILLE.WA.US

To: City of Woodinville Tree Board **Date:** September 14, 2011

From: Hal H. Hart, Development Services Director *HHH*

Subject: Review of the City of Woodinville's 1998 Community Urban Forestry Plan

ISSUE: Shall the City of Woodinville Tree Board review staff recommendations for updating the Woodinville's 1998 Community Urban Forestry Plan?

STAFF RECOMMENDATION: Staff recommends the Tree Board hold a public meeting and discussion for all proposed changes and updates to the 1998 Community Urban Forestry Plan.

POLICY DECISION: Under the Woodinville Municipal Code (WWC) 2.24.050 Duties and responsibilities, the Tree Board functions as the sounding body for the Community Urban Forestry Plan:

- (1) It shall be the responsibility of the Board as directed by the City Council to study, investigate, develop, advise, recommend, and update, at least every three years, a written plan and standards to include, at a minimum, provisions for the care, preservation, pruning, planting, replanting, or removal of trees and shrubs in the parks, along streets and in other public areas, which plan is herein referred to as the community urban forestry plan and the community urban forestry standards. The community urban forestry plan will be presented to the City Council and upon its acceptance and approval shall be adopted as a part of the Comprehensive Plan and development regulations of the City, and shall constitute the official Comprehensive Community Urban Forestry Plan for the City of Woodinville, Washington.
- (2) Subsequent to City Council approval of the Community Urban Forestry Plan, the Board will be responsible for reviewing and developing educational materials to be distributed to developers and citizens to assist in the implementation of the Community Urban Forestry Plan.
- (3) The Community Urban Forestry Plan shall establish the goals, policies, implementing strategies, and monitoring program for developing and maintaining the Community Urban Forestry Plan within the City of Woodinville.

- (4) The Community Urban Forestry Standards shall, at a minimum, include a set of specifications for the selection of species, preparation, planting, care, and maintenance of trees to be planted in the public places of the City. Additionally, the Community Urban Forestry Standards shall include:
- (a) A list of official tree species for appropriate locations in Woodinville.
 - (b) Planting and spacing requirements of street trees and plants on public property.
 - (c) Protection and restoration of areas identified in the critical areas ordinance, with prioritized recommendations for critical areas or projects most needed for replanting submitted for the annual capital improvement planning process.
 - (d) Regulations or recommendations for property acquisitions which preserve scenic corridors, neighborhood buffers or urban separators.
 - (e) At least every five years, an assessment of tree canopy for each of the neighborhoods identified in the Parks, Recreation and Open Space Plan, describing the health of forests, net loss of overall vegetative coverage or significant loss of mature trees, and other issues related to tree coverage as may be appropriate.
- (5) Following its adoption by the City Council, the appropriate sections of the Community Urban Forestry Standards shall be included within and shall become a part of the City of Woodinville public infrastructure standards and specifications.
- (6) The appropriate sections of the adopted Community Urban Forestry Standards shall be included within and shall become a part of the City of Woodinville Municipal Code to be applied by the Planning Commission and Hearing Examiner to all new development, and enforced by the Planning Director.
- (7) The Board, when requested by the City Council, Planning Commission or Parks and Recreation Commission, shall consider, investigate, make findings, report and recommend upon any special matter or question coming within the scope of its work.

BACKGROUND AND ANALYSIS: The following policy matrix is presented as a discussion/study tool for the tree board to analyze policy gaps/overlaps, etc.

Current Policy Within the Adopted 1998 Urban Forestry Management Plan	How it is being currently Implemented?	Alternative or Recommended Policy Updates?
Goal CUF-1 To provide a balance between development and the natural environment through voluntary measures, then incentives, and finally as a last resort, regulations.		
CUF-1.1 Use educational materials that encourage preservation, enhancement, and maintenance of the community urban forest.	Educational materials are available for residents.	On-going discussion for the tree board.
CUF-1.2 Offer incentive measures that give options for development design and strongly encourage tree and plant preservation.	Incentive measures should be reviewed for subdivisions and short plats.	As a part of the 2012 – 2014 update – changes to existing regulations will be evaluated.
CUF-1.3 Establish tree and plant retention regulations for development that are flexible and provide options while ensuring the preservation and enhancement of the community urban forest.	Regulations have been established. The flexibility of the regulations needs monitoring and will be reviewed as part of the 2014 regulation update.	As a part of the 2012 – 2014 update – changes to existing regulations will be evaluated.
Goal CUF-2 To work towards no net loss of the overall community urban forest cover; in the long term, measurable gain.		
CUF-2.1 Maintain the existing canopy cover and work towards an attainable canopy cover increase.	This will require periodic assessment and funding or staff time to accomplish this task.	This discussion will be part of the 2012-2014 review process. If not, it would be a part of the next comprehensive plan effort for the City.
CUF-2.2 Develop and incorporate voluntary measures for development to add to the community urban forest by identifying areas within the City that can be used for planting new trees and plants thereby mitigating for	The area identified for reforestation are publically owned properties within the City of Woodinville especially those areas along the Little Bear Creek Corridor and/or the Sammamish River.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.

losses.		
CUF-2.3 Promote volunteer projects that focus on community plantings to increase the community urban forest cover.	Annual volunteer project opportunities are scheduled and coordinated by Public Works and Development Services staff.	On-going discussion item for the tree board.
CUF-2.4 Provide options and incentives in development regulations to promote and encourage a gain in the community urban forest cover.	These options should be carefully reviewed as a part of the 2012-2014 comprehensive plan review process and regulatory update.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.
CUF-2.5 Establish a forestry recovery plan from disasters that impact the community urban forest.	This has not been done at this time.	This could be a recommendation for the future to work with Emergency Management or others to formulate a strategy.
CUF-2.6 Require strong tree and plant retention and replacement regulations that will aid in a long term increase in the canopy cover of the City.	A strong tree and plant retention replacement ordinance was adopted by the City of Woodinville, and its implementation is currently being monitored.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects and discuss how well we are doing at this point.
Goal CUF-3 Enhance the overall canopy of the community urban forest to create significant, seamless shade corridors in the City.		
CUF-3.1 Promote neighborhood planting projects.	The grant resources for this effort have been reduced or eliminated due to the current economic conditions. Volunteer efforts would still be encouraged.	Recommend this as work program item for the update – engage with neighborhoods with regards to their tree canopy. Tie back into voluntary funds perhaps as well.
CUF-3.2 Require measures to mitigate for the loss of shade cover in new development.	The Shoreline Master Program addresses these issues along water bodies as does the Critical Areas ordinance. Additional shade measures would need to be studied.	Recommend this as a work program item for the update.
CUF-3.3 Establish a voluntary tree account for donations and fund raising events that will directly benefit planting programs in all areas of the City.		Jim Katica the City Finance Director – would have to establish such a fund.

<p>Goal CUF-4 To provide for opportunities to increase "green spaces" to create an enhanced balance of people, nature, and economic development.</p>		
<p>CUF-4.1 Offer incentives to developers to create green spaces that allow access for people to interact with the environment.</p>	<p>These options should be carefully reviewed as a part of the 2012-2014 comprehensive plan review process and regulatory update.</p>	<p>Recommend this as a work program item for the update.</p>
<p>CUF-4.2 Require trees and plants to be included in recreation areas.</p>	<p>Trees and plants are included in the development of recreation areas (Ball fields example).</p>	<p>Recommend that specific park and recreation projects be reviewed for tree and plant species lists in the future?</p>
<p>Goal CUF-5 To encourage tree and vegetation planting that increases environmental benefits including energy savings, noise reduction, cleaner air and water, and protection from the elements.</p>		
<p>CUF-5.1 Participate in area studies, when feasible, that measure the impacts of gain and/or loss of tree and plant cover.</p>	<p>The City developed a tree report working with the UW GIS team who coordinated with UW Forestry</p>	<p>Recommend that staff continue to look for additional voluntary coordination/student forestry project opportunities in the future.</p>
<p>CUF-5.2 Encourage planting of trees and vegetation to mitigate the environmental impacts of new development.</p>	<p>This is currently in code.</p>	<p>Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.</p>
<p>CUF-5.3 Require site design measures that include tree and plant retention or replacement that saves energy, serves as a noise reducing buffer, enhances cleaner air, reduces and cleans water runoff, and protects structures and people from the elements.</p>	<p>This is currently in code through site planning process.</p>	<p>Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.</p>
<p>CUF-5.4 Use trees and</p>	<p>This is currently</p>	

vegetation to reduce soil erosion and landslides.	encouraged under code.	
CUF-5.5 Provide for effective coordination and compliance of land clearing and development with other applicable City development standards including, but not limited to, building, zoning, subdivision, sensitive areas, grading, landscaping, tree preservation, stormwater, erosion control, and street design.	This is currently being done, however the monitoring needs to continue.	Recommend feedback on the success to the Tree Regulations. How well are they accomplishing what we want them to do? Evaluate linkage to other codes.
Goal CUF-6 To enhance the natural habitat where appropriate for wildlife, salmon, and other aquatic wildlife and animals with particular focus on endangered species.		
CUF-6.1 Establish a comprehensive stream shade enhancement program in conjunction with the Planning, Parks, and Public Works Departments to increase the chances of salmon and other aquatic animal and fish survival.	This is currently incorporated into the Shoreline Master Program and critical area regulations for the City of Woodinville.	Recommend feedback on the success to the Tree Board.
CUF-6.2 Require tree and vegetation planting that provides for and encourages desirable wildlife habitats.	This is currently incorporated into the Shoreline Master Program and critical area regulations for the City of Woodinville.	Recommend feedback on the success to the Tree Board.
CUF-6.3 Participate in regional programs, where feasible, to protect and enhance wildlife habitat.	Coordination with WRIA and other regional efforts has been limited due to staff limitations	Specifically coordinate for this policy where possible.
Goal CUF-7 To achieve a sustainable community urban forest through diversity of species and ages to safeguard the forest's overall health and to enhance scenic beauty.		
CUF-7.1 In all incentives	Preservation is the favored	

and regulations, strongly favor preservation over replanting.	alternative presently.	
CUF-7.2 Require tree and plant minimum replacement standards that over time will provide an equal or greater value to the community urban forest .	This is currently in place.	Monitoring program needs to be in place and articulated.
CUF-7.3 Actively promote the Heritage Tree Program, as established by the City's Tree Board and adopted by the City Council, to identify and bring attention to important trees in the community.	Heritage Tree Program is still in existence. Additional public outreach may be required.	Updated map should be included in the 2012-2014 update.
CUF-7.4 Encourage and require tree and plant species diversity by promoting the "Required Tree Species List" and an approved "Landscape Plant List".	Work with the development community is on-going.	The list is to be periodically updated.
Goal CUF-8 To experience a well maintained, healthy community urban forest including all tree and plant areas on private and public property.		
CUF-8.1 Establish and maintain maintenance standards that include, as appropriate, consultation with certified arborists for the best available methods practical in commercial development.	The City has access to an arborist.	Recommend developing a group of certified arborists for a review of the best available methods practical in commercial development in the future.
CUF-8.2 Provide educational materials for residents, business owners, and developers which describes the importance and preferred methods of proper tree and plant maintenance.	Update the existing handout materials.	Recommend annual review of the information by the Tree Board professional team and City Staff.
CUF-8.3 Require maintenance security bonds for landscaping in	Currently required for three years at the present time.	Review as a part of the code update for 2014.

new development for an appropriate length of time, to ensure trees and plants are established and healthy.		
Goal CUF-9 To ensure that tree and plant maintenance programs keep up with the growth of the community urban forest.		
CUF-9.1 Annually evaluate maintenance requirements and cost to ensure maintenance programs keep up with an increase in the community urban forest.	Public Works/Parks	Work with public works – to identify what these costs are to the City.
CUF-9.2 Maintain the City's tree inventory to assist with planning maintenance programs.	Public Works/Parks	Work with public works – to identify what these costs are to the City.
CUF-9.3 Require a tree inventory audit to ensure the accuracy and health of the City's trees.	Policy needs to be reviewed by the tree board – is this Citywide or on an individual basis or both?	As time and finances allow, potential coordination with university.
CUF-9.4 Establish and maintain a tree budget to ensure annual maintenance of the City's trees.	The Tree Board Budget includes the time to administer regulations, permitting, tree board and outreach along with voluntary efforts to plant and the time the City takes with its field crews managing the urban forest.	On-going recommendations.
Goal CUF-10 To encourage neighborhood identity and character that includes the community urban forest.		
CUF-10.1 Promote neighborhood street tree plans.	A grant program was in place which assisted community groups in some situations to plant trees and clean up neglected areas.	City comprehensive update process and the neighborhood level might be an effective way to do this for the comprehensive plan update 2012.
CUF-10.2 Require tree and plant retention in all new residential development.	Required.	Evaluation of success and failures should be both ongoing and a part of the 2012-2014 review for mid course corrections if needed.

Goal CUF-11 To create inviting commercial and public areas that include safety measures in design and maintenance that also attract citizens, shoppers, and visitors.		
CUF-11.1 Require the incorporation of site safety concerns and tree and plant retention regulations into the site design.	This is already done per an arborists report, common sense considerations of buffer goals and objectives at the site planning level.	Review of site safety concerns should be a part of the update process for 2012-2014.
CUF-11.2 Require proper maintenance methods that take into consideration site safety issues.	This is done on a permit by permit basis as per the development conditions placed upon each project	Discussion/evaluation: do we have adequate information available to the public?
Goal CUF-12 To promote screening from freeways and other development.		
Use strong incentives and regulations that require landscape screening for residential development, parks, recreation areas, and open spaces from freeways, industrial, and commercial areas.	The City is working on an amendment to this concept currently.	Discuss this issue at the tree board /planning commission. Developing a long term set of incentives and regulations that require landscape screening for a wide variety of areas is in place. Evaluating its effectiveness is also important.
Goal CUF-13 To soften hard edges of structures and paved areas by retaining and adding trees and plants in existing and new development.	Current standards address this issue	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.
CUF-13.1 Provide incentives for existing development to retrofit sites with trees and plants where there are large structures and paved areas.	Current code addresses this issue.	Adequacy to be evaluated 2012-2014
CUF-13.2 Require planting of trees and plants near all new commercial and industrial buildings and associated paved areas.	Current code addresses this issue.	Adequacy to be evaluated 2012-2014
Goal CUF-14 To select appropriate trees and plants for retention and planting at the time of development including		

native species.		
CUF-14.1 Require new development to include species from the adopted "Tree Species List."	Required under code now.	
CUF-14.2 Require new development to select plants from the City's "Required Plant List."	Current code addresses this issue.	On-going discussion; continue to refine the list.
CUF -14.3 Require developers to enlist the services of an appropriate qualified professional i.e. certified arborist, landscape designer, or landscape architects during site design, during site work, tree and plant retention and installation to ensure proper methods are used for projects other than an individual single family residence.	Required under current code.	Evaluation of the effectiveness of this strategy should be a discussion for the 2012-2014 update.
CUF-14.4 Develop tree and other vegetation planting standards that include proper site preparation methods and appropriate bonding provisions for required landscaping.	Required under current code.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.
Goal CUF-15 To ensure parks and city streets provide shade corridors that include trees and plants.		
CUF-15.1 Coordinate with City departments on regulations and city project designs to include trees and plants for significant shade along paved streets and city parks.	Coordination with departments is current policy and procedures.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.
CUF-15.2 Require street trees in all residential, commercial, industrial, and public development and redevelopment subject to a master street tree plan for City streets, where appropriate.	Standards exist under current regulations.	Tree Board and staff should take a walking tour to look at public project plantings and discuss these projects.

CUF-15.3 Require new development along City street frontages to plant appropriate street trees as part of the proposal.	Current regulations in line with practices-this issue is covered.	Photos or tour area with Tree Board.
Goal CUF-16 To preserve and enhance a distinctive tree canopy on the valley walls of the City.	Overall the plan and the regulatory intent is to achieve this goal.	Photos or tour area with Tree Board.
CUF-16.1 Preserve the existing valley wall canopy based on a study that evaluates the existing valley wall canopy and recommends preservation guidelines for future development.	Current code addresses - aligns us.	Photos or tour area with Tree Board.
CUF-16.2 Use strong incentives and regulations that require tree preservation on sloped areas of the City.	Incentives have been incorporated in the code at various locations. Currently, some of these are under review.	Periodically review the outcomes.
CUF-16.3 Encourage alternatives to "topping" and "removals" as effective solutions for "opening up" views from Woodinville's forested hillsides.	Current code addresses this.	Make sure public information is available.
CUF-16.4 Use educational materials to assist property owners and developers with pre-project planning and plantings so that proper plantings of trees and associated vegetation will not affect views over the long term.	Current code and current practices address this issue.	
CUF-16.5 Require a balanced, efficient and visually aesthetic development plan which is most compatible with the forested hillside environment.	Current code addresses this issue.	Review how well the City has done this to date through the Comp Plan Update/Regs Update 2012-2014 process.
CUF-16.6 Maintain the natural integrity of the designated sensitive areas, erosion problem areas, and landslide hazard areas and their buffers through	Current code addresses this issue through the City's critical areas regulations.	These will be evaluated again.

adopted codes and standards.		
Goal CUF-17 To encourage and maintain a balance between tree lined streets and safe utility corridors.		
CUF-17.1 Promote relationships with local utility companies on planting and maintenance of trees and plants in and around utility poles, wires, underground cable, and pipes (conduit).	Current code addresses this issue.	This could be an area of growth in the future. This could be a recommendation moving forward. We could have someone address the Tree Board/Planning Commission and provide a presentation.
CUF-17.2 Require standards and programs for utility corridors to ensure proper maintenance and planting methods are used and appropriate tree species are selected at the time of installation.	Current code addresses this issue.	Discussion as to proper maintenance and planting methods would be helpful to staff. Recommend a field trip to educate staff and Tree Board/Planning Commission.
CUF-17.3 Explore opportunities to participate with local utilities in joint pruning projects.	This could be an area of growth in the future.	This could be an area of growth in the future. This could be a recommendation moving forward.
Goal CUF-18 To enhance the community urban forest so that its value increases annually.	The City currently encourages this.	Additional educational strategies/tools/actions should be added.
CUF-18.1 Encourage enhancement of the community urban forest through community education and events.	Current code addresses this issue.	Current practice addresses this issue through events such as the Spring Fair and Arbor Day Celebration.
CUF-18.2 Create community programs that encourages citizen participation in the enhancement of the community urban forest.	Current practices address this issue modestly given the constraints.	Additional discussion is needed by the Tree Board.
Goal CUF-19 To achieve active participation of the community in tree related activities by involving citizens, community groups, and nonprofit organizations in the care and enhancement of the		

community urban forest.		
CUF-19.1 Maintain the City's Tree Board to advise and recommend to the City Council on tree matters of the City.	The City is attempting to do this despite reduced funding, current staffing. In order to accomplish this, Tree Board and Planning Commission functions could be managed more effectively/together.	Currently being discussed by the City Council.
CUF-19.2 Encourage the Tree Board to cooperate with other city tree boards or commissions within the eastside community and throughout the Puget Sound region in an effort to educate itself.	The City is attempting to do this despite reduced funding opportunities.	Schedule/Discussion with other staff for 2012.
CUF-19-3 Assist in establishing public/public and private/public partnerships.	Current code addresses this issue.	This needs to be an on-going discussion of the tree board. More could be done in this arena.
CUF-19.4 Encourage tree and landscape planting programs to promote civic pride and involvement in the public and private sector.	Current code addresses this issue on a case by case basis for both the private developer and the public project realm.	Special attention to Woodinville Fields and Roundabouts.
CUF-19.5 Promote a reward program to publicize correct tree care or planting within the community, whether residential or commercial.	Recommend the technical team work with the rest of the tree board to suggest the bounds of this program.	This needs to be an on-going discussion of the tree board. Identify partners and develop the concept further.
CUF-19.6 Assist in establishing public/public and private/public partnerships.	Current effort to establish a public/private partnership will take partners from the private sector.	This needs to be an on-going discussion of the tree board. Identify partners and develop the concept further.
CUF-19.7 Support and encourage community support programs that encourage volunteer efforts, material donations, etc.	One of the difficulties of constrained budgets and time is developing broader community support that will encourage greater volunteer efforts including donations.	This needs to be an on-going discussion of the tree board.
Goal CUF-20 To increase the awareness and importance of the benefits of the community urban forest		

among local business owners, residents, and developers.		
CUF-20.1 Educate citizens and land owners about tree and plant care in all areas of the City.	Addressed under current code.	Currently, the City educates via website, and annual events. Other venues which will not impact finances should be explored.
CUF-20.2 Provide educational materials regarding all aspects of the community urban forest available to the public at City Hall and other community areas.	Current practice has some tree information available to the public.	More outreach materials should be developed over time.
CUF-20.3 Use all forms of media to keep the community informed of all activities involving the community urban forest.	Through current practices and existing financial limitations, the City addresses this issue.	Review of the current methods and forms is always a good idea. Outreach requires coordination and the means of outreach evolve over time.
CUF-20.4 Provide landowners/developers with educational resources necessary to make informed decisions regarding development and existing vegetation retention.	Current code addresses this issue.	As a part of the 2012-2014 update a discussion of outreach will be needed. The city is looking for more effective ways to reach the community at all times.
Goal CUF-21 To encourage consistency with other adopted Plans to achieve citywide goals.		
CUF-21.1 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with, support, and compliment the City's adopted Comprehensive Plan.	Current code addresses this issue.	Internal coordination and consistency is required under the Growth Management Act (GMA). This will be evaluated again as a part of the 2012-2014 update process.
CUF-21.2 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with, support, and compliment the City's adopted Park, Recreation,	Current code addresses this issue.	Internal coordination and consistency is mandated by the Growth Management Act (GMA). This will be a part of the 2012-2014 update to ensure we have internal plan consistency within the

and Open Space Plan.		City.
CUF-21.3 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with other City adopted codes and regulations.	Current code addresses this issue.	Consistency evaluation is mandated by the Growth Management Act (GMA). These issues typically require a policy balance.
CUF 21.4 Ensure future codes and regulations are reviewed with the Community Urban Forestry Plan and Community Urban Forestry Standards for consistency.	Current code addresses this issue.	2012 – 2014 Update
Implementation Strategies		
CUF-1.A Complete public educational information for property owners and developers on incentive programs related to landscaping and tree preservation for public distribution. (Education)	Current code addresses this issue.	Constrained by current staffing – this should be reviewed as a part of the 2012 -2014 update process.
CUF-1.B Research and develop incentive opportunities for property owners and developers to create open space for tree preservation and natural vegetation. (Incentives)	Current code addresses this issue.	This is currently under review (interim regulations discussion) by the City of Woodinville.
CUF-1.0 Review, revise, and develop urban forestry based standards and regulations to ensure they meet the City of Woodinville current Comprehensive Plan and the Community Urban Forestry Plan. (Regulations)	Current code addresses this issue.	Consistency is required by the Growth Management Act. Evaluation of this strategy should be completed as a part of the City's overall comprehensive plan update 2012-2014.
CUF-2.A Develop mitigation opportunities for tree loss by development and redevelopment. Replace trees lost because of clearing for development and other reasons to achieve a "no net loss" to the community urban forest.	Current code addresses this issue.	Evaluation of this strategy should be reviewed as a part of the City's overall comprehensive plan update 2012-2014.

(Regulations)		
CUF-2.B Set up a program to plant trees as a mitigation for tree cutting that occurs in other areas of the City. Identify appropriate sites for tree planting. (Planning and Maintenance)	Current code addresses this issue.	The sites that have generally been selected have been along the Downtown Little Bear Creek corridor and where existing city properties are located within the City of Woodinville.
CUF-2.C Develop tree and landscape planting programs to promote civic pride and involvement in the public and private sector. (Community Volunteer Outreach)	Current code addresses this issue.	Civic projects have received attention, including roundabouts and Woodinville Fields.
CUF-2.D Develop incentives that promote landscape and tree planting within existing development to encourage a net gain in the community urban forest cover. (Incentives)	Current code attempts to create a net gain on a site-by site basis. If that cannot be accomplished on site a mechanism for off site mitigation – tree fund exists.	Evaluation of this item could be accomplished in the 2012-2014 update process.
CUF-2.E Prepare disaster plans for storm-related emergencies, outbreaks of pests, and diseases in native and non-native landscapes involving the community forest. (Planning and Maintenance)	Current code does not address this issue.	This could be work that is done as part of the 2012-2014 update.
CUF-2.F Review and update the public street tree inventory to include other public areas of the City where there are trees and vegetation that will assist with community urban forest monitoring. (Assessment)	Current code addresses this issue through standards.	This will be a part of the 2012-2014 update process.
CUF-2.G Examine effectiveness of regulations in meeting objectives of the Community Urban Forestry Plan and adjust as needed. (Assessment)	Current code addresses this issue.	This will be a part of the 2012-2014 update process.
CUF-5.A In addition to the ongoing management of the public tree inventory, a review and update of the	Current code addresses this issue.	Potentially work with Parks & Public Works regarding Intern effort.

public street tree inventory should occur at least every three years to develop a coordinated and comprehensive maintenance program. (CUF-9.B)		
CUF-5.B Evaluate contributions of the urban forest toward salmon habitat protection, enhancement and development. (CUF-6.B)	Current code addresses this issue.	Long term goal between updates – consistent with regional salmon recovery goals.
CUF-7.0 Determine a tree replacement value based on accepted industry appraisal standards. The values should be reviewed at least bi-annually and adjusted accordingly.	Current code addresses this issue.	Current discussion item.
CUF-16.A Conduct a study that includes an inventory of the forested hillsides with regard to percentage of canopy cover, species composition, overall health, age, and protection measures. The study should include preservation guidelines for future development.	Current code addresses this issue.	Long term funding resources: looking for partnership opportunities.
CUF-18.B Use existing and updated inventory information to determine an overall value of the community urban forest.	The City has not attributed an overall value of the community urban forest in 2011 dollars.	This could be a function of 2012-2014 update. Determining the value of the urban forest and the benefits it provides to the community.
Funding Component There are major factors or contributors to a successful urban forestry program. The support of the community, City Council, and municipal staff are important for a sustainable program. money to ensure the sustainability of the urban forestry program.	Current code addresses this issue.	Long term funding resources: looking for partnership opportunities.
Funding is just as important. The Woodinville		On-going

community and City staff must look at alternative sources of money to ensure the sustainability of the urban forestry program.		
CUF-3.0 Evaluate and establish alternative ways to fund elements of the Community Urban Forestry Plan that may include, permit fees, gas tax/road tax for street trees, frontage assessments, public bond measures for the urban forest, and/or donations/fund raising events.	Current code addresses this issue.	On-going effort to look at financial stability.
CUF-3.D Establish a tree account to provide for mitigation in those cases where trees must be removed and cannot be replaced on site.	Current code addresses this issue.	Established by the Finance Director.
CUF-9,A Develop an annual budget for the Woodinville Community Forestry Program.	Current code addresses this issue.	On-going effort. (Categories: staff time, outreach, long range)
CUF-19.E Research and apply for future grant money associated with community urban forestry.	On-going search.	The search for research/grant funding is on-going and highly competitive.
Community Volunteer Outreach Component Trees grace our environment and our lives; they provide a habitat for wildlife, soften city structures, clean our air, provide us with a connection to the past and to living nature, and protect our water resources. The Woodinville Tree Board is empowered to help develop and maintain a comprehensive community urban forestry program for the establishment and care	Current code addresses this issue.	On-going effort.

<p>of trees on public property within the city limits. An important aspect in developing the urban forestry program and Community Urban Forestry Plan is public involvement. The Woodinville Tree Board is representing the public interest, and receiving input from them. To establish partnerships and direct public involvement the board will develop an outreach program to solicit ideas and participation from the residents of this community. The people of this community are a major part of the urban forest resource.</p>		
<p>CUF-2.0 Develop tree and landscape planting programs to promote civic pride and involvement in the public and private sector. (CUF-10.C)</p>	<p>Current code addresses this.</p>	<p>New projects/civic projects are designed to meet the City's code provisions.</p>
<p>CUF-7.A Continue, develop, and schedule annual community urban forestry related programs and events such as Arbor Day celebrations, educational workshops, and Community Urban Forestry Month. (CUF-19.E)</p>	<p>Current code address this issue.</p>	<p>More can be done.</p>
<p>CUF-7.B Continue the promotion and review of candidates for the Heritage Tree Program.</p>	<p>Currently program information is available to the public.</p>	<p>Constraint of current staffing.</p>
<p>CUF-19.A Establish an "Adopt-A-Planting Area" program for citizens to participate in the beautification and maintenance of public planting areas.</p>	<p>Current code addresses this issue.</p>	<p>Constraint of current staffing.</p>
<p>CUF-19.B Establish a landscape maintenance and design awards program</p>		<p>Constraint of current staffing.</p>

for citizens and business owners.		
CUF-19.0 Establish a "green" developer awards program that recognizes developers that pay special attention to the benefits of trees and plants and implements measures to enhance the community urban forest.		This needs to be implemented but the current constraint of staffing has limited the City so far.
CUF-20.0 Continue to achieve annual "Tree City USA" designation.		This needs to be implemented.

Recommended Action: Review and discuss this report and develop recommendations.



Community Urban Forestry Plan

December 14, 1998



City of Woodinville
Community Urban Forestry Plan

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ORDINANCE NO. 228

AN ORDINANCE OF THE CITY OF WOODINVILLE, WASHINGTON, RELATING TO COMPREHENSIVE PLANNING AND LAND USE, ADOPTING THE COMMUNITY URBAN FORESTRY PLAN TO ENCOURAGE THE PRESERVATION AND ENHANCEMENT OF TREES AND PLANTS IN THE CITY OF WOODINVILLE.

WHEREAS, the City of Woodinville values its Northwest woodland character; and

WHEREAS, trees and plants provide environmental and aesthetic benefits; and

WHEREAS, the City Council established a Tree Board in 1995 to advise them on tree and plant matters of the City; and

WHEREAS, the Tree Board is charged with developing a comprehensive plan that addresses Woodinville's community urban forest; and

WHEREAS, the Tree Board developed the Community Urban Forestry Plan; and

WHEREAS, the Tree Board held Open Houses on October 13, 1998, and October 15, 1998, to received public comment. No written comments were received; and

WHEREAS, the Tree Board presented the Community Urban Forestry Plan to the Planning Commission and the Parks and Recreation Commission on October 21, 1998 and the Commission endorse the Plan; and

WHEREAS, the City Council has reviewed the Community Urban Forestry Plan and finds the Plan to benefit all citizens in the City; and

WHEREAS, the following ordinance is necessary for the public health, safety and general welfare; NOW, THEREFORE,

**THE CITY COUNCIL OF THE CITY OF WOODINVILLE, WASHINGTON, DO
ORDAIN AS FOLLOWS:**

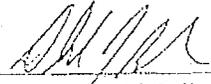
Section 1. Community Urban Forestry Plan Adopted. That certain compilation attached hereto as Exhibit 1 and entitled "City of Woodinville Community Urban Forestry Plan", dated December 14, 1998, is hereby adopted and incorporated in full by this reference. One copy of said plan shall be on file in the office of the City Clerk for use and examination by the public.

Section 2. Severability. If any portion of this Ordinance as now or hereafter amended, or its application to any person or circumstance is held invalid or unconstitutional, such adjudication shall not affect the validity of the ordinance as a whole, or any section, provision, or part thereof not adjudged to be invalid or unconstitutional, and its application to other persons or circumstances shall be affected. Any ordinance or regulation in conflict with this ordinance is hereby repealed.

Section 3. Effective Date. This ordinance, or a summary thereof consisting of the title, shall be published in the official newspaper of the City, and shall take effect and be in full force five (5) days after publication.

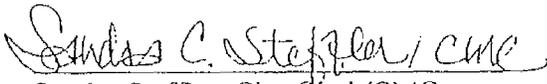
ADOPTED by the City Council of the City of Woodinville this 14th day of December, 1998.

APPROVED:



Donald J. Brocha, Mayor

ATTEST:



Sandra Steffler, City Clerk/CMC

APPROVED AS TO FORM:

OFFICE OF THE CITY ATTORNEY:

By: 

FILED WITH THE CITY CLERK: 12-14-98
PASSED BY THE CITY COUNCIL: 12-14-98
PUBLISHED: 12-21-98
EFFECTIVE DATE: 12-26-98
ORDINANCE NO. 228



City of Woodinville
Community Urban Forestry Plan

I. ACKNOWLEDGMENTS

The Community Urban Forestry Plan has been a work in progress over the last three years. The City would like to acknowledge those individuals, both past and present participants, who spent many hours advocating the benefits of trees in our community by developing this plan.

City Council

Don Brocha, Mayor
Scott Hageman, Deputy Mayor
Bob Miller, Councilmember
Marsha Engel, Councilmember
Barbara Solberg, Councilmember
Randy Ransom, Councilmember
Carol Bogue, Councilmember

Tree Board Members

Karen K. Steeb
Pam Coney
James R. Erickson
Mark A. Schuster
David Dahl
Molly Beck (past contributing member)
Carol Bogue (past contributing member)
Tom Berg (past contributing member)

City Staff

Joe Wallis (past)
Ray Sturtz
Rebecca Perkins
Stephanie Cleveland

Consultant

Kevin M. McFarland, Sound Urban Forestry

Tree Inventory Assistance

Al Wagar, University of Washington Professor
Yan Ping Liang, University of Washington Student



City Of Woodinville
Community Urban Forestry Plan

II. INTRODUCTION

The Woodinville Tree Board was established in 1995 for the purpose of developing a strategy to address the community goal of maintaining Woodinville's trees over the long term. That original goal still holds true, and is expanded to incorporate the community's intent to improve and enhance the quality and management of the entire urban forest.

The Comprehensive Plan presents a Vision Statement that relays the value that the community places on their urban forest. Furthermore, many of the Comprehensive Plan elements, such as Land Use, Community Design, Parks & Recreation, and Economic Development contain goals and policies that address urban forestry-related issues.

Woodinville is located in one of the fastest-growing regions in Western Washington. This fact underscores the critical nature of the challenges that face the community urban forest. While the community's urban trees are in good condition in areas, it shows decline in many other ways.

Woodinville's urban forest is a mosaic of native forest, planted trees, and plants. Urban forests serve us directly and indirectly. The natural occurring and planted trees within this community need to be managed to provide the inhabitants with a continuing level of economic, social, environmental, and ecological benefits both today and in the future.

The benefits of trees in the City are many. Becoming familiar with our trees creates an awareness of our interdependence and a greater appreciation of the positive elements they provide. Trees fill our physical environment with life and beauty; they are a valuable and direct link to our most fundamental heritage.

To fulfill the Vision Statement, the Woodinville Tree Board is charged with developing a Community Urban Forestry Plan (CUFP), and regulations that will protect and preserve the Community's urban forest. The CUFP includes short-term and long-term goals, overall policies and objectives. These goals and policies offer a basis from which urban forestry related projects, programs, and standards can be drawn.

The Woodinville Tree Board, along with City Staff and the public developed this comprehensive plan. It contains goals and policies that will guide the City of Woodinville in its decisions and actions affecting the urban forest within the city limits.

The purpose of the Community Urban Forestry Plan is to assist the City Council, Tree Board, City Staff, and citizens to build a self-sustaining community urban forestry program. By adopting this plan, the City acknowledges the quality of life issues which are supported by a healthy and beautiful urban forest. Without a comprehensive understanding of the urban forest and a coordinated management plan to maintain and enhance it, we risk losing an enormously valuable resource - one that affects our physical, emotional, and economic well-being and our quality of life.

Coordination and involvement of local government, volunteers, and citizens increase the probability for the survival and enhancement of the community urban forest.

City of Woodinville
Community Urban Forest

III. VISION STATEMENT

In the Year 2015, Woodinville's community urban forest is a reflection of the City's health, well-being and livability. We have upheld scenic beauty as an important natural resource and we have preserved our Northwest woodland character. The community urban forest has been sustained and encouraged, creating a balance of nature, people and economic development.

Our citizens experience daily the environmental benefits of trees. Our trees provide cleaner air and water by removing pollutants from the air and reducing runoff; protect streams with shade for survival of salmon and other aquatic habitats; and line our streets to offer shade and protection from the elements.

A distinctive tree canopy remains on our valley walls. We have encouraged the tree canopy on our neighboring valley walls. Trees provide screening for residential areas from freeways, commercial, and industrial areas and soften our city structures. Our parks and city streets are lined with trees and protected with shade. Our pleasant environment attracts citizens and visitors to a growing and attractive business community. People frequent business districts where trees and plants provide shade to help save energy, reduce noise, and soften the hard edges of structures and paved areas.

Appropriate trees and plants are selected for retention and planting at the time of development so that the community urban forest is full of diverse tree and plant species and ages. There is a continued commitment to plant more trees, understory plants, and ground covers annually to contribute to the community urban forest, an investment that grows in value each year.

The city trees and plants are expertly maintained by well-trained professional staff. From their example Woodinville's residents expect and receive the best tree planting and care. Public spaces are clean, attractive, and well maintained. Woodinville citizens encourage and participate in the planting and maintenance of the community urban forest. The citizens are guided by priorities that value the community urban forest.

We have achieved a healthy, sustained community urban forest. It is carefully managed and cared for which contributes to the economic and environmental well-being of the city and benefits all our citizens. The Woodinville community respects and honors its trees and plants. Our Northwest woodland character has been preserved giving Woodinville a special sense of place.





City of Woodinville
Community Urban Forestry Plan

IV. GOALS AND POLICIES

Goal CUF-1 To provide a balance between development and the natural environment through voluntary measures, then incentives, and finally as a last resort, regulations.

Policies

- CUF-1.1 Use educational materials that encourage preservation, enhancement, and maintenance of the community urban forest.
- CUF-1.2 Offer incentive measures that give options for development design and strongly encourage tree and plant preservation.
- CUF-1.3 Establish tree and plant retention regulations for development that are flexible and provide options while ensuring the preservation and enhancement of the community urban forest.

Goal CUF-2 To work towards no net loss of the overall community urban forest cover; in the long term, measurable gain.

Policies

- CUF-2.1 Maintain the existing canopy cover and work towards an attainable canopy cover increase.
- CUF-2.2 Develop and incorporate voluntary measures for development to add to the community urban forest by identifying areas within the City that can be used for planting new trees and plants thereby mitigating for losses.
- CUF-2.3 Promote volunteer projects that focus on community plantings to increase the community urban forest cover.
- CUF-2.4 Provide options and incentives in development regulations to promote and encourage a gain in the community urban forest cover.
- CUF-2.5 Establish a forestry recovery plan from disasters that impact the community urban forest.
- CUF-2.6 Require strong tree and plant retention and replacement regulations that will aid in a long term increase in the canopy cover of the City.

Goal CUF-3 Enhance the overall canopy of the community urban forest to create significant, seamless shade corridors in the City.

Policies

- CUF-3.1 Promote neighborhood planting projects.
- CUF-3.2 Require measures to mitigate for the loss of shade cover in new development.
- CUF-3.3 Establish a voluntary tree account for donations and fund raising events that will directly benefit planting programs in all areas of the City.

Goal CUF-4 To provide for opportunities to increase “green spaces” to create an enhanced balance of people, nature, and economic development.

Policies

- CUF-4.1 Offer incentives to developers to create green spaces that allow access for people to interact with the environment.
- CUF-4.2 Require trees and plants to be included in recreation areas.

Goal CUF-5 To encourage tree and vegetation planting that increases environmental benefits including energy savings, noise reduction, cleaner air and water, and protection from the elements.

Policies

- CUF-5.1 Participate in area studies, when feasible, that measure the impacts of gain and/or loss of tree and plant cover.
- CUF-5.2 Encourage planting of trees and vegetation to mitigate the environmental impacts of new development.
- CUF-5.3 Require site design measures that include tree and plant retention or replacement that saves energy, serves as a noise reducing buffer, enhances cleaner air, reduces and cleans water runoff, and protects structures and people from the elements.
- CUF-5.4 Use trees and vegetation to reduce soil erosion and landslides.
- CUF-5.5 Provide for effective coordination and compliance of land clearing and development with other applicable City development standards including, but not limited to, building, zoning, subdivision, sensitive areas, grading, landscaping, tree preservation, stormwater, erosion control, and street design.

Goal CUF-6 To enhance the natural habitat where appropriate for wildlife, salmon, and other aquatic wildlife and animals with particular focus on endangered species.

Policies

CUF-6.1 Establish a comprehensive stream shade enhancement program in conjunction with the Planning, Parks, and Public Works Departments to increase the chances of salmon and other aquatic animal and fish survival.

CUF-6.2 Require tree and vegetation planting that provides for and encourages desirable wildlife habitats.

CUF-6.3 Participate in regional programs, where feasible, to protect and enhance wildlife habitat.

Goal CUF-7 To achieve a sustainable community urban forest through diversity of species and ages to safeguard the forest's overall health and to enhance scenic beauty.

Policies

CUF-7.1 In all incentives and regulations, strongly favor preservation over replanting.

CUF-7.2 Require tree and plant minimum replacement standards that over time will provide an equal or greater value to the community urban forest .

CUF-7.3 Actively promote the Heritage Tree Program, as established by the City's Tree Board and adopted by the City Council, to identify and bring attention to important trees in the community.

CUF-7.4 Encourage and require tree and plant species diversity by promoting the "Required Tree Species List" and an approved "Landscape Plant List".

Goal CUF-8 To experience a well maintained, healthy community urban forest including all tree and plant areas on private and public property.

Policies

CUF-8.1 Establish and maintain maintenance standards that include, as appropriate, consultation with certified arborists for the best available methods practical in commercial development.

CUF-8.2 Provide educational materials for residents, business owners, and developers which describes the importance and preferred methods of proper tree and plant maintenance.

CUF-8.3 Require maintenance security bonds for landscaping in new development for an appropriate length of time to ensure trees and plants are established and healthy.

Goal CUF-9 To ensure that tree and plant maintenance programs keep up with the growth of the community urban forest.

Policies

CUF-9.1 Annually evaluate maintenance requirements and cost to ensure maintenance programs keep up with an increase in the community urban forest.

CUF-9.2 Maintain the City's tree inventory to assist with planning maintenance programs.

CUF-9.3 Require a tree inventory audit to ensure the accuracy and health of the City's trees.

CUF-9.4 Establish and maintain a tree budget to ensure annual maintenance of the City's trees.

Goal CUF-10 To encourage neighborhood identity and character that includes the community urban forest.

Policies

CUF-10.1 Promote neighborhood street tree plans.

CUF-10.2 Require tree and plant retention in all new residential development.

Goal CUF-11 To create inviting commercial and public areas that include safety measures in design and maintenance that also attract citizens, shoppers, and visitors .

Policies

CUF-11.1 Require the incorporation of site safety concerns and tree and plant retention regulations into the site design.

CUF-11.2 Require proper maintenance methods that take into consideration site safety issues.

Goal CUF-12 To promote screening from freeways and other development.

Policies

CUF-12.1 Use strong incentives and regulations that require landscape screening for residential development, parks, recreation areas, and open spaces from freeways, industrial, and commercial areas.

Goal CUF-13 To soften hard edges of structures and paved areas by retaining and adding trees and plants in existing and new development.

Policies

- CUF-13.1 Provide incentives for existing development to retrofit sites with trees and plants where there are large structures and paved areas.
- CUF-13.2 Require planting of trees and plants near all new commercial and industrial buildings and associated paved areas.

Goal CUF-14 To select appropriate trees and plants for retention and planting at the time of development including native species.

Policies

- CUF-14.1 Require new development to include species from the adopted "Tree Species List."
- CUF-14.2 Require new development to select plants from the City's "Required Plant List."
- CUF-14.3 Require developers to enlist the services of an appropriate qualified professional i.e. certified arborist, landscape designer, or landscape architects during site design, during site work, tree and plant retention and installation to ensure proper methods are used for projects other than an individual single family residence.
- CUF-14.4 Develop tree and other vegetation planting standards that include proper site preparation methods and appropriate bonding provisions for required landscaping.

Goal CUF-15 To ensure parks and city streets provide shade corridors that include trees and plants.

Policies

- CUF-15.1 Coordinate with City departments on regulations and city project designs to include trees and plants for significant shade along paved streets and city parks.
- CUF-15.2 Require street trees in all residential, commercial, industrial, and public development and redevelopment subject to a master street tree plan for City streets, where appropriate.
- CUF-15.3 Require new development along City street frontages to plant appropriate street trees as part of the proposal.

Goal CUF-16 To preserve and enhance a distinctive tree canopy on the valley walls of the City.

Policies

- CUF-16.1 Preserve the existing valley wall canopy based on a study that evaluates the existing valley wall canopy and recommends preservation guidelines for future development.
- CUF-16.2 Use strong incentives and regulations that require tree preservation on sloped areas of the City.
- CUF-16.3 Encourage alternatives to "topping" and "removals" as effective solutions for "opening up" views from Woodinville's forested hillsides.
- CUF-16.4 Use educational materials to assist property owners and developers with pre-project planning and plantings so that proper plantings of trees and associated vegetation will not affect views over the long term.
- CUF-16.5 Require a balanced, efficient and visually aesthetic development plan which is most compatible with the forested hillside environment.
- CUF-16.6 Maintain the natural integrity of the designated sensitive areas, erosion problem areas, and landslide hazard areas and their buffers through adopted codes and standards.

Goal CUF-17 To encourage and maintain a balance between tree lined streets and safe utility corridors.

Policies

- CUF-17.1 Promote relationships with local utility companies on planting and maintenance of trees and plants in and around utility poles, wires, underground cable, and pipes (conduit).
- CUF-17.2 Require standards and programs for utility corridors to ensure proper maintenance and planting methods are used and appropriate tree species are selected at the time of installation.
- CUF-17.3 Explore opportunities to participate with local utilities in joint pruning projects.

Goal CUF-18 To enhance the community urban forest so that its value increases annually.

Policies

- CUF-18.1 Encourage enhancement of the community urban forest through community education and events.

CUF-18.2 Create community programs that encourages citizen participation in the enhancement of the community urban forest.

Goal CUF-19 To achieve active participation of the community in tree related activities by involving citizens, community groups, and nonprofit organizations in the care and enhancement of the community urban forest.

Policies

- CUF-19.1 Maintain the City's Tree Board to advise and recommend to the City Council on tree matters of the City
- CUF-19.2 Encourage the Tree Board to cooperate with other city tree boards or commissions within the eastside community and throughout the Puget Sound region in an effort to educate itself.
- CUF-19.3 Promote an awards program that highlights the preservation, establishment, and maintenance of the urban forest within the community.
- CUF-19.4 Encourage tree and landscape planting programs to promote civic pride and involvement in the public and private sector.
- CUF-19.5 Promote a reward program to publicize correct tree care or planting within the community, whether residential or commercial.
- CUF-19.6 Assist in establishing public/public and private/public partnerships.
- CUF-19.7 Support and encourage community support programs that encourage volunteer efforts, material donations, etc.

Goal CUF-20 To increase the awareness and importance of the benefits of the community urban forest among local business owners, residents, and developers.

Policies

- CUF-20.1 Educate citizens and land owners about tree and plant care in all areas of the City.
- CUF-20.2 Provide educational materials regarding all aspects of the community urban forest available to the public at City Hall and other community areas.
- CUF-20.3 Use the all forms of media to keep the community informed of all activities involving the community urban forest.

- CUF-20.4 Provide landowners/developers with educational resources necessary to make informed decisions regarding development and existing vegetation retention.

Goal CUF-21 To encourage consistency with other adopted Plans to achieve citywide goals.

Policies

- CUF-21.1 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with, support, and compliment the City's adopted Comprehensive Plan.
- CUF-21.2 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with, support, and compliment the City's adopted Park, Recreation, and Open Space Plan.
- CUF-21.3 Ensure the Community Urban Forestry Plan and Community Urban Forestry Standards are consistent with other City adopted codes and regulations.
- CUF-21.4 Ensure future codes and regulations are reviewed with the Community Urban Forestry Plan and Community Urban Forestry Standards for consistency.



City of Woodinville
Community Urban Forestry Plan

V. IMPLEMENTATION STRATEGIES

The following Community Urban Forestry Plan strategies implement the goals and policies with specific actions. Each strategy has a corresponding number to the goal number followed by a sequential letter. Many Implementation Strategies serve to accomplish multiple goals.

The next section, following the list of implementation strategies below, organizes the strategies according to the specific components of the City's implementation program. These components include: *Education, Regulations, Incentives, Planting & Design Standards, Maintenance & Planning of the Urban Forest, Planting Opportunities, Assessment, Funding, and Community Outreach.*

Implementation Strategies

- CUF-1.A Complete public educational information for property owners and developers on incentive programs related to landscaping and tree preservation for public distribution. (Education)
- CUF-1.B Research and develop incentive opportunities for property owners and developers to create open space for tree preservation and natural vegetation. (Incentives)
- CUF-1.C Review, revise, and develop urban forestry related standards and regulations to ensure they meet the City of Woodinville current Comprehensive Plan and the Community Urban Forestry Plan. (Regulations)
- CUF-2.A Develop mitigation opportunities for tree loss by development and redevelopment. Replace trees lost because of clearing for development and other reasons to achieve a "no net loss" to the community urban forest. (Regulations)
- CUF-2.B Set up a program to plant trees as a mitigation for tree cutting that occurs in other areas of the City. Identify appropriate sites for tree planting. (Planning and Maintenance)
- CUF-2.C Develop tree and landscape planting programs to promote civic pride and involvement in the public and private sector. (Community/Volunteer Outreach)
- CUF-2.D Develop incentives that promote landscape and tree planting within existing development to encourage a net gain in the community urban forest cover. (Incentives)

- CUF-2.E Prepare disaster plans for storm-related emergencies, outbreaks of pests, and diseases in native and non-native landscapes involving the community forest. (Planning and Maintenance)
- CUF-2.F Review and update the public street tree inventory to include other public areas of the City where there are trees and vegetation that will assist with community urban forest monitoring. (Assessment)
- CUF-2.G Examine effectiveness of regulations in meeting objectives of the Community Urban Forestry Plan and adjust as needed. (Assessment)
- CUF-2.H Refer also to CUF-1.C (Regulations).
- CUF-3.A Develop tree planting and landscaping programs and regulations on public and private property that protect and enhance wildlife habitat. (Planting Opportunities)
- CUF-3.B Develop minimum standards for landscape design, tree preservation, landscape and streetscape maintenance and establishment for new development. (Regulations)
- CUF-3.C Evaluate and establish alternative ways to fund elements of the Community Urban Forest Plan that may include, permit fees, gas tax/road tax for street trees, frontage assessments, public bond measures for the urban forest, and/or donations/fund raising events. (Funding)
- CUF-3.D Establish a tree account to provide for mitigation in those cases where trees must be removed and cannot be replaced. (Funding)
- CUF-4.A Coordinate with City departments to fulfill the goals and policies presented in the Community Urban Forestry Plan. (Planning and Design Standards)
- CUF-4.B Develop planting programs that improve the community urban forest on City property. (Planting Opportunities)
- CUF-4.C Refer also to CUF-1.B (Incentives) and CUF-1.C (Regulations).
- CUF-5.A In addition to the ongoing management of the public tree inventory, a review and update of the public street tree inventory should occur at least every three years to develop a coordinated and comprehensive maintenance program. (Assessment)
- CUF-5.B Evaluate contributions of the urban forest to salmon habitat protection, enhancement and development. (Assessment)
- CUF-5.C Distribute and update at regular intervals and as necessary, the "Required Tree Species List" for landscape designs and street tree plantings. The list should include prohibited species. An alternative species selection process for the public should be established. (Planting and Design Standards)

- CUF-5.D —Coordinate with public and private utility providers to develop appropriate tree maintenance standards and to ensure appropriate tree selection in areas affected by their areas of service. (Planting Opportunities, Planning and Maintenance)
- CUF-5.E Develop and distribute easy-to-understand visual information about the community urban forest and its care, including benefits and aesthetics. Possible audiences include: developers, property owners, schools, political leaders, neighborhood associations, media, green industry, utilities, and other businesses. (Education)
- CUF-5.F Develop information about tree retention and landscape regulations for distribution during the pre-development stage of a project or at other appropriate times so the public knows what is expected and why. (Regulations and Education)
- CUF-5.G Review, revise, and/or adopt enforcement procedures of urban forestry related policies, regulations, and standards. (Regulations)
- CUF-5.H Refer also to CUF-3.B (Regulations).
- CUF-6.A Coordinate tree-related activities with municipal departments, regional governments, local businesses, local clubs, and interest groups. (Planning and Maintenance)
- CUF-6.B Refer also to CUF-3.A (Planting Opportunities), CUF-4.A (Planning and Design Standards), and CUF-5.B (Assessment).
- CUF-7.A Continue, develop, and schedule annual community urban forestry related programs and events such as Arbor Day celebrations, educational workshops, and Community Urban Forestry Month. (Education, Community/Volunteer Outreach)
- CUF-7.B Continue the promotion and review of candidates for the Heritage Tree Program. (Community/Volunteer Outreach)
- CUF-7.C Determine a tree replacement value based on accepted industry appraisal standards. The values should be reviewed at least bi-annually and adjusted accordingly. (Assessment)
- CUF-7.D Refer also to CUF-2.A (Regulations), CUF-3.B (Regulations), and CUF-5.C (Planning and Design Standards).
- CUF-8.A Review and adopt nationally recognized, industry-wide standards for landscape installation and maintenance, tree installation, protection and maintenance. Develop new standards where needed. (Planning and Maintenance)
- CUF-8.B Refer also to CUF-1.C (Regulations), CUF-5.F (Regulations), and CUF-5.G (Regulations).
- CUF-9.A Develop an annual budget for the Woodinville Community Urban Forestry Program. (Funding)
- CUF-9.B Refer also to CUF-5.A (Assessment) and CUF-8.A (Planning and Maintenance).

- CUF-10.A Develop a master street tree plan that includes all appropriate areas of the City. (Planning and Maintenance)
- CUF-10.B Inventory available planting space in street rights-of-way areas to determine composition and planting needs. (Planting Opportunities)
- CUF-10.C Refer also to CUF-2.C (Community/Volunteer Outreach) and CUF-3.B (Regulations).
- CUF-11.A Refer to CUF-3.B (Regulations).
- CUF-12.A Refer to CUF-1.C (Regulations) and CUF-5.C (Planning and Design Standards).
- CUF-13.A Refer to CUF-1.C (Regulations) and CUF-2.D (Incentives).
- CUF-14.A Develop an approved "Landscape Plant List" as part of the City's Landscape Code and Standards (Regulations).
- CUF-14.B Refer also to CUF-5.C (Planting and Design Standards) and CUF-8.A (Planning and Maintenance).
- CUF-15.A Refer to CUF-4.A (Planting and Design Standards) and CUF-10.A (Planning and Maintenance).
- CUF-16.A Conduct a study that includes an inventory of the forested hillsides with regard to percentage of canopy cover, species composition, overall health, age, protection measures appropriate for the type of vegetation and site. The study should include preservation guidelines for future development. (Assessment)
- CUF-16.B Refer also to CUF-1.A (Education) and CUF-1.C (Regulations).
- CUF-17.A Refer also to CUF-1.C (Regulations), CUF-5.D (Planting Opportunities, Planning and Maintenance), and CUF-8.A (Planning and Maintenance).
- CUF-18.A Work with representatives of the local landscape industry, and wholesale and retail nursery businesses to promote community urban forestry education and tree selection. (Planting Opportunities)
- CUF-18.B Use existing and updated inventory information to determine an overall value of the community urban forest. (Assessment)
- CUF-18.C Refer also to CUF-3.B (Regulations) and CUF-7.A (Education).
- CUF-19.A Establish an "Adopt-a-Planting Area" program for citizens to participate in the beautification and maintenance of public planting areas. (Community/Volunteer Outreach)
- CUF-19.B Establish a landscape maintenance and design awards program for citizens and business owners. (Community/Volunteer Outreach)

- CUF-19.C Establish a "green" developer awards program that recognizes developers that pay special attention to the benefits of trees and plants and implements measures to enhance the community urban forest. (Community/Volunteer Outreach)
- CUF-19.D Research and apply for future grant money associated with the community urban forest. (Funding)
- CUF-19.E Refer also to CUF-7.A (Community/Volunteer Outreach).
- CUF-20.A Prepare and distribute tree-related informational articles and event announcements to newspapers, local organization newsletters, municipal newsletters or mailings. (Education)
- CUF-20.B Continue to achieve annual "Tree City USA" designation. (Community/Volunteer Outreach)
- CUF-20.C Refer also to CUF-5.E (Education), CUF-5.F (Education) and CUF-7.A (Education).
- CUF-21.A Develop a preventative maintenance program for public trees to improve tree health and reduce maintenance costs. (Planning and Maintenance)
- CUF-21.B Review the effectiveness of established development regulations that provide incentives to promote and encourage a gain in the community urban forest cover. (Incentives)
- CUF-21.C Refer also to CUF-1.C (Regulations), CUF-6.A (Planning and Maintenance), and CUF-8.A (Planning and Maintenance).

Implementation Program

Education component

The Woodinville Community will have an educational program recognizing trees as an important part of a healthy environment. Education concerning tree planting, maintenance, and the benefits of well placed trees is perhaps the most important tool that can be used to ensure that Woodinville's trees continue to be an integral part of its future. By involving residents, city staff, local government, and the business community in tree plantings, education, project or planning process, valuable information can be shared with those who will make critical decisions here in the future.

Implementation Strategies That Support Education & Information Goals *Reference Number and Description (Also supports CUF-//A)*

- CUF-1.A Complete public educational information for property owners and developers on incentive programs related to landscaping and tree preservation for public distribution. (CUF-16.B)

- CUF-5.E Develop and distribute easy-to-understand visual information about the community urban forest and its care, including benefits and aesthetics. Possible audiences include: developers, property owners, schools, political leaders, neighborhood associations, media, green industry, utilities and other businesses. (CUF-8.B, CUF-18.C, CUF-20.C)
- CUF-5.F Develop information about tree retention and landscape regulations for distribution during the pre-development stage of a project or at other appropriate times so the public knows what is expected and why. (CUF-20.C)
- CUF-7.A Continue and develop community forestry related programs and events such as Arbor Day celebrations, educational workshops, and Community Urban Forestry Month. (CUF-20.C)
- CUF-20.A Prepare and distribute tree-related informational articles and event announcements to newspapers, local organization newsletters, municipal newsletters or mailings.

Incentives Component

As Woodinville continues to grow, we can expect additional pressure for development. In order to maintain a healthy and a Northwest woodland character, it is important that an attempt is made to encourage developers and property owners to maintain existing trees as a part of their development. Within the process of developing a property the City of Woodinville provides regulatory language focused on incentives to developers who demonstrate a commitment to retaining existing trees as a part of their projects.

- CUF-1.B Research and develop opportunities for property owners and developers to create open space for tree preservation and natural vegetation. (CUF-4.C)
- CUF-2.D Develop incentives that promote landscape and tree planting within existing development to encourage a net gain in the community urban forest cover. (CUF-13.A)
- CUF-21.B Review the effectiveness of established development regulations that provide incentives to promote and encourage a gain in the community urban forest cover.

Regulations Component

The Woodinville community recognizes the very tangible benefits that trees provide in the urban environment.

Tree ordinances are among the tools used by communities striving to attain a healthy, vigorous, and well-managed community forest. Sound public policy and regulations simply provide the authorization and standards for management activities. These activities must be integrated into an overall management strategy if the ordinances are to be productive.

- CUF-1.C Review, revise, and develop urban forestry related standards and regulations to ensure they meet the City of Woodinville current Comprehensive Plan and the Community Urban Forestry Plan. (CUF-2.H, CUF-4.C, CUF-8.B, CUF-12.A, CUF-13.A, CUF-16.B, CUF-17.A, CUF-21.C)

- CUF-2.A Develop mitigation opportunities for tree loss by development and redevelopment. Replace trees lost due to clearing for development and other reasons to achieve a "no net loss" for tree planting. (CUF-7.D)
- CUF-3.B Develop public and private development minimum standards for landscape design, tree preservation, landscape and streetscape maintenance and establishment. (CUF-5.H, CUF-7.D, CUF-10.C, CUF-11.A, and CUF-18.C)
- CUF-5.F Develop information about regulations for distribution during the predevelopment stage of a project or at other appropriate times so the public knows what is expected and why. (CUF-7.D, CUF-18.C, CUF-20.B)
- CUF-5.G Review, revise, and/or adopt enforcement procedures of urban forestry related policies, regulations, and standards. (CUF-18.B)
- CUF-14.A Develop an approved "Landscape Plant List" as part of the City's Landscape Code and Standards.

Planning And Maintenance Of The Urban Forest Component

Planning is a method for achieving an end, a detailed formulation of a program of action, or an orderly arrangement of parts of an overall design or objective. The Woodinville Community Urban Forestry Plan intends to offer direction in properly maintaining, establishing, protecting and managing its urban forest. The following implementation strategies offer a direction for future projects and accomplishments toward fulfilling the goals and policies established in the Community Urban Forestry Plan.

- CUF-2.B Set up a program to plant trees as a mitigation for tree cutting that occurs in other areas of the City. Identify appropriate sites for tree planting.
- CUF-2.E Prepare disaster plans for storm-related emergencies, outbreaks of pests and diseases in native and non-native landscapes involving the community urban forest.
- CUF-5.D Coordinate with public and private utility providers to develop appropriate tree maintenance standards and to ensure appropriate tree selection in areas affected by their service line. (CUF-17.A)
- CUF-6.A Coordinate tree-related activities with municipal departments, regional governments, local businesses, civic groups, local clubs, and interest groups. (CUF-21.C)
- CUF-8.A Review and adopt nationally recognized, industry-wide standards for landscape installation and maintenance, tree installation, protection, maintenance and landscape security and safety concerns. Develop new standards where needed. (CUF-9.B, CUF-14.B, CUF-17.A, and CUF-21.C)
- CUF-10.A Develop a master street tree plan that includes all appropriate areas of the City. (CUF-15.A)

CUF-21.A Develop a preventative maintenance program for public trees to improve tree health and reduce maintenance costs.

Planting And Design Standards Component

The City of Woodinville will develop standards associated with proper street tree and landscape plant selection, design, planting, and maintenance. The following implementation strategies offer a direction for future projects and accomplishments toward fulfilling the goals and policies established in the Community Urban Forestry Plan.

CUF-4.A Coordinate with City departments to fulfill the goals and policies presented in the Community Urban Forestry Plan. (CUF-6.B and CUF-15.A)

CUF-5.C CUF-5.C Distribute and update at regular intervals and as necessary, the "Required Tree Species List" for landscape designs and street tree plantings. The list should include prohibited species. An alternative species selection process for the public should be established.. (CUF-7.D, CUF-12.A, and CUF-14.B)

Planting Opportunities Component

Many planting opportunities exist in the City, such as park areas, under-planted arterials, and in new neighborhoods. Plantings must take into consideration existing site constraints, current and future maintenance needs, and ensure their mature size and placement adds to the community environment.

CUF-3.A Develop tree planting and landscaping programs and regulations on public and private property that protect and enhance wildlife habitat. (CUF-6.B)

CUF-4.B Develop planting programs that improve the community urban forest on City property.

CUF-5.D Coordinate with non-city utility providers (Puget Sound Energy, water districts, telephone, and cable companies) to ensure appropriate tree selection in the areas affected by their service lines. (CUF-17.A)

CUF-10.B Inventory available planting space in street rights-of-way areas to determine composition and planting needs.

CUF-18.A Work with representatives of the local landscape industry, and wholesale and retail nursery businesses to promote community urban forestry education and tree selection.

Assessment Component

An inventory plays an important part of developing a successful community forestry program. Management and program decisions are based on the information derived from a tree inventory.

Assessment can be described and associated with many efforts toward urban forestry management. The Woodinville Tree Board members and City staff realize that acquiring and maintaining inventory data concerning the community forest is an important task. The following recommended implementation strategies will allow the community to achieve their vision of

Woodinville's urban forest in the future.

- CUF-2.F Review and update the current public street tree inventory to include other public areas of the City where there are trees and vegetation that will assist with community urban forest monitoring.
- CUF-2.G Examine effectiveness of regulations in meeting objectives of the Community Urban Forestry Plan and adjust as needed.
- CUF-5.A In addition to the ongoing management of the public tree inventory, a review and update of the public street tree inventory should occur at least every three years to develop a coordinated and comprehensive maintenance program. (CUF-9.B)
- CUF-5.B Evaluate contributions of the urban forest toward salmon habitat protection, enhancement and development. (CUF-6.B)
- CUF-7.C Determine a tree replacement value based on accepted industry appraisal standards. The values should be reviewed at least bi-annually and adjusted accordingly.
- CUF-16.A Conduct a study that includes an inventory of the forested hillsides with regard to percentage of canopy cover, species composition, overall health, age, and protection measures. The study should include preservation guidelines for future development.
- CUF-18.B Use existing and updated inventory information to determine an overall value of the community urban forest.

Funding Component

There are major factors or contributors to a successful urban forestry program. The support of the community, City Council, and municipal staff are important for a sustainable program. Funding is just as important. The Woodinville community and City staff must look at alternative sources of money to ensure the sustainability of the urban forestry program.

- CUF-3.C Evaluate and establish alternative ways to fund elements of the Community Urban Forestry Plan that may include, permit fees, gas tax/road tax for street trees, frontage assessments, public bond measures for the urban forest, and/or donations/fund raising events.
- CUF-3.D Establish a tree account to provide for mitigation in those cases where trees must be removed and cannot be replaced on site.
- CUF-9.A Develop an annual budget for the Woodinville Community Forestry Program.
- CUF-19.E Research and apply for future grant money associated with community urban forestry.

Community/Volunteer Outreach Component

Trees grace our environment and our lives; they provide a habitat for wildlife, soften city structures, clean our air, provide us with a connection to the past and to living nature, and protect our water resources. The Woodinville Tree Board is empowered to help develop and maintain a comprehensive community urban forestry program for the establishment and care of trees on public property within the city limits.

An important aspect in developing the urban forestry program and Community Urban Forestry Plan is public involvement. The Woodinville Tree Board is representing the public interest, and receiving input from them. To establish partnerships and direct public involvement the board will develop an outreach program to solicit ideas and participation from the residents of this community. The people of this community are a major part of the urban forest resource.

- CUF-2.C Develop tree and landscape planting programs to promote civic pride and involvement in the public and private sector. (CUF-10.C)
- CUF-7.A Continue, develop, and schedule annual community urban forestry related programs and events such as Arbor Day celebrations, educational workshops, and Community Urban Forestry Month. (CUF-19.E)
- CUF-7.B Continue the promotion and review of candidates for the Heritage Tree Program.
- CUF-19.A Establish an "Adopt-A-Planting Area" program for citizens to participate in the beautification and maintenance of public planting areas.
- CUF-19.B Establish a landscape maintenance and design awards program for citizens and business owners.
- CUF-19.C Establish a "green" developer awards program that recognizes developers that pay special attention to the benefits of trees and plants and implements measures to enhance the community urban forest.
- CUF-20.C Continue to achieve annual "Tree City USA" designation.



CITY OF WOODINVILLE TREE INVENTORY ANALYSIS

Introduction

The City of Woodinville was incorporated on March 31, 1993. Even prior to incorporation there was an active Woodinville community. In March 1995, the City Council established a Tree Board to advise them on tree matters in the City in response to Woodinville's 20-year vision statement which says:

"We have preserved our Northwest woodland character, our open space, and our clean environment."

Woodinville residents and business owners stated they value their Northwest woodland character with its trees and wooded areas, open spaces with views, green spaces, and a clean environment. Subsequently, Woodinville has been recognized by the National Arbor Day Foundation as a Tree City USA.

The Tree Board is charged with developing a plan and regulations that will protect, preserve, and enhance the Community's urban forest. The first step in this process was to conduct an inventory of the existing trees. The inventory information will be used to help develop future planting projects, determine maintenance needs and applications, and budget decisions regarding the community urban forest. The inventory information is used to assist the City with maintenance methods, maintenance schedules, and budget decisions. The inventory information will also assist with evaluating the environmental health of the City.

Background

The City of Woodinville is located northeast of Seattle, Washington. The City is situated in a valley with wooded hillsides that are starting to show signs of large scale development. The Sammamish River lies on the valley floor. The size of the City is approximately 5.6 square miles with a population of approximately 10,130 people (based on July 1, 1998 Washington State Office of Financial Management estimate).

Woodinville has experienced rapid growth over the past 20 years. The main commercial area is concentrated in downtown along NE 175th St. There is an agricultural district to the south of the City limits along the Sammamish River. The City has two large industrial areas and two smaller neighborhood commercial areas offering a range of employment opportunities in Woodinville.

Notable feature of the City along NE 175th Street include Molbak's, an established large nursery in the heart of downtown; Woodinville Memorial Park, the City's cemetery located on the west end of town; and interim City Hall, located in the old brick school building known as Sorenson with associated community ballfields. Additional features downtown include a

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comprehensive commercial development known as the TRF development with a small City park; Wilmot Gateway Park, the City's first major park under construction; and Woodin Creek, a tributary along the south bypass (NE 171st St.) that runs directly into the Sammamish River. Other notable features in the City limits include the Hollywood Schoolhouse, originally built in the 1920's; the Tourist District that contains the wineries and a brewery located in the south end of the City; and a small man-made privately owned lake known as Lake Leota located in the northeast part of the City.

A majority of the street trees on NE 175th St. were initially planted in planter boxes. The planter boxes were installed as a result of a Woodinville community effort prior to incorporation during the redesign of NE 175th St. The controversy surrounding the design was a three-lane versus a four-lane street. The planter box concept was introduced and property owners allowed for the them to be placed within a five foot planting strip. Eventually the trees outgrew the boxes and something needed to be done. Approximately 11 years ago, a large community group removed the trees from the boxes and planted them in the areas they are currently located. During the year, the planter boxes are full of beautiful plants that are kept up by local garden clubs. The three fir trees standing on the southwest corner of 140th Ave. NE were originally to be removed during that same redesign of 140th Ave. NE and NE 175th Street. However, they were retained due to the efforts of individuals within the community. They and the planter boxes are another link in our efforts to preserve our woodland heritage.

Tree Inventory Report

The downtown area was developed primarily during King County jurisdiction. Street trees and other landscape features were installed in accordance with King County development regulations. However, an inventory of the trees was never conducted. Since the City's incorporation, development requirements have included additional street tree installation.

A tree inventory was conducted in the fall of 1996 at the request of the Tree Board. The inventory was conducted by University of Washington student, Yan Ping Liang. The inventory was limited to the downtown area along NE 175th Street in the Commercial Business District zone, the North Bypass along NE North Woodinville Way, and the South Bypass along NE 171st St.

The public tree inventory that was conducted consists of a report outlining the methodology used, observations, and recommendations for problems noted.

Tree Analysis

The inventory revealed there are 972 public trees including 30 different species in the City of Woodinville commercial areas. There are 7 additional management areas where trees were not individually inventoried. The species breakdown (Attachment A-1) indicates *Acer rubrum* (red maple) and *Pyrus calleryana* (flowering pear) comprise 46% of the street trees.

The information gathered for each tree has been entered into a computer database program called UTMS. The information includes:

- Species;
- Diameter at breast height;

- Condition/health of the tree;
- Location value (shading/aesthetics);
- Address;
- Age of the tree;
- Public or Private tree;
- Irrigation; and
- Type and size of space where tree is located.

Each tree is given an identifying number so records can be kept on each individual tree. All of these factors are used to determine the tree's value. The value is calculated at \$42.00 per square inch. This figure is a standard formula used in the arborist and landscaping industry. The value accounts for factors that may not be favorable. The preliminary established value of the street trees inventories total approximately \$411,776. Follow-up verification is required to finalize this number.

Specific observations were made during the inventory. These observations are:

Spacing for *Pyrus calleryana* (Flowering pear)

The *Pyrus calleryana* along 140th Ave. NE near NE 171st St. were planted too close together. The report indicates that some are planted 10 feet apart and some at 13-15 feet apart. Neither of these distances are adequate. In order to avoid future problems, an arborist should be contacted to evaluate and make recommendations for proper spacing of specific tree species.

Mechanical wounds on street trees

There is evidence that street trees are being damaged by landscape maintenance methods that include weed trimming machines. The wounds on the trees could become fatal. A landscape maintenance specialist or other similar professional should be consulted on how to correct this problem. Additionally, maintenance standards should include appropriate methods to avoid this problem in the future.

Shallow planting

At the time this inventory was conducted, some of the *Pyrus calleryana* along NE 171st St. were not planted deep enough. Since then, however, some of those trees were removed and replanted in conjunction with a project along that street. A reinspection should occur to confirm that shallow planting conditions still exist and an evaluation made at that time.

Tree roots exposed on *Acer rubrum* (Red maple)

Acer rubrum along NE 171st St. have roots exposed most likely from shallow watering. As with the shallow planting, these trees should be reinspected and an evaluation made at that time to correct the problem if feasible.

Species diversity

Because nearly half of the street trees are only two different species, a potentially devastating community urban forest loss could occur with a major pest or disease problem that attacks one or the other species. A greater representation of the other 28 species present in the City along with other Tree Board recommended tree species should be encourage and/or required.

Overgrown *Platanus x acerifolia* (London plane tree)

The *Platanus x acerifolia* along 140th Ave. NE and NE 175th St. have outgrown their spaces. Roots appear to be growing near or at the surface causing some sidewalk damage. A collaboration effort between the Planning Department and Public Works Department in conjunction with a consulting arborist should begin as soon as possible to determine the best course of action to correct this problem.

Tree Inventory Maintenance

The following procedures are recommended with regard to updating tree inventory records in the UTMS:

1. Street and public trees that are required as part of new development shall be recorded upon acceptance by the City of the project. This process can be done via a manual forms method or via the permit tracking system. This information will be added monthly to the UTMS inventory database.
2. Specific tree information shall accompany tree maintenance crews on the job. Changes in the trees health or conditions shall be recorded. Also a date will be recorded to assist in the maintenance cycles. Problems shall be noted so that action can be taken in a timely manner. The Public Works Department, Parks Department, and Planning Department shall coordinate all public tree and plant efforts.
3. An inventory audit should be conducted at least every three years to confirm public tree information.

APPENDIX A

City of Woodinville
Tree Inventory Summary

Species	Common name	Scientific name	Quantity of Trees in City	Percent of Total Trees	Value of Trees (\$42.00 sq. in.)
ACCI	Vine maple	<i>Acer circinatum</i>	28	3%	\$123
ACPL	Norway maple	<i>Acer platinoides</i>	20	2%	\$19,369
ACRU	Red maple	<i>Acer rubrum</i>	247	25%	\$87,132
CABE	Columnar hornbeam	<i>Carpinus betulus "Fastig"</i>	4	0%	\$8
CEAT	Blue atlas cedar	<i>Cedrus atlantica</i>	1	0%	\$2,683
CEDE	Deodar cedar	<i>Cedrus deodara</i>	1	0%	\$12,390
COFL	Eastern dogwood	<i>Cornus florida</i>	6	1%	\$22
GLTR	Honey locust	<i>Gleditsia triacanthos</i>	7	1%	\$149
LIST	Sweet gum	<i>Liquidambar styraciflua</i>	30	3%	\$4,141
MA?	Flowering crabapple	<i>Malus sp.</i>	-		\$0
MARA	Radiant crabapple	<i>Malus radiant</i>	3	0%	\$10
NATVEG	Native vegetation	<i>Native vegetation</i>	-		\$0
PI?	Pine	<i>Pinus</i>	1	0%	\$128
PIAB	Norway spruce	<i>Picea abies</i>	1	0%	\$35
PINI	Austrian pine	<i>Pinus nigra</i>	8	1%	\$4,336
PLAC	London plane	<i>Platanus x acerifolia</i>	80	8%	\$139,935
POTR	Quaking aspen	<i>Populus tremuloides</i>	6	1%	\$97
PR?	Cherry	<i>Prunus sp.</i>	2	0%	\$105
PRYE	Yoshino cherry	<i>Prunus yedoensis</i>	37	4%	\$3,127
PSME	Douglas-fir	<i>Pseudotsuga menziesii</i>	106	11%	\$74,423
PYCA	Flowering pear	<i>Pyrus calleryana</i>	202	21%	\$9,725
QUCO	Scarlet Oak	<i>Quercus coccinea</i>	5	1%	\$1,373
QUPA	Red oak	<i>Quercus palustris</i>	10	1%	\$10,004
ROPS	Black locust	<i>Robinia Pseudoacacia</i>	9	1%	\$26,442
SEGI	Giant redwood	<i>Sequoiadendron gigantea</i>	10	1%	\$90
SOAU	European mt. ash	<i>Sorbus aucuparia</i>	57	6%	\$3,677
STJA	Japanese snowbell	<i>Styrax japonica</i>	3	0%	\$13
THPL	Western red-cedar	<i>Thuja plicata</i>	29	3%	\$3,107
TICO	Big leaf linden	<i>Tilia cordata</i>	59	6%	\$9,132
VACANT	VACANT SITE	VACANT SITE	-		\$0
		TOTALS	972		\$411,776

12/4/96

1996 City of Woodinville Aerial Photo

← North



ORDINANCE NO. 207

AN ORDINANCE OF THE CITY OF WOODINVILLE,
WASHINGTON, AMENDING SECTIONS 2.24.010,
2.24.020, 2.24.040, 2.24.050, 2.24.060 AND ADDING A
NEW SECTION, 2.24.065 TO THE WOODINVILLE
MUNICIPAL CODE, RELATING TO THE DUTIES AND
RESPONSIBILITIES OF THE TREE BOARD.

WHEREAS, the citizens of the City of Woodinville are supportive of ensuring quality care of trees and other vegetation, and

WHEREAS, the citizens of the City of Woodinville are supportive of creating and sustaining a City Tree board within the City;

WHEREAS, the City Council finds it necessary to amend certain aspects of the Tree Board, NOW THEREFORE

THE CITY COUNCIL OF THE CITY OF WOODINVILLE, WASHINGTON, DO
ORDAIN AS FOLLOWS:

Section 1. Amendments to Woodinville Municipal Code Section 2.24.010 of the Woodinville Municipal Code (herein referred to as WMC) which reads:

2.24.010 Definitions

Street trees: "Street trees," are herein defined as trees, shrubs, bushes, and all other woody vegetation on land lying between property lines on either side of all streets, avenues, or ways within the City.

Park Trees: "Park trees," are herein defined as trees, shrubs, bushes, and all other woody vegetation in areas owned by the City, or to which the public has free access as a park.

is hereby amended to read as follows:

2.24.010 Definitions.

- (1) "Community Urban Forest" shall mean the aggregate of public and private trees and plants in the City.
- (2) "Community Urban Forestry Plan" shall mean a plan adopted as part of the Comprehensive Plan establishing the goals, policies, and implementation strategies for developing and maintaining the Community Urban Forest within the City of Woodinville.
- (3) "Community Urban Forestry Standards" shall mean a set of standards and specifications to include, at a minimum, provisions for the care, preservation, pruning,

planting, replanting, or removal of trees and shrubs in the parks, along public streets and in other public areas of the City, together with development standards for private development projects which require City approval.

(4) "Tree and/or plant industry professional" shall mean an individual who has professional experience in the tree and/or plant industry including, but not limited to, arboriculture, landscaping, horticulture, urban forestry or other similar industries.

(5) "Park trees and plants" are herein defined as trees, shrubs, and all other woody vegetation in areas owned by the City, or to which the public has access as a park.

(6) "Street trees and plants" are herein defined as trees, shrubs, and all other woody vegetation on public right-of-way on either side of all streets, avenues, or ways within the City.

Section 2.24.020 which reads:

2.24.020 Creation and Establishment of a City Tree Board

There is hereby created and established a City Tree Board for the City of Woodinville, Washington. The Tree Board shall be made up of five members: residents or business owners, with at least one business owner and at least three residents and with a certified arborist, who is not required to live in Woodinville or the Planning Area. Any arborist who does live within Woodinville or the Planning Area will be given preference over those who do not. The members of the board shall be appointed by the Mayor and with the approval of the Council.

is hereby amended to read as follows:

WMC 2.24.020 Creation and Establishment of a City Tree Board.

There is hereby created and established a City Tree Board for the City of Woodinville, Washington. The Tree Board shall be made up of five members, residents and business owners of the City, with at least one City business owner and at least three City residents, including 2 tree and/or plant industry professionals. The members of the board shall be appointed by the Mayor with the approval of the Council.

Section 3. Section 2.24.040 which reads:

2.24.040 Compensation

Members of the Board shall serve without compensation.

is hereby amended to read as follows:

2.24.040 Compensation.

Members of the Board shall serve without compensation but with the appreciation of the City Council

Section 2.24.050 which reads:

2.24.050 Duties and Responsibilities

It shall be the responsibility of the Board to study, investigate, council and develop and/or update annually, and administer a written plan for the care, preservation, pruning, planting, replanting, removal or disposition of trees and shrubs in the parks, along streets and in other public areas. Such plan will be presented to the City Council and upon their acceptance and approval shall constitute the official comprehensive City Tree Plan for the City of Woodinville, Washington. Upon City Council approval of the Plan, the Board will be responsible for reviewing and developing educational materials to be distributed to developers and citizens to assist in the implementation of the plan.

The Board, when requested by the City Council, shall consider, investigate, make finding, report and recommend upon any special matter of question coming within the scope of its work.

is hereby amended to read as follows:

2.24.050 Duties and responsibilities.

(1) It shall be the responsibility of the Board as directed by the City Council to study, investigate, develop, advise, recommend, and update, at least every three years, a written plan and standards to include, at a minimum, provisions for the care, preservation, pruning, planting, replanting, or removal of trees and shrubs in the parks, along streets and in other public areas, which plan is herein referred to as the Community Urban Forestry Plan and the Community Urban Forestry Standards. The Community Urban Forestry Plan will be presented to the City Council and upon their acceptance and approval shall be adopted as a part of the Comprehensive Plan and Development Regulations of the City, and shall constitute the official comprehensive Community Urban Forestry Plan for the City of Woodinville, Washington. The Community Urban Forestry Standards will be presented to the City Council and upon their acceptance and approval shall become a part of the appropriate parts of the City of Woodinville development codes in accordance with 2.24.050(5-6).

(2) Subsequent to City Council approval of the Community Urban Forestry Plan, the Board will be responsible for reviewing and developing educational materials to be distributed to developers and citizens to assist in the implementation of the Community Urban Forestry Plan.

(3) The Community Urban Forestry Plan shall establish the goals, policies, implementing strategies, and monitoring program, for developing and maintaining the Community Urban Forestry Plan within the City of Woodinville.

(4) The Community Urban Forestry Standards shall, at a minimum, include a set of specifications for the selection of species, preparation, planting, care, and maintenance of trees to be planted in the public places of the City. Additionally, the Community Urban Forestry Standards shall include:

- a. A list of official tree species for appropriate locations in Woodinville.
- b. Planting and spacing requirements of street trees and plants on public property.

- (5) Following its adoption by the City Council, the appropriate sections of the Community Urban Forestry Standards shall be included within and shall become a part of the City of Woodinville Development Standards and Specifications of the Public Services Department.
- (6) The appropriate sections of the adopted Community Urban Forestry Standards shall be included within and shall become a part of the City of Woodinville Municipal Code to be applied by the Planning Commission and Hearing Examiner to all new development, and enforced by the Planning Director.
- (7) The Board, when requested by the City Council, Planning Commission or Parks Board shall consider, investigate, make finding, report and recommend upon any special matter of question coming within the scope of its work.
- (8) The Board shall be responsible for receiving and reviewing applications or nominations, and recommending City Council recognition of trees to be designated in the adopted Heritage Tree program of the City.
- (9) The Board may coordinate an Arbor Day Celebration each year.
- (10) The Board shall participate in the joint City Council, Boards and Commissions meetings as scheduled by the City Council.

Section 2.24.060 which reads:

2.24.060 Operation

The Board shall choose its own officers, make its own rules and regulations and keep a journal of its proceedings. A majority of the members shall be a quorum for the transaction of business.

is hereby amended to read as follows:

2.24.060 Operation.

The Board shall choose its own officers and establish their own procedural rules and regulations and keep a journal of its proceedings. A majority of the members shall be a quorum for the transaction of business.

Section 3. WMC Chapter 2.24 is hereby amended by adding a new Section 2.24.065 to read as follows:

2.24.065 Technical Advisors to the Tree Board

The Board may call upon a certified arborist, horticulturist, landscape architect or other similar professional, that is retained by the City, to provide them with technical advice on an as needed basis. At a minimum, a certified arborist shall be on call to attend regular Tree Board meetings. Each year during the City budgeting process, the Board shall provide to City staff an estimate of anticipated required technical advisory time to be used by the Board for the ensuing year to be approved by the City Council.

Section 4. Severability.

If any section, sentence, clause or phrase of this ordinance should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other section, sentence, clause or phrase of this ordinance.

Section 5. Effective Date.

This ordinance, or a summary thereof consisting of the title, shall be published in the official newspaper of the City, and shall take effect and be in full force five (5) days after publication.

PASSED BY THE CITY COUNCIL OF THE CITY OF WOODINVILLE THIS 27th DAY OF APRIL , 1998.

APPROVED:



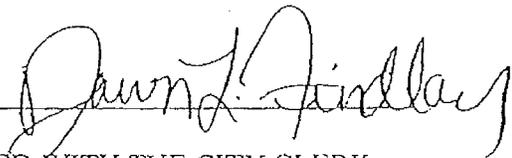
Donald J. Brocha, Mayor

ATTEST/AUTHENTICATED:



Sandra Steffler
City Clerk

APPROVED AS TO FORM :
OFFICE OF THE CITY ATTORNEY

By: 

FILED WITH THE CITY CLERK:
PASSED BY THE CITY COUNCIL:
PUBLISHED:
EFFECTIVE DATE:
ORDINANCE NO. 207



City of Woodinville
Community Urban Forestry Plan

PUBLIC PARTICIPATION

Public Open Houses

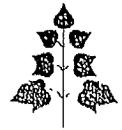
The Tree Board opened the Community Urban Forestry Plan for public comment on October 9, 1998. Public open houses were advertised and held on October 13 and October 15. No written responses have been received. Five people from the public attended the open houses. Two individuals expressed concern that the plan would dictate what kind of residential landscaping they had to install on their property and what they could or could not do with their trees.

Joint Planning Commission and Parks and Recreation Commission Meeting

The Board presented the plan to the Planning and Parks & Recreation Commission at a joint meeting on October 21, 1998. After review and discussion, the general consensus from the Commissions was to forward their endorsement of the Plan to the City Council.

City Council Adoption

The City Council reviewed the Community Urban Forestry Plan at the Study Session of November 2, 1998. The Council then held first reading of the adopting ordinance, Ordinance No. 228, on November 23, 1998. The City Council is scheduled to hold second reading of the ordinance on December 14, 1998. As of November 25, 1998, no written comments have been received.



Community Urban Forestry Plan Open House

 The City of Woodinville Tree Board invites you to attend an Open House to review and comment on the City's Draft Community Forestry Plan. The event is scheduled for Tuesday, October 13, 1998 at 3:00 pm, and Thursday, October 15, 1998 at 7:00 pm, at City Hall. The Board will also introduce the Plan to the Planning and Parks Commissions on October 21, 1998, at 7:00 pm. The public is invited to attend these sessions.

 The Community Urban Forest includes all trees and plants within the City of Woodinville. The Plan will guide the protection of these resources, preserve the City's Northwest woodland character, and contribute to our clean environment. The Plan covers goals and policies that reflect Woodinville's vision of a City that values its health, well-being, and livability, and upholds scenic beauty as an important natural resource.

 The Draft Community Urban Forestry Plan will be available October 9, 1998, at City Hall weekdays between 8:00 am and 5:00 pm for review. The Tree Board invites and encourages your comments. You may send your comments to the City of Woodinville, attention: Stephanie Cleveland, Planning Department, 13203 NE 175th St. , Woodinville, WA 98072.

 ***For more information about the Tree Board, contact our web site www.woodinville-city.co. You will also find information about the National Arbor Day Foundation on our site, or contact them direct at www.arborday.org.***



Falcons jump over Kangaroos

by Russ Paris
Woodinville scored quickly and often in the first period against Lake Washington running up a 28-0 lead in the first half on two passing and two running touchdowns.

The first Woodinville drive started on the Falcon 19-yard line. A 37-yard run by Jamie Franklin moved the ball to the 17. Aaron Hinesline burst off tackle to the 40 where Kris Hiltmaier lofted a 40-yard touchdown pass to Zach Fuatosopos.

On Woodinville's next possession, Jeremy Tager sliced off tackle and out ran every Kang defender for a 77-yard touchdown. Next, Hiltmaier threw his second TD pass to Blake Macintosh to make it 11-0 at the end of the first period.

The Falcons scored again in Tager's six yard run following Hinesline's interception of a Kang pass and 40 yard run to the 18.

All of Curtis Cruz's PATs were good for a 28-0 halftime lead for WHS.

In the second half Lake Washington scored twice on 30 yard passes to Nesby Glasgow (the number Tenner 979 UW Row Boat player of the same name) and a six-yard run making it 28-12.

Falcon quarterback Hiltmaier returned the favor

with a 5 yard TD run to put the game out of reach 35-12 at the end of three quarters.

Head coach Terry Agnew sent the reserves in during the fourth period. Alexander Batsinger ran for 15 yards after taking the handoff from Josh Stein.

Lake Washington scored with a 13 yard pass to make it 49-24.

Offensively, Woodinville was led by Jeremy Tager's eight carries for 113 yards. Defensively, Josh O'Leary had a fumble recovery, and Aaron Hinesline made an interception. Jamie Franklin had eight tackles and three unassisted tackles for 11 stops.

Woodinville ran up 408 total yards; Lake Washington had 280.

The next game for the Falcons is Oct. 2 at Redmond High School.

In other Northshore action, Redmond High School rushed for four touchdowns to defeat Bothell 33-10. Josh Speed scored the only TD for Bothell in the third quarter. The Cougars are now 2-1 for the season.

In a Saturday night game, Ingleside avoided an upset by defeating Garfield 30-23 in two overtimes.

The Vikings missed a chance to break the 16-16 tie in regulation time, but Ryan

Sorenson's 25 yard kick missed to the left sending the game into overtime.

Billy Lanis scored his third touchdown of the night with a two yard run. Ryan Madayag, with 231 rushing yards, setup the winning play with a 23 yard run.

Swim lessons

Northshore Recreation Council will sponsor swim lessons for the non-swimmer thru beginner level at Woodmoor school pool, Wednesdays and Thursdays. Lessons start every half hour, beginning at 5 p.m. The next session begins Oct. 7. The cost

is \$35 for ten lessons. To register, call Georgia Bibbins, evening, at 783-3186.

Basketball tryouts set

Tryouts for the Woodinville Boys Eastside Traveling League (Select) tryouts will

be held Oct. 4, 6 and 8 at the Woodinville High gym. Grades 6 and 7 will try out from 6 to 7:30 p.m. and grades 8 and 9 from 7:30 to 9 p.m.

A parents' meeting will be held Oct. 4 at 5 p.m. at the gym.

For details, call Dave Lombard at (425) 485-7015.

Legend wins opener 3-0

The U-13 Legend defeated Snohomish United in the opening game of the Premier League season Sept. 13 at the Snohomish High School field. Legend was led by Carly Sawhill with one goal and one assist.

Other goals were scored by Heidi Jacobson and Britt Johnson. Christina Nordmark recorded the shutout for Legend.

The team is coached by Norm England and Ken Jones.



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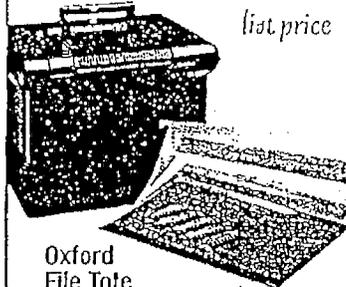
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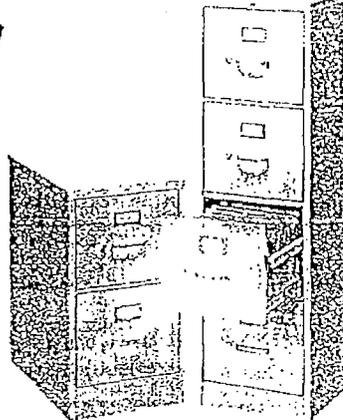
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Everett: 1405 SE Everett Mall Way Everett Mall • 425-353-7000
Bothell: 15811 Bothell Way NE, Box 6000 Everett Highway • 425-485-9611



Community Urban Forestry Plan Open House

The City of Woodinville Tree Board invites you to attend an Open House to review and comment on the City's Draft Community Urban Forestry Plan. The event is scheduled for Tuesday, October 13, 1998, at 3:00 p.m. and Thursday, October 15th, 1998, at 7:00 p.m. The Board will also introduce the Plan to the Planning and Parks Commissions on October 21, 1998, at 7:00 p.m. The public is also invited to attend these sessions.

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The Draft Community Urban Forestry Plan will be available October 9, 1998, at City Hall weekdays between 8:00 a.m. and 5 p.m. for review. The Tree Board invites your comments. You may send your comments to City of Woodinville, Attn: Stephanie Cleveland, Planning Department, 13203 NE 175th St., Woodinville, WA 98072.

For more information about the Tree Board, contact our web site at www.woodinville-city.com. You will also find information about the National Arbor Day Foundation on our site or contact them direct at www.arborday.org.

Published September 28, 1998



The National Arbor Day Foundation®

APPENDIX F

211 N. 12th Street • Lincoln, NE 68508 • 402-474-5655 • www.arborday.org

March 17, 1997

Joseph Meneghini
City Manager
13203 NE 175th Street
Woodinville, WA 98072

Dear Mr. Meneghini:

Congratulations to Woodinville on being named as a 1996 Tree City USA!

As we celebrate the 125th anniversary of Arbor Day this year, it is especially appropriate to recognize the value of trees to our communities. Trees beautify and lend value to our homes, neighborhoods, parks and business areas. At the same time, those trees conserve energy, help clean the air, protect rivers and streams, and provide a home for wildlife.

The Tree City USA award indicates that you take your municipal tree-care responsibilities seriously.

An effective community forestry program is an ongoing process of growth and renewal--a program of planting and care that continues through the years. As a Tree City USA, you have a solid foundation for that process of improvement.

Tree City USA is sponsored in cooperation with the National Association of State Foresters. State foresters are responsible for the presentation of the Tree City USA flag and other materials. We will forward your awards to Tracy Salisbury in your state forester's office. They will be coordinating the presentation with you. I hope you will make the presentation of the Tree City USA award a part of your Arbor Day celebration, and that your town will give special emphasis to Arbor Day during its 125th anniversary.

Again, congratulations on receiving this national recognition for your tree-care program.

Best regards,

John Rosenow
President

cc: Joe Wallis



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Former Secretary of Interior

EDDIE ALBERT
Entertainer

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Executive Vice President
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U.S. Congressman

DONALD BORUT
Executive Director
National League of Cities

DICK CAVETT
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Executive Director
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Chief
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Ski Club

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Former National First Lady

JAMES C. OXSON
J. Sterling Morton Biographer

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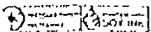
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March 6, 1998

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STAFF

JOHN ROSENOW
President

SUSAN MCINTOSH KIRZ
Executive Vice President

Roy Rainey
City Manager
13203 NE 175th Street
Woodinville, WA 98072

Dear Mr. Rainey:

Congratulations to Woodinville on being named as a
1997 Tree City USA!

A community's tree-planting program is a living memorial to the citizens' concern for the quality of life. The trees we plant and care for today will increase property values, cool and beautify our cities, fight pollution, conserve energy, and give wildlife a home for years to come.

The Tree City USA award indicates that you take your municipal tree-care responsibilities seriously.

An effective community forestry program is an ongoing process of growth and renewal--a program of planting and care that continues through the years. As a Tree City USA, you have a solid foundation for that process of improvement.

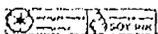
Tree City USA is sponsored in cooperation with the National Association of State Foresters. State foresters are responsible for the presentation of the Tree City USA flag and other materials. We will forward your awards to Tish Carr in your state forester's office. They will be coordinating the presentation with you. It would be especially appropriate to make the Tree City USA award a part of your Arbor Day ceremony.

Again, congratulations on receiving this national recognition for your tree-care program.

Best regards,

John Rosenow
President

cc: Rebecca Perkins



CITY OF WOODINVILLE, WASHINGTON

RESOLUTION NO. 151

A RESOLUTION OF THE CITY COUNCIL CREATING AND SETTING FORTH THE HERITAGE TREE PROGRAM FOR THE CITY OF WOODINVILLE

WHEREAS, The vision statement of the City of Woodinville for the year 2015 states that "We have preserved our Northwest woodland character" and Goal CD-2 of the Comprehensive Plan states the City's intent "*To maintain the Northwest woodland character and heritage of Woodinville*"; and

WHEREAS, Trees are the principal component of the City that contributes to "the northwest woodland character" the City strives to preserve; and

WHEREAS, The Tree Board of the City recommends the establishment of this HERITAGE TREE PROGRAM to promote healthy trees in the City of Woodinville,

THEREFORE, THE CITY COUNCIL OF THE CITY OF WOODINVILLE, WASHINGTON, DOES RESOLVE AS FOLLOWS:

Section 1. The purpose of the HERITAGE TREE PROGRAM shall be to accomplish the following:

- A. Increase public awareness of trees in general;
- B. Draw attention to and protect trees that are unique examples of genus, species or cultivar form, size or other desirable feature(s);
- C. Provide publicity for increased awareness of the purpose and activities of the City of Woodinville;
- D. Encourage public participation in the identification and perpetuation of HERITAGE TREES in the City.

Section 2. The definition of a HERITAGE TREE is a tree or stand of trees that is particularly desirable because it has valued, unique characteristics that set them apart from other similar trees. Valued, unique characteristics include uncommon of genus, species, form, size, location, historic significance or other desirable feature(s).

Section 3. The process for nomination shall be as follows:

- A. Any City resident or City business owner interested in identifying and preserving heritage trees may nominate a tree or trees on any property for "HERITAGE" status.
- B. Heritage tree nominations shall be submitted to the Tree Board of the City on forms provided by the City and include a photograph and location of the tree.
- C. The owner of the property on which the nominated tree is located shall agree to the nomination by signing the consent statement on the nominating form.
- D. The owner of the property on which the nominated tree is located shall agree to allow the tree to be placed on a City map of heritage trees.
- E. The nomination shall include a description of the tree nominated and the characteristics that merit the tree being designated for heritage status.

F. The nomination shall include a history of the tree nominated, if known.

Section 4. The authority and process for designation of Heritage Trees shall be as follows:

A. The City Council may nominate a tree or stand of trees and shall have exclusive authority to designate trees for HERITAGE TREE status for the City.

B. The Tree Board shall convene themselves or be convened at the request of the City Council to consider HERITAGE TREE status nominations when a nomination is submitted for consideration. A quorum of members of the Tree Board shall be present for recommending HERITAGE TREE designation. No tree may be recommended for HERITAGE TREE status unless four Board members vote in favor of the nomination except that the City Council may designate a HERITAGE TREE or stand of trees without the recommendation of the Board. The Board shall then forward its recommendation to the City Council.

C. Criteria to be considered by the Tree Board for recommending a nomination for HERITAGE TREE status shall include the following:

(1). The tree(s) nominated shall be a specimen tree that exhibits exceptional characteristics worthy of standards for such trees in the City, or;

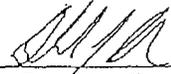
(2). The tree nominated shall exhibit unique features that are notable (i.e. unique specimen of a genus, species, form, size location, significant historic or other desirable feature[s]);

(3). The owner of the tree agrees to the "HERITAGE" designation of the tree and agrees to placing a notation of the tree on a map of heritage trees in the City.

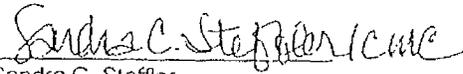
Section 5. The owner of the tree must agree in writing to the "HERITAGE" designation of the tree, to placing a notation of the tree on a map of heritage trees in the City, and to identifying the HERITAGE TREE by a plaque or other appropriate identification selected by the City with concurrence of the owner and to be paid for and installed by the City.

Section 6. A HERITAGE TREE or stand of trees is retained by the property owner and does not become the property or responsibility of the City. The property owner is responsible for all maintenance and liability issues pertaining to the tree or trees. A HERITAGE TREE designation does not prohibit a property owner from developing the property and/or removing the HERITAGE TREE or trees subject to the City's Tree Retention Regulations. If a property owner removes the HERITAGE TREE or stand of trees, the plaque or identification marker shall be returned to the City.

PASSED AND APPROVED THIS 14 DAY OF September, 1998.


Donald J. Brocha, Mayor

ATTEST/AUTHENTICATED:


Sandra C. Steffler
City Clerk/CMC

September 14, 2011 Tree Board Meeting

Urban Forestry Resources – Disaster Recovery

Urban Forestry – Best Practices Guide for Public Works Managers

<http://www2.apwa.net/documents/About/CoopAgreements/UrbanForestry/UrbanForestry-4.pdf>

Preparing the urban forest – storm recovery articles

<http://edis.ifas.ufl.edu/pdffiles/FR/FR17300.pdf>

Leesburg Virginia – Urban Forestry Resource Page

<http://www.leesburgva.gov/index.aspx?page=946>

Urban Forestry Best Management Practices for Public Works Managers

Urban Forest Management Plan



Urban Forestry Best Management Practices for Public Works Managers
Urban Forest Management Plan

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Urban Forestry Best Management Practices for Public Works Managers

Introduction

Trees on streets and on other publicly owned properties managed by public works agencies provide a multitude of aesthetic and environmental benefits to citizens, businesses and visitors alike. Beyond shade and beauty, trees also have practical benefits and a real monetary value that cities sometimes are unaware of—your urban forest provides valuable public services and could be worth over a million dollars. Unlike other public infrastructure components, properly planted and maintained trees increase in value over time.

An urban forest management plan, based on recent tree inventory data and analysis of available staff, equipment, and budget resources, is an essential tool for protecting this valuable resource. An urban forest management plan is an action plan; it gives public works agencies detailed information, recommendations, and resources needed to effectively and proactively manage public trees.

The purpose of having an urban forest management plan is to ensure that a community will enjoy the benefits of trees through proper arboricultural techniques and management practices. The goal of the plan is to state what is needed to manage the urban forest and to describe activities and services required to execute these responsibilities.

If a management plan is based on analysis from an accurate tree inventory and developed with input from public works staff, arboricultural experts, and the citizens, then the public works agency responsible for the urban forest will realize many benefits:

Increased Public Safety

All public works agencies know that a large part of their primary mission is to assure safety and manage risk related to public infrastructure. A tree inventory and management plan will provide lists of trees requiring priority removal and pruning that a manager can carry out within the limits of budget and time. The inventory can be used subsequently to monitor trees for safety risks on a continual basis. By implementing recommendations made in the management plan, storm damage risks will also decline.

Increased Efficiency

Once an inventory has identified the work to be done and a management plan has prescribed a maintenance program, a manager can execute that work in a much more efficient manner than before. By scheduling all work in a given area to be done at the same time (rather than by reacting to single requests) the savings in travel and setup time are substantial, with historical examples showing about a 50 percent reduction in cost—especially when a system of rotational work and/or preventative maintenance is adopted. There is also increased efficiency in the office created by using an electronic inventory to locate and manipulate records and select and schedule work. The efficient response to citizen requests and questions also improves customer service.

Facilitate Short- And Long-Term Planning

Planning can be made much easier by using the results of the tree inventory and the analysis of an urban forest management plan. Since maintenance and planting needs have been assessed, and other issues such as hardscape conflicts and right-of-way clearances, personnel levels and training, and even public relations are addressed in the plan, short and long-term planning for the forest is made easier.

Justify Budgets

An urban forest management plan provides the data and analysis needed to determine specific levels of funding for tree maintenance and tree planting projected over a multi-year period. With accurate data, a manager can establish, prioritize, and justify annual budget requests. The tasks and associated costs are clearly spelled out in the plan, and can be supported by detailed lists. Many public works managers have found that they have much greater success with budget requests that are based on the analysis of high-quality data. Also, a good inventory provides a solid basis for grant applications.

Documentation

For many reasons, public works managers are frequently asked to provide documentation of their actions. This documentation can range from annual work accomplishments to a contractor's costs per tree, from a removal list to a specific service request. Some requests may be routine, while others may have strong budgetary or even legal implications. The urban forest management plan and most tree inventory software programs make such documentation very easy through reports that are included in the plan or that can be generated from the inventory database. Software packages come with standard reports, and there is usually a mechanism for creating special reports.

Management Plan Components

The components and variations of urban forest management plans are many, depending on the developmental stage of the urban forestry program within a public works agency. Generally, these elements are included or addressed in the plan:

1. Tree inventory data and analysis
2. Tree inventory and mapping data management software
3. Tree risk reduction/emergency storm response plan
4. Tree board or advisory council development
5. Public relations and education
6. Urban forest cost/benefit analysis

In the following sections, these six basic components of a plan will be discussed in more detail. They will be prioritized for the benefit of managers who are just beginning a program and for managers who have an established program and are looking to improve it.

Tree Inventories

What Is a Tree Inventory?

Public tree inventories are a statistically reliable survey of publicly owned and managed trees, used to determine the location and the exact or estimated measurements of quantity, quality, health, and trends of the urban forest, as well as a description of other urban forest attributes, such as potential planting sites, utilities present, and hardscape features.

Data commonly collected during an inventory includes:

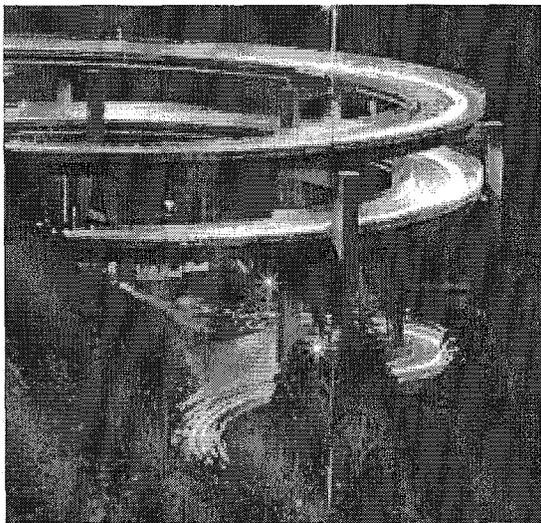
- Location
- Species
- Diameter
- Condition
- Maintenance need and priority
- Proximity to utility lines, traffic signs and signals
- Sidewalk and other hardscape damage
- Insect and disease problems
- Potential planting sites

Inventories are generally completed by trained Certified Arborists or experienced inventory arborists. The tree attribute and location data are generally collected using handheld computers, geographic information systems (GIS) data, and/or geographic positioning systems (GPS) equipment.

Types of Inventories - Depending on the size of your community and your resources, there are different types of inventories that can be accomplished to provide you with an accurate accounting of public trees.

- **“Windshield” Surveys** – A windshield survey is a simple method of evaluating public trees, and may be a good first step for a new or developing urban forestry program. To perform a windshield survey, an arborist or someone knowledgeable about trees, drives along a community's roads recording certain tree characteristics. Windshield surveys are most efficient when the arborist is looking for only a few particular tree characteristics, such as species, size, maintenance needs, or safety risk level. Windshield surveys have been and continue to be used in many cities and towns throughout the United States. The data collected during such a survey can be kept in written format on simple data forms, or entered into simple spreadsheet programs.

- **Statistical Sample Inventories** – A statistically sound, random sample of an urban forest is a cost-effective way of obtaining an overall picture of the state of the trees. Usually, obtaining data from between 3 to 6 percent of street miles and/or public property acreage will produce results that are accurate to within 10 percent of what a complete inventory would produce.



- **Partial Inventories** – Partial inventories collect tree data on 100 percent of the right-of-way miles or acres, but only in specific areas of a community. When budgets are limited, this approach can be effective and affordable. The public works agency decides which defined areas of the city or county are inventoried: particular wards, neighborhoods, districts, historic areas, etc. Using partial inventories allows the agency to spread the inventory process over a period of time depending on available funds and resources.
- **Complete Inventories** – A 100 percent, or complete, inventory is the best method if the public works agency wants a

highly accurate accounting of the urban forest on a citywide basis. All trees and potential planting sites on all public rights-of-way and public property under the management of public works are located and assessed during a complete inventory.

Using and Managing the Inventory Data

Using commercially available tree management GIS-based asset management software programs, simple computer spreadsheet programs, or other database programs, public works agencies can use the inventory data to create work reports, schedule tree maintenance and planting tasks, track costs, and efficiently respond to citizen requests.

Managing and updating inventory data and work orders can entail a significant investment of time and money, so public works managers need to carefully consider who will be performing this task, and what outputs are desired, and then select a system that is compatible with current agency capabilities and procedures. When the right tree inventory data management system is selected, public works managers are able to use the data for long-range, proactive planning to ensure the continued beauty, vitality, safety, and survival of all public trees.

Inventory Data Analysis

A significant component of an urban forest management plan is a professional analysis of the tree inventory data. Generally, statistical analysis is performed resulting in a number of tables and graphs depicting the

tree population's characteristics. Then, based on that analysis and the results, maintenance and planting priorities are developed and overall management recommendations are made for a multi-year period. Following is a description of the inventory data analysis part of a management plan.

- Population Characteristics

The public urban forest is a complex, inter-related system of trees, site conditions, and other infrastructure components. Understanding this dynamic system is important for proper decision making regarding appropriate tree care practices, planting decisions, and urban forest management. The public tree population characteristics section of a management plan provides insight into the current composition and condition of an inventoried tree population.

The characteristics of the urban forest include species, size, condition, and other related tree and site factors. By identifying the species, size, and condition of trees in the urban forest, much is revealed about the forest's composition, relative age, and health. It is important for public works managers to know the kinds of trees as well as the number of trees present. Species composition data are essential because tree species vary considerably in life expectancy and maintenance needs. The types of trees present in a community greatly affect tree maintenance activities and budgets. Similarly, tree diameter and size class data help to define the general age and size

distribution of the total tree population.

By analyzing and using this information, public works and urban forest managers can forecast trends, anticipate maintenance needs, budget for tree-related expenditures, and develop a basis for long-range planning. Knowing urban forest population characteristics facilitates decision making, which then allows proper and timely action to be taken for safety risk-reduction on the public right-of-way, preventive maintenance to reduce storm damage and planning for needed tree planting operations. This ensures a stable and diverse tree population for the future.

- Maintenance and Planting Programs

One objective of an urban forest management plan is to determine the current appropriate maintenance recommendations for the tree population and to prioritize these tasks. Typical maintenance recommendations are: removal, pruning, stump grinding, green waste disposal, fertilization, insect and disease treatment, grate and guard repair, mulching, and watering.

The highest priority maintenance recommendations of removal and pruning pertain primarily to protecting public safety and are based on the existence of potential risks to the right-of-way, public property, and the citizens and their property at the time of the inventory. Rather than being priority safety pruning and removal activities, other maintenance

recommendations are practices directed at improving the overall health, longevity, and aesthetics of the urban forest.

Often, the plan will provide additional resources and information regarding current industry standards and specifications for performing tree maintenance tasks. The plan can make recommendations for in-house staffing levels and equipment and/or determine if contractors can more efficiently perform a task or function. Operational reviews are commonly incorporated into the urban forest management plan.

The urban forest management plan looks at all inventory data and recommends an implementation schedule and prioritization scheme that allows public works agencies to develop cost-effective strategies for urban forest maintenance programs based on an accurate evaluation of current tree population characteristics and on future tree-related expenditures.

- **Planting Programs** ... Urban forest management plans address planting needs also and can use inventory data to develop and guide public tree planting programs. Tree species selection and planting location designations are significant components of an urban forestry program. Decisions of what kind of tree to plant and where to plant it are critical due to the long-term impact of these decisions.

The tree inventory reveals the number of vacant planting sites, the size and types of these locations, the current species distribution, and other pertinent data.

The urban forest management plan looks at this data to develop an overall planting strategy and address many issues related to new tree planting and care. The plan identifies the areas with the greatest need for improvement, recommends species appropriate for the available planting spaces, discusses specific maintenance plans for newly establishing trees, and provides technical information about proper tree planting techniques.

Using the urban forest management plan with its accurate data and professional interpretation and planning, a public works agency can plant trees that will ultimately be healthier, safer, have greater life expectancies, have fewer conflicts with utilities and other infrastructure, be less expensive to maintain, and maximize the benefits to the community provided by public trees.

- **Insect and Disease Threats and Control** American cities and counties have dealt with insect and disease threats to public forests for more than a hundred years. Historically, many communities have suffered significant tree loss and damage from such threats as the chestnut blight, Dutch elm disease, and the gypsy moth. The twenty-first century and the new global economy bring new threats to our urban forests, such as the Emerald Ash Borer, Asian Longhorned Beetle, and Sudden Oak Death.

Through careful analysis of local conditions and species composition, provisions in the management plan can be included to attempt to mitigate the disruption to its urban forest caused by the existing or potential insect and disease infestations. Taking a proactive approach to these kinds of threats enable the public works agency to address public and private needs in an efficient and effective manner.

With the urban forest management plan as a guide, public works managers can endeavor to distribute the costs associated with significant tree loss and damage from insects, disease and natural disasters over a manageable time period, as well as lessen the social and economic impact that such an extensive loss will have on the quality of life in our community.

- Budgets
Urban forest management plans generally include a multi-year, prioritized program for all basic urban forestry activities and provide relative costs that could be incurred by the recommended activities. These budget figures are usually based on local contractual charges for maintenance and planting tasks and on in-house costs for performing the needed services.

Urban forestry program budgets in management plans typically are presented on an annual basis for a period of five to ten years. The budget is recommended to address the highest priority removal and

maintenance recommendations first. This is intended to reduce potential high-risk situations for the public and all associated liabilities. Then the public works agency can phase in the recommended routine pruning and planting cycles to distribute the annual budget funds more evenly. It is not uncommon for the budgets presented in the management plan to exceed the current resources of the public works agency. However, with the information about how much funding is required to properly maintain and sustain the public urban forest and improve public safety, public works agencies and managers should know what financial commitment is necessary and then take steps in subsequent years to attain the level of funding required.

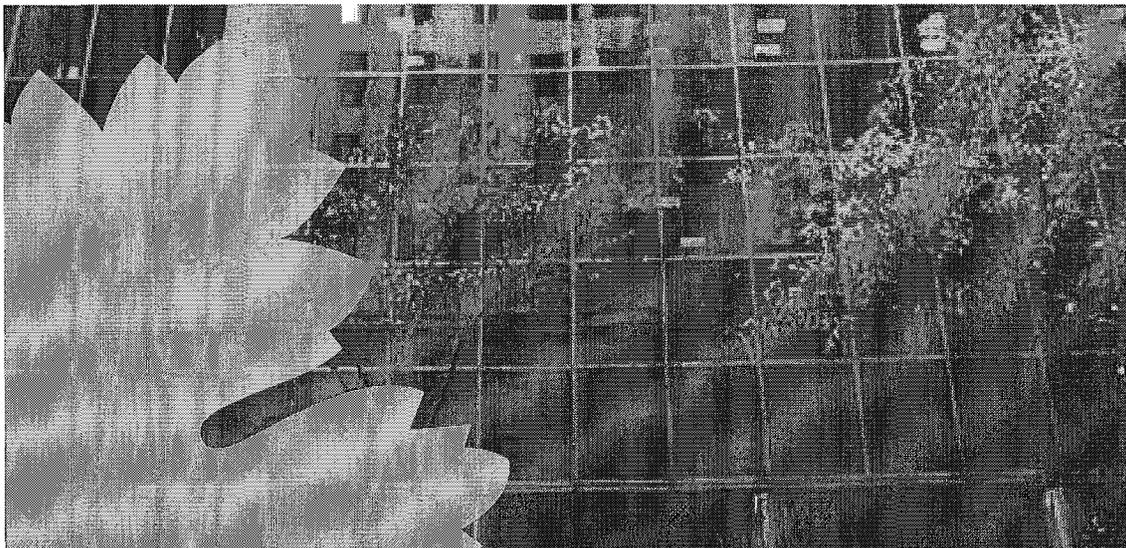
Tree Inventory and Mapping Data Management Software

Computerized facility and asset inventories, location information, and work order systems are common tools used by public works managers every day. Managing tree inventory information is not that different than managing any other public infrastructure component and there are a variety of computerized systems and software programs to help in this task.

On the most basic level, tree inventory data can be entered and maintained in any simple spreadsheet or database software program. These programs are inexpensive, easy to use, and usually already exist on most office computers. Simple data sorting and querying can quickly provide information on urban forest conditions and tasks.

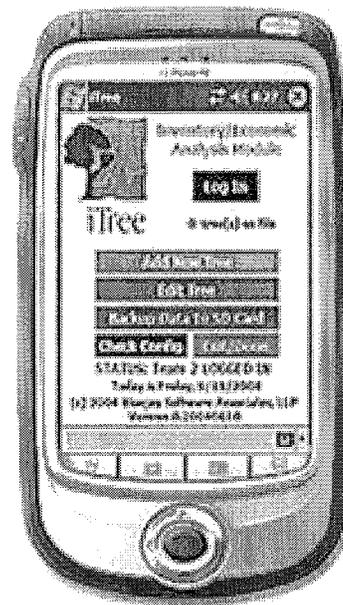
More commonly, tree inventory data and mapped location information are best maintained and managed using commercially available software programs specifically designed for urban forest management. These programs are customized for the public works agency to facilitate updating and editing, and are capable of instantly providing useful information and producing reports such as:

- **Work histories and costs for each tree**
- **Citizen service and information requests**
- **Work orders**
- **Available planting sites**
- **Tree valuation**
- **Maps**



As a management tool, a computerized tree inventory and data management software program promotes efficient allocation of work crews and equipment; expedites responses to service requests; identifies safety risks; facilitates accurate cost analysis; provides data for communicating with the public, elected officials, and other departments; can provide information needed for grant applications; tracks permits; and projects future work programs and required budgets.

The management plan will generally assess the needs, capabilities, and responsibilities of the public works agency and make an appropriate recommendation of what individual or combination of software programs and data management systems is right for the agency.



There are a number of commercially available tree management software programs from arboricultural consulting companies. There is also free, public-domain software, such as the U.S. Forest Service's Mobile Community Tree Inventory (MCTI) program that can be run on personal digital assistants or desktop computers.

Tree Risk Reduction Plan/ Emergency Storm Response Plan

The urban forest management plan can and should have sections devoted to urban forest risk reduction and an emergency response and recovery plan that provides information about general tree risk reduction and gives directions to the public works agency during an extreme storm emergency.

When developing an emergency management plan, dealing with serious public safety and health issues is an obvious component, but including trees and woody debris in mitigation efforts must not be overlooked.

When catastrophic disasters, such as tornadoes, ice storms, hurricanes, and severe straight-line winds strike a metropolitan center, thousands of cubic yards of debris are produced. Trees and vegetation can account for approximately 30 percent of this debris volume.

Beyond the task of collecting and disposing of this debris, additional management considerations include increased threat to life from hanging limbs and uprooted trees, hindrance to life-saving efforts by blocked streets and driveways, power outages and power restoration efforts, and personal and public property damage. The impact of these additional tree-related considerations is not always quantifiable but can overwhelm public services and slow down the short and long-term recovery process.

A comprehensive urban forest management program greatly reduces storm hazards through proper planting, preventive maintenance, and systematic risk reduction. However, when disasters occur, an emergency plan as an addendum to this plan can provide solid data, facts, and protocols to assure service continuity and timely recovery and restoration. The overall objective is to create an emergency preparedness program that details improved policies and procedures, increasing the efficiency and productivity of emergency storm response operations.

Risk reduction plans can also address threats to public safety, health and public works operational responsibilities and issues that are non-storm emergencies, such as:

- Clearing leaves and woody debris from gutters and storm drains
- Sidewalk, street, and building clearance standards
- Line-of-sight conflicts for street and safety signage
- Blockage of street lamps and traffic lights
- Conflicts with overhead and underground utilities

Both the emergency response plan and risk reduction plans should be created as a collaborative effort between all key agencies and stakeholder in the community. With the public works department as the lead, information and input from police and fire, parks, purchasing, city or county administration, controlling utility companies, local and state emergency management agencies, and contractors should be obtained and considered when developing these plans.



Tree Board or Advisory Council Development

Greening and maintaining a community's urban forest is a long-term commitment dependent on not only the professional management and expertise of public works staff but also on the support and involvement of the citizens. Unlike fire hydrants and sidewalks, an urban forest is a public asset that can generate both positive and negative emotional responses. An important step in dealing with this unique characteristic of an infrastructure component is forming and supporting a group of local citizens who are dedicated to the care and maintenance of the community trees while assisting the public works agency in its mission.

This group is often called a tree board or an urban forestry advisory council and can provide a number of services to public works agencies. They can educate the citizens at large on the importance of trees, interact directly with elected officials in support of the program, assist in maintenance tasks like small tree maintenance, mulching, planting, and watering, and apply for grants and generate private financial donations.

Their singular mission, however, is to recommend unbiased, citizen-based direction and alternatives regarding community tree management to public works managers. They serve in an advisory capacity only, and depend on public works personnel to actually implement most of their recommendations. Still, the ultimate responsibility for the community's urban forestry program rests with the public works agency.

The urban forest management plan should include information on creating a local community forestry program in areas that do not already have one, and for sustaining one that already exists.

Public Relations and Education

On a basic and general level, having a computerized tree inventory and urban forest management plan facilitates and improves public relations and education. For instance, most citizen callers are pleased when they have reached someone who knows their tree and can answer general questions or respond directly to their request because of quick access to information such as tree attributes and scheduled work. Computerized tree inventories are also useful tools for public education. The inventory data, maps or summary reports can be distributed in print or on a website so the public can access them. In this way, the public can gain a better understanding of the work of urban forestry and become more willing to support its program.

Through years of experience, urban forest managers across the country have found that public education is the true key to reaching the goals of an urban forestry program in a community. A public works agency will be able to effectively achieve urban forest management goals only by educating citizens, elected officials, and other public agencies working within the community. Ordinances, management plans, guidelines, policies and

procedures alone will not guarantee success. An urban forest management plan will recommend specific actions to increase and support public relations and education about trees and the urban forestry program. Such recommendations may include:

- Holding a seminar or public meeting to discuss the tree inventory project, its results, and its importance for the community.
- Developing monthly evening or weekend seminars directed at residents related to tree care and landscaping. Bring in local guest experts from various disciplines in the green industry.
- Writing a monthly tree-related article for local newspapers and community websites, or preparing a press release for each new project.
- Sending letters to residents in areas where tree maintenance or planting projects will be conducted each year.
- Developing a tree care door hanger or brochure to go to each residence where new trees are planted to encourage them to help maintain the tree and not damage it during mowing.

Urban Forest Cost/Benefit Analysis

The public trees growing in any community are valuable municipal resources. They provide tangible and intangible benefits for diverse services such as pollution control, energy reduction, storm water management, property values, wildlife habitat, education, and aesthetics. Previously, the services and benefits trees provided in the urban and suburban setting were considered to be unquantifiable. However, by using extensive scientific studies and practical research, these benefits can now be confidently calculated using models contained in i-Tree software and current tree inventory information.

The i-Tree suite of free software tools was recently released by the U. S. Forest Service and can be used to assess and manage community forests. With these tools, public works and urban forest managers can

accurately quantify the benefits of urban forests and understand and balance the costs of managing an urban forest.

Using the tree inventory data and applying i-Tree's STRATUM (street tree resource analysis tool for urban forest managers) an urban forest management plan can assess and quantify the functions of the public tree resource and place a dollar value on the annual environmental benefits they provide. However, enhancing, protecting, and maintaining this municipal resource has costs; public works agencies annually allocate public funds for planting, removal, pruning, emergency cleanup, inspection, and administration of the urban forestry program. The STRATUM model accounts for costs of managing an urban forest and provides results in terms of net benefits.



An urban forest management plan that includes such a cost-benefit analysis will help the public works manager:

- Obtain economic evaluations of street trees using annual budget and expenditure data to assess the management program.
- Justify funding and perform strategic planning for the urban forest.
- Gain more public support for the value of trees to economic development, environmental health, and quality of life issues in the community.
- Determine the annual amount of pollution removed by the urban forest, the percent of air quality improvement, the amount of carbon sequestered, the amount of energy consumption reductions, and estimated increases in property values and aesthetics.

This kind of cost/benefit analysis may provide public works managers with the justification for more attention and funding for urban forestry planning, design, management, and maintenance. The science behind these models and type of analysis is sound and has been published in peer-reviewed journals. The challenge now is to apply the science to enhance the quality of life in our communities by improving the condition and extent of the urban forest.

Urban Forest Management Plan Summary

The urban forest management plan should be considered a “living,” working document. The work programs recommended in it should be reviewed annually and adjustments made appropriately for the following year. The entire document itself should be reviewed on a five or ten year basis to determine if management and urban forest conditions have changed significantly.

The management of public trees is challenging, to say the least. Public works managers have the daunting task of balancing the recommendations of experts, the wishes of council members and other elected officials, the needs of citizens, the pressures of local economics, the concerns for liability issues, the physical aspects of trees, the forces of nature and severe weather events, and the desire for all of these factors to be met simultaneously.

Without a management plan, the governments and individuals responsible for taking care of an urban forest will not be effective in meeting the true needs of the trees and the community. A management plan establishes a clear set of priorities and objectives related to the goal of maintaining a productive and beneficial community forest.

You’ve heard the riddle, “How do you eat an elephant?” The answer is, “One bite at a time.” This is also good advice for creating or improving an urban forest management plan. If you are just beginning an urban forest management plan project, try to accomplish these tasks first:

- Conduct a windshield survey or sample tree inventory that is managed and updated on paper or in a computerized spreadsheet program.
- Based on the data you collect, create a management plan with sections that address the highest priority maintenance and planting tasks with estimated budgets for this work.

If you already have an existing, basic tree management plan, consider improving it by accomplishing these tasks:

- Complete a 100 percent public tree inventory with GIS or GPS tree location mapping, if it doesn’t already exist.
- Obtain a customized tree inventory data management software program to help you carry out the plan’s recommendations and record your work accomplishments.
- Create or update your management plan to include analysis and recommendations for preventive maintenance cycles; a community-wide planting program;

expanded public relations and education; and risk reduction programs.

If you have an existing comprehensive urban forest management plan, the next time it is reviewed, consider addressing and including these components:

- Comprehensive risk reduction and emergency storm response plans.
- Operational review with recommendations for improved work procedures, equipment inventory, budget level, and administrative efficiencies.
- Ordinance, policies, and procedures review and recommended revisions
- Tree cost-benefit analysis.

Whatever level your urban forestry program is at currently, and depending on where you want to go with it in the future, an urban forest management plan can help guide you to achieving your goals. There are many sources of information and assistance at your disposal just for the asking.

The existence of an urban forest management plan in a community indicates a high level of commitment to protecting trees, and it indicates a higher level of education and knowledge about natural resource issues in general. The benefits of trees can be maximized when both professional management resources and an educated public coexist.

With a tree inventory and urban forest management plan, a public works agency can objectively consider each specific issue and balance these pressures with a knowledgeable understanding of trees and their needs. If balance is achieved, the community's beauty will flourish and the health and safety of its trees and citizens will be maintained.

For More Information

Your State Urban Forestry Coordinator

www.arborday.org/programs/urbanforesters.cfm

USDA Northeastern Area Urban and Community Forest Resources

"A GUIDE: DEVELOPING A STREET AND PARK TREE MANAGEMENT PLAN"

<http://www.na.fs.fed.us/urban/inforesources/mgmtplanguide/mgtplanguide.pdf>

Wisconsin Department of Natural Resources Bureau of Forestry

"A Technical Guide to Developing Urban Forestry Strategic and Management Plans"

<http://www.dnr.state.wi.us/org/land/Forestry/uf/resources/uf%20planning%20guide.pdf>

Urban Forestry South

"Urban and Community Forestry Strategic Plans"

<http://www.urbanforestrysouth.org/Resources/Collections/u-cf-strategic-plans-1/view>

National Arbor Day Foundation

Tree City USA Bulletins

www.arborday.org/programs/treecitybulletinsbrowse.cfm

USDA Northeast Center for Urban and Community Forest Resources

"Community Tree Inventory: Data Collection"

www.umass.edu/urbantree/inventorywhitepaper.pdf

National Arbor Day Foundation

Tree City USA Bulletins

www.arborday.org/programs/treecitybulletinsbrowse.cfm



USDA Northeastern Area Urban and Community Forest Resources

"Tree Inventory and Management Software List with Descriptions"

www.na.fs.fed.us/urban/inforesources/inventory/InventorySoftwareListDetails.pdf

USDA Northeastern Area Urban and Community Forest Resources

"A Guide to Street Tree Inventory Software"

www.na.fs.fed.us/spfo/pubs/uf/streettree/toc.htm

USFS i-Tree Tools

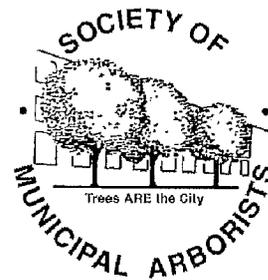
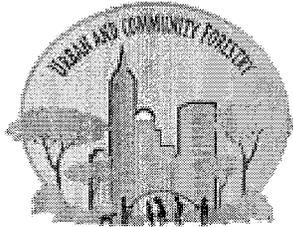
<http://www.itreetools.org>

Cost/Benefit Analysis

USFS i-Tree Tools

[/www.itreetools.org](http://www.itreetools.org)

Thank You



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Urban Forestry Best Management Practices for Public Works Managers

Urban Forest Management Plan



WIND AND TREES: LESSON LEARNED FROM HURRICANES



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FOR 118

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Introduction

Hurricane-force winds can be extremely damaging to communities and urban forests. Without question, trees can become hazardous and pose risks to personal safety and property. As destructive as these storms are, it is important not to forget that trees provide many environmental benefits, such as providing shade and energy conservation, reducing the well known “heat island” effect in cities caused by concrete and pavement, and increasing property values. Also, there are opportunities to better prepare for the next hurricane season by rebuilding a healthy urban forest. Valuable lessons can be learned from knowing more about how, when and why trees fail in storms. A key issue facing communities is how to manage the urban forest from an ecological standpoint so urban forests are healthier and more wind-resistant.

A healthy urban forest is composed of trees that maximize ecosystem benefits while being able to withstand natural and anthropogenic stresses and disturbances,

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such as wind from hurricanes and tropical storms, flooding, pollution, etc.

This fact sheet reports on the lessons learned from research conducted after 10 hurricanes by scientists at the University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS). It also includes valuable field observations from professionals, such as urban foresters, scientists, and arborists.

Our goal is to promote a healthy and more wind-resistant urban forest. This publication is aimed at citizens and communities who seek to rebuild and set better urban forest management practices so that future storms are less devastating.

The Study

Since 1992, when Hurricane Andrew struck South Florida, researchers at University of Florida/IFAS have been studying the impacts of hurricanes on the urban forest (Duryea *et al.* 1996). Hurricane wind damage to urban neighborhoods was measured again in 1995 when two hurricanes struck the Pensacola, FL area (Duryea 1997) and once more in 1998 when Hurricane Georges crossed over the entire island of Puerto Rico. In 2004, four hurricanes (Charley, Jeanne, Francis and Ivan) struck Florida with maximum sustained winds ranging from 105 to 145 mph. In 2005, Hurricanes Dennis, Katrina, and Rita struck the Gulf Coast of the U.S. (Figure 1).

The impacts of these hurricanes gave us the opportunity to study over 150 urban tree species and their comparable responses to hurricanes (Duryea *et al.* 2007).

Our goal was to answer the question, *what makes a tree more wind resistant?* Our main objective was to determine what biological, site, and cultural factors make trees more or less wind resistant. By evaluating these factors, we can understand the difference between species (i.e., whether they defoliate quickly in wind) and between certain practices (such as planting trees in groups compared to individual tree planting).

This fact sheet describes the lessons and recommendations about the urban forest, trees (i.e. species and structure), and soil and rooting conditions.

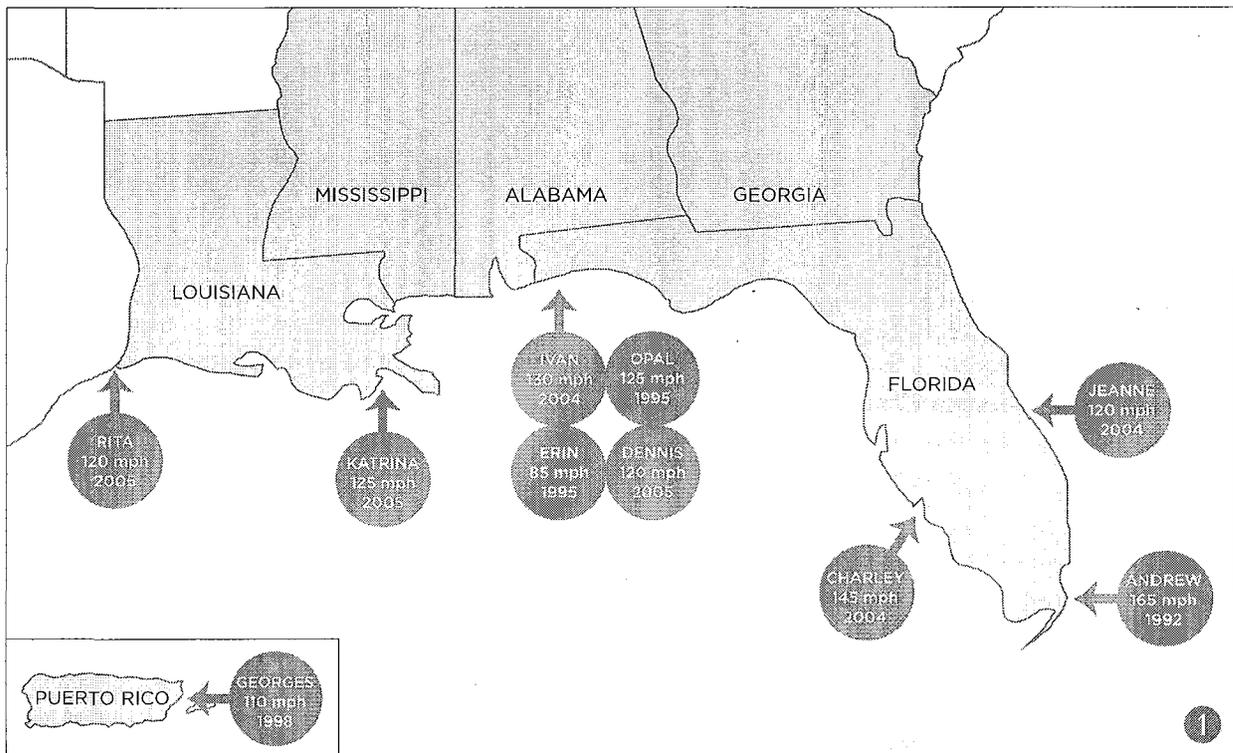


Figure 1

In the UF/IFAS study, urban trees were measured in neighborhoods following the nine hurricanes striking Florida and the Gulf Coast and one hurricane in Puerto Rico. For each hurricane, the year and maximum sustained wind speed (mph) are included.

I. Lessons about the Urban Forest

Lesson 1

The higher the wind speed of the hurricane, the more likely trees will fail.

In the 10 hurricanes we studied, we measured standing, leaning, or fallen trees in yards. Standing trees were considered as survivors of the wind. Trees were considered not surviving if they had fallen or were leaning at less than a 45 degree angle.

From these numbers we calculated the percent of urban forest lost in each hurricane, which ranged from 11% in Hurricane Erin to 21% in Hurricane Rita to 23% in Katrina to 38% in Hurricane Andrew (Figure 2). As wind speed increases, trees are more likely to suffer damage (i.e. uproot, break or lean), resulting in greater urban forest loss, as the graph shows.

However, it is important to point out that in addition to wind intensity and speed, other factors influence urban forest damage during hurricanes:

- Conditions accompanying the hurricane, such as precipitation and the time it takes to move through an area
- Tree species, age, health, and structure
- Site characteristics, such as soil conditions (soil depth, water table, soil compaction) and soil composition
- Urban forest conditions, such as overall tree canopy density and composition

These factors together will determine whether a tree will fail during winds. Biological factors such as tree species, age, health and condition are related to the urban forest composition and structure. For example, Pensacola, FL has a denser tree canopy composed of older trees and these trees suffered considerably more damage during hurricanes when compared to Miami, FL, with less canopy cover and younger tree species.

Conditions accompanying the hurricane also influence tree fall. For instance, a slower-moving storm with a lot of precipitation will mean more water accumulating in the soil and less friction between roots and soil to hold trees up.

Trees growing in shallow soils, such as in Miami-Dade County with soils no more than 1 foot deep, will also behave differently from those planted in deeper soils. Trees in shallow soils are more prone to blow over than trees rooted more deeply.

Recommendation

Establish and manage a healthy urban forest to improve wind resistance by:

- Having a comprehensive tree management plan for your community
- Beginning a structural pruning program for young and mature trees
- Choosing more wind-resistant species
- Selecting the right species and designing the right place
- Planting high-quality trees with central leaders and good structure.

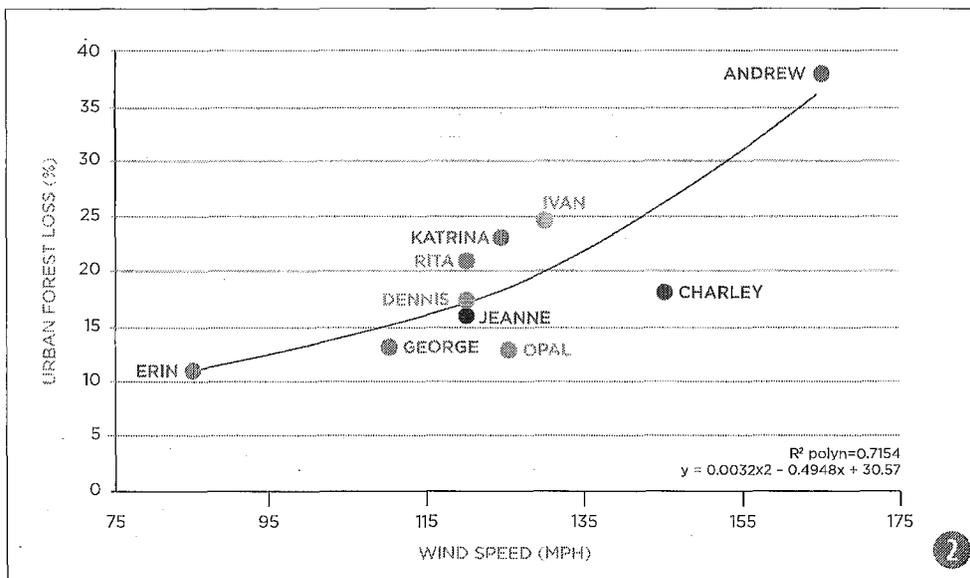


Figure 2
Urban forest loss (%) at different wind speeds (mph) in ten hurricanes.

Lesson 2

Trees in groups survive winds better than trees growing individually.

In Hurricanes Ivan and Jeanne, our research showed that trees growing in groups survived the winds better than individual trees (80% versus 70% in Hurricane Ivan, and 88% versus 78% in Hurricane Jeanne.) A group was defined as five or more trees, each growing within 10 feet of another tree, but not in a row, as shown in Figure 3.

Our research has also shown that the more rooting space trees have, the less likely they are to fail (see section *Lessons Learned about Soil and Rooting Conditions* for more details). Only if they have adequate soil space can trees develop a strong supporting root system.

Recommendation 1

Plant trees in groups of at least five trees (Figure 4) as opposed to individually (Figure 5).

Recommendation 2

Plant a variety of species, ages and layers of trees and shrubs to maintain diversity in your community (Figure 6).



Figure 3
These sand live oaks grow naturally in groups and survived winds very well.

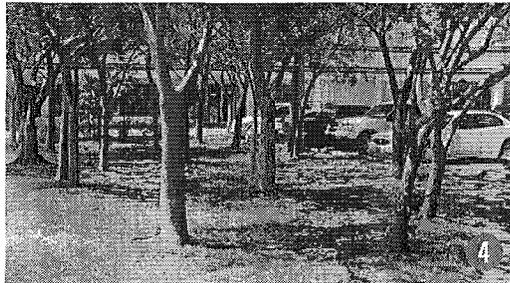


Figure 4
Notice the large rooting space provided for the group of trees.



Figure 5
These trees planted individually will grow too big for the soil space provided.



Figure 6
A healthy urban forest with a mixture of young and mature trees provides good canopy cover and benefits such as protection from high winds.

II. Lessons about Trees

Lesson 1

Some species resist wind better than others.

In our measurements of trees after ten hurricanes, we have seen that some tree species are more resistant to wind than others. Wind resistance is defined as the ability or capacity of a tree to survive (remain standing and living) hurricane-force winds, which means that they do not easily uproot or break in the winds.

One of the main objectives of this study was to develop lists of wind-resistant tree species. To complement our findings, we conducted a survey of arborists, scientists and urban foresters who ranked wind resistance of urban tree species they observed after hurricanes. We used these ratings along with our research

results and the available scientific literature to classify broad-leaved, conifer, palm, and fruit tree species into highest, medium-high, medium-low and lowest wind resistance. The recommended tree species are divided into the Southeastern Coastal Plain region (including USDA hardiness zones 8 and 9) and Tropical and Subtropical regions (USDA hardiness zones 10 and 11).

Recommendation 1

Plant tree species that have been shown to be more wind resistant.

Southeastern Coastal Plain Tree Species

HIGHEST WIND RESISTANCE

DICOTS

Carya floridana, Florida scrub hickory
Cornus florida, dogwood
Ilex cassine, dahoon holly
Ilex glabra, inkberry
Ilex opaca, American holly
Ilex vomitoria, yaupon holly
Lagerstroemia indica, crape myrtle
Magnolia grandiflora, southern magnolia
Quercus geminata, sand live oak
Quercus laevis, turkey oak
Quercus myrtiflora, myrtle oak
Quercus virginiana, live oak
Podocarpus spp, podocarpus
Vaccinium arboreum, sparkleberry

CONIFERS

Taxodium distichum, baldcypress
Taxodium ascendens, pondcypress

PALMS

Butia capitata, pindo or jelly
Phoenix canariensis, Canary Island date
Phoenix dactylifera, date
Sabal palmetto, cabbage, sabal

DICOTS

Acer saccharum, Florida sugar maple
Acer palmatum, Japanese maple
Betula nigra, river birch
Carpinus caroliniana, ironwood
Carya glabra, pignut hickory
Carya tomentosa, mockemut hickory
Cercis canadensis, red bud
Chionanthus virginicus, fringe tree
Diospyros virginiana, common persimmon
Fraxinus americana, white ash
Liquidambar styraciflua, sweetgum
Magnolia virginiana, sweetbay magnolia
Magnolia x soulangiana, saucer magnolia
Nyssa aquatica, water tupelo
Nyssa sylvatica, black tupelo
Ostrya virginiana, American hophombeam
Prunus angustifolia, chickasaw plum
Quercus michauxii, swamp chestnut
Quercus shumardii, Shumard oak
Quercus stellata, post oak
Ulmus alata, winged elm

MEDIUM-HIGH WIND RESISTANCE

Tropical/Subtropical Tree Species

DICOTS

Bursera simaruba, gumbo limbo
Carya floridana, Florida scrub hickory
Conocarpus erectus, buttonwood
Chrysobalanus icaco, cocoplum
Cordia sebestena, geiger tree
Eugenia axillaris, white stopper
Eugenia confusa, redberry
Eugenia foetida, boxleaf stopper
Guaiacum sanctum, lignum vitae
Ilex cassine, dahoon holly
Krugiodendrum ferreum, ironwood
Lagerstroemia indica, crape myrtle
Magnolia grandiflora, southern magnolia
Podocarpus spp, podocarpus
Quercus virginiana, live oak
Quercus geminata, sand live oak

CONIFERS

Taxodium ascendens, pondcypress
Taxodium distichum, baldcypress

PALMS

Butia capitata, pindo or jelly
Dypsis lutescens, areca
Coccothrinax argentata, Florida silver
Hyophorbe lagenicaulis, bottle
Hyophorbe verschaffeltii, spindie
Latania loddigesii, blue latan
Livistona chinensis, Chinese fan^b
Phoenix canariensis, Canary Island date
Phoenix dactylifera, date
Phoenix reclinata, Senegal date^b
Phoenix roebelenii, pygmy date
Ptychoesperma elegans, Alexander
Sabal palmetto, cabbage, sabal
Thrinax morrisii, key thatch
Thrinax radiata, Florida thatch
Veitchia merrillii, Manila

DICOTS

Annona glabra, pond apple
Calophyllum calaba, Brazilian beautyleaf^c
Chrysophyllum oliviforme, satinleaf
Coccoloba uvifera, sea grape
Coccoloba diversifolia, pigeon plum
Liquidambar styraciflua, sweetgum
Lysiloma latsiliqua, wild tamarind
Magnolia virginiana, sweetbay magnolia
Nyssa sylvatica, black tupelo
Sideroxylon foetidissimum, mastic
Simarouba glauca, paradise tree
Swietenia mahagoni, mahogany

PALMS

Caryota mitis, fishtail
Cocos nucifera, coconut
Dypsis decaryi, triangle
Roystonea elata, royal

FRUIT TREES

Litchi chinensis, lychee

^a Prohibited in Florida

^b Invasive, not recommended in Florida

^c Caution: manage to prevent escape in Florida (Fox et al. 2005)

Recommendation 2

Consider removing over-mature and hazardous tree species that have demonstrated poor survival in hurricanes. This is especially true if trees are over-mature and endangering lives and property, and belong to the lowest wind resistance list. Some of these species can be seen below and include sand pine, pecan, laurel oak, and water oak in north Florida and queen palm, Australian pine, melaleuca, weeping banyan, and Washington palm in South Florida (See chapters 8 and 9 for a full description of different wind-resistant species.). For borderline species, consult a professional urban forester or a certified arborist.

Southeastern Coastal Plain Tree Species

MEDIUM-LOW WIND RESISTANCE

DICOTS

Acer negundo, boxelder
Acer rubrum, red maple
Acer saccharinum, silver maple
Celtis laevigata, sugarberry
Celtis occidentalis, hackberry
Cinnamomum camphora, camphor^b
Eriobotrya japonica, loquat^c
Eucalyptus cinerea, silverdollar eucalyptus
Fraxinus pennsylvanica, green ash
Morus rubra, red mulberry
Myrica cerifera, wax myrtle
Persea borbonia, redbay
Platanus occidentalis, sycamore
Prunus serotina, black cherry
Quercus alba, white oak
Quercus phellos, willow oak
Salix x sepulchralis, weeping willow
Ulmus americana, American elm

CONIFERS

Pinus elliotii, slash pine
Pinus palustris, longleaf pine
Pinus taeda, loblolly pine

DICOTS

Carya illinoensis, pecan
Liriodendron tulipifera, tulip poplar
Prunus caroliniana, Carolina laurelcherry
Pyrus calleryana, Bradford pear
Quercus falcata, southern red oak
Quercus laurifolia, laurel oak
Quercus nigra, water oak
Sapium sebiferum, Chinese tallow^a
Ulmus parvifolia, Chinese elm

CONIFERS

Juniperus silicicola, southern red cedar
x-Cupressocyparis leylandii, Leyland cypress
Pinus clausa, sand pine
Pinus glabra, spruce pine

PALMS

Washingtonia robusta, Washington fan

LOWEST WIND RESISTANCE

Tropical/Subtropical Species

MEDIUM-LOW WIND RESISTANCE

DICOTS

Acer rubrum, red maple
Bauhinia blakeana, Hong-Kong orchid
Bucidas buceras, black olive
Callistemon spp, bottlebrush
Cinnamomum camphora, camphor^b
Delonix regia, royal poinciana^c
Enterolobium cyclocarpum, ear tree
Eriobotrya japonica, loquat^c
Eucalyptus cinerea, silverdollar eucalyptus
Ficus aurea, strangler fig
Kigelia pinnata, sausage tree
Myrica cerifera, wax myrtle
Persea borbonia, redbay
Platanus occidentalis, sycamore
Quercus laurifolia, laurel oak
Tabebuia heterophylla, pink trumpet tree
Terminalia catappa, tropical almond^c

CONIFERS

Pinus elliotii, slash pine
Pinus palustris, longleaf pine

FRUIT TREES

Averrhoa carambola, star-fruit, carambola
Citrus spp, oranges, limes, grapefruits
Mangifera indica, mango

DICOTS

Casuarina equisetifolia, Australian pine^a
Cassia fistula, golden shower
Chorisia speciosa, floss-silk tree
Ficus benjamina, weeping banyan
Grevillea robusta, silk oak
Jacaranda mimosifolia, jacaranda
Melaleuca quinquenervia, melaleuca^a
Quercus nigra, water oak
Peltophorum pterocarpa, yellow poinciana
Prunus caroliniana, Carolina laurelcherry
Sapium sebiferum, Chinese tallow^a
Spathodea campanulata, African tuliptree
Tabebuia caraiba, silver trumpet tree
Ulmus parvifolia, Chinese elm

CONIFERS

Araucaria heterophylla, Norfolk Island pine
x-Cupressocyparis leylandii, Leyland cypress
Juniperus silicicola, southern red cedar
Pinus clausa, sand pine

PALMS

Syagnus romanzoffiana, queen^c
Washingtonia robusta, Washington fan

FRUIT TREES

Persea americana, avocado

LOWEST WIND RESISTANCE

a Prohibited in FL.

b Invasive, not recommended in FL.

c Caution: manage to prevent escape in FL (Fox et al 2005)

We present these lists with the caveat that no tree is perfectly wind-proof and that many other factors contribute to wind resistance including soil conditions, wind intensity, previous cultural practices, tree health and age. These lists do not include all trees that could be wind resistant. They list those species encountered during our studies in large enough numbers to run statistical comparisons.

Recommendation 3

When a tree fails, plant a new tree in its place.

In the streets of Bagdad, Florida, laurel oaks such as the one on the house in the background are being replaced with more wind-resistant, longer living street tree species, such as live oaks (Figure 7). The healthy urban forest this will create, with its mixture of young and mature trees, will provide benefits such as good canopy cover, diversity and mitigation of high winds.

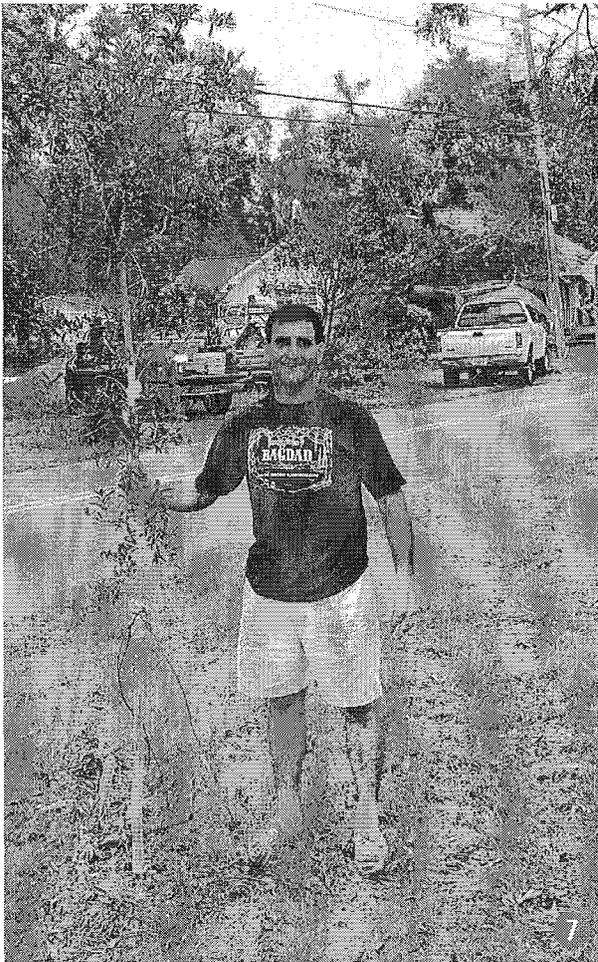


Figure 7

Community efforts to replace trees that have failed in storms are essential for a healthier and more wind-resistant urban forest. A resident in Bagdad, FL shows a newly planted and longer living live oak.

Another Finding: Oaks

When comparing survival of sand live oak, live oak, and laurel oak in four panhandle Florida hurricanes (Erin, Dennis, Opal and Ivan), laurel oak had poorer overall survival than both live oak and sand live oak (Duryea *et al.* 2007) (Figure 8).

However, in two South Florida hurricanes (Jeanne and Charley), both survival and branch loss for these oaks were similar. Speculations about the reasons for this lack of difference include: (1) Laurel oak in South Florida may be a different cultivar or variety than those in North Florida and (2) Sandier soils in South Florida and their accompanying lower site quality may result in laurel oaks with shorter heights or lower height-to-diameter ratio (as occurs between the North Florida and South Florida varieties of slash pine (*Pinus elliottii* var. *elliottii* and var. *densa*). Still, many authors point to live oak as a tree with strong wood and little failure in hurricanes (Touliatos and Roth 1971; Swain 1979; Hook *et al.* 1991; Barry *et al.* 1993).

Recommendation

Become familiar with the recommended tree species and how they perform in natural and urban ecosystems in your community. The same species in different locations may behave differently due to soils, climate, local disease problems, and other factors.

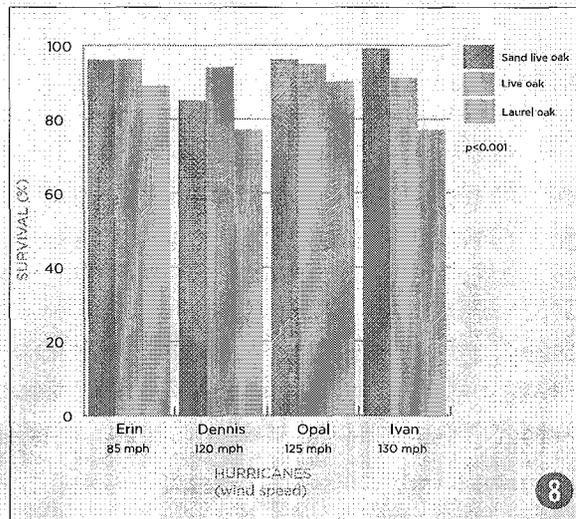


Figure 8

Laurel oak had the lowest survival rate compared to live oak and sand live oak in all four panhandle hurricanes.

Lesson 2

As a group, palm species survive hurricanes better than broad-leaved and conifer trees.

When compared to broad-leaved and other conifer trees (such as pines), palms have often been observed to be more resistant to winds. Palms grow differently from other trees because they have one terminal bud. If that bud is not damaged, palms may lose all their fronds (leaves) and still survive.

Our research shows that palms in the coastal plain and tropical and subtropical regions are often more resistant to winds (Figure 9). However, individual palm species do vary in their responses to wind like. Examples would be queen and Washington palms which have exhibited poor survival in south Florida during hurricanes (Figure 10).

Recommendation 1

Consider planting wind-resistant palm species. Examples include as sabal palm, Canary Island date palm, and manila palm.

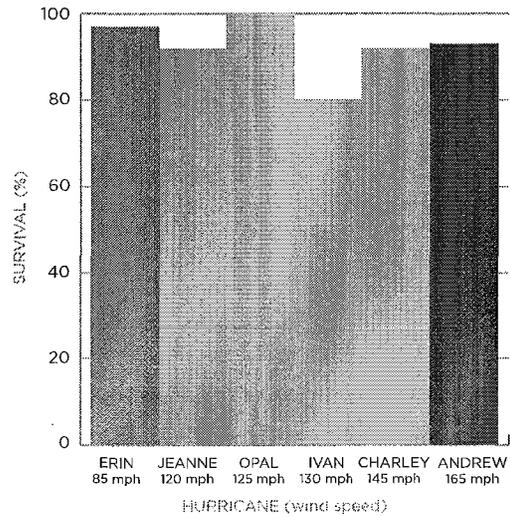
Recommendation 2

Monitor palms carefully after storms. Bud damage may not show up immediately after the storm. Allow at least 6 months for palms to put out new fronds. Palms should also be checked for hidden root, stem or bud damage.



Figure 9

Sabal palms have consistently exhibited high survival rates during hurricanes in north and south Florida.

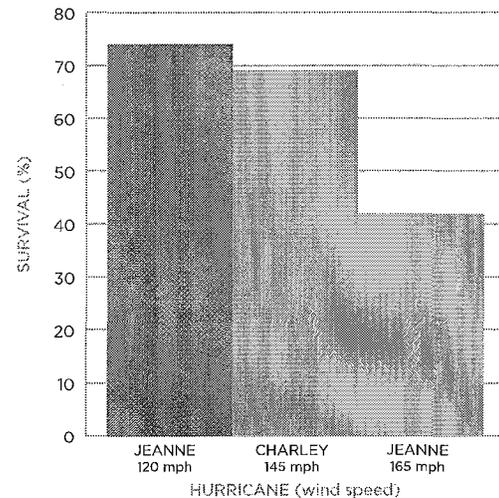


9



Figure 10

The fallen queen palm in this picture, has exhibited poor survival in south Florida hurricanes, as can be seen in the graph.



10

Lesson 3

Pines may show no immediate visible damage after hurricanes but may decline over time.

In our study, we measured pines right after hurricanes and they looked green and healthy (Figure 11). However, we went back three months after Hurricane Charley and found that 27% of the standing south Florida slash pines and 48% of the standing longleaf pines had died.

Pines have been observed to be very sensitive to wind damage. They may show no immediate visible damage after high winds but may die sometime later. They can die slowly over a period of 6 months to 2 years after wind storms. Some may remain green for a year or more, and then suddenly turn yellow (Figure 12) and quickly progress to brown needles in a very short period.

The causes of yellowing of the needles and pine death are not completely understood. It is likely due to hidden damage produced by bending and twisting during hurricane-force winds. Prolonged winds may also rupture smaller roots without breaking the larger support roots. The injured stems and roots are unable then to supply the water and nutrients needed in the crown, resulting in pine decline and death.

Recommendation

Monitor pines carefully.

Sometimes there is hidden damage and the tree declines over time. Look for signs of stress or poor health. Check closely for insects. Weakened pines may be more susceptible to beetles and diseases.



Figure 11

Pines may look green and healthy just like this one immediately after Hurricane Charley. Yet, they can slowly or suddenly die in the aftermath of the storm.



Figure 12

Pine decline as a result of wind damage.

Lesson 4

Trees that lose all or some of their leaves in hurricanes are not necessarily dead.

The greater the wind speed, the more leaves trees lose during hurricanes. Trees can lose all or some of their leaves in most hurricanes. However, leaf loss does not mean the tree is dead, rather it means the tree is temporarily unable to photosynthesize (produce food) and store energy. With time, the tree will produce new leaves which are a sign of recovery, since they restore the tree's ability to photosynthesize and bring the tree back to health.

Some species defoliate (lose leaves) easily during winds. Losing leaves may be a good strategy, helping the tree to better resist winds. Our research in Hurricane Ivan found that trees that lost their leaves survived the winds better. Live oak (in north Florida) (Figure 13) and gumbo limbo (in south Florida) are examples of trees which readily lose leaves and small branches and stand up well to winds.

Recommendation

Wait, watch for leaves, and monitor the tree's health. Most trees will leaf out again in a few months or in the spring of the following year. If the tree does not grow new leaves by the spring or early summer following the hurricane, it is not likely to recover. Note that some species, such as pines, may not recover if defoliated.

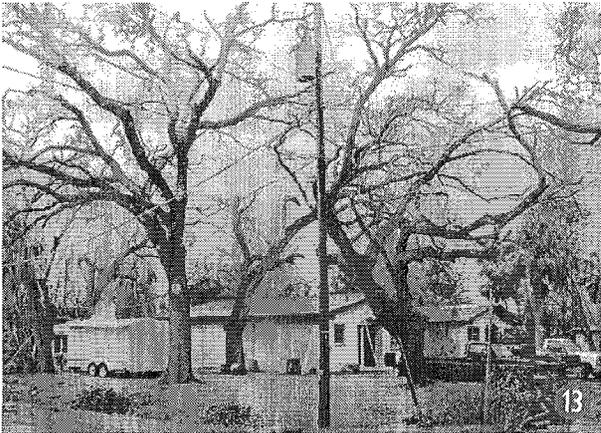


Figure **B**

Live oak defoliates easily in hurricanes. Leaf loss was positively correlated with survival during Hurricane Ivan, meaning that trees that lost the most leaves withstood winds best.

Lesson 5

Native tree species survived better in South Florida hurricanes (Jeanne, Andrew, and Charley).

In our research, native trees survived better in south Florida hurricanes but not in north Florida (Hurricane Ivan) (Figure 14). Native species also lost fewer branches than exotic species in Jeanne (36% versus 21%) and Charley (39% versus 36%) in south Florida.

Some of the exotic species with low survival in south Florida were melaleuca, Australian pine and queen palm as compared to native species with high survival, such as live oak, gumbo limbo and sabal palm.

In tropical and subtropical areas, exotics represent a large proportion of the urban forest (for Hurricane Jeanne, exotics made up 38% of the trees in the urban forest, for Hurricane Charley, 42% and for Hurricane Andrew 64% were exotics). In the southeast coastal plains (Hurricane Ivan), exotic tree species make up 9% of the trees in the urban forest. The major exotic species were crape myrtle, Chinese tallow (a prohibited invasive species), camphor tree, (an invasive species), Bradford pear and palms such as pindo and Washington palms.

These differences in the composition of the urban forest may explain why, with fewer exotics in their population, natives did not survive better in the coastal plain during Hurricane Ivan.

Native trees also survived winds better in south Florida hurricanes when compared to Puerto Rico (Hurricane Georges) (Figure 15). Out of the 35 tree species measured in Puerto Rico, only 4 were native to the island. The lighter winds and conditions of Hurricane Georges showed no differences between native and exotic species.

Recommendation

Consider native tree species when selecting trees for planting. Native trees should receive strong consideration when selecting trees for the urban forest. Additional benefits of using native species include their values for wildlife and native ecosystem conservation.

Lesson 6

Older trees are more likely to fail in hurricanes

As trees grow and age, they become more susceptible to insects and diseases, branches and parts of the tree begin to die, they become less flexible, and they may be more vulnerable to winds.

Our research shows that larger and older trees lose more branches in hurricanes. Larger trees (40 to 79 inches in diameter) lost a greater percentage of their branches compared to small trees (less than 8 inches in diameter) (Figure 16).

Every tree species has an inherent life span. Some tree species live longer than others (Table 1). It is important to keep in mind that risk of failure in wind increases with age. For example, the life span of laurel oak is 50 years; it begins to decay and show signs of diseases as it reaches 40 years. The older a tree gets, the greater the likelihood of diseases and pathogens, breakage during winds, and the greater the risk of it causing damage when it fails.

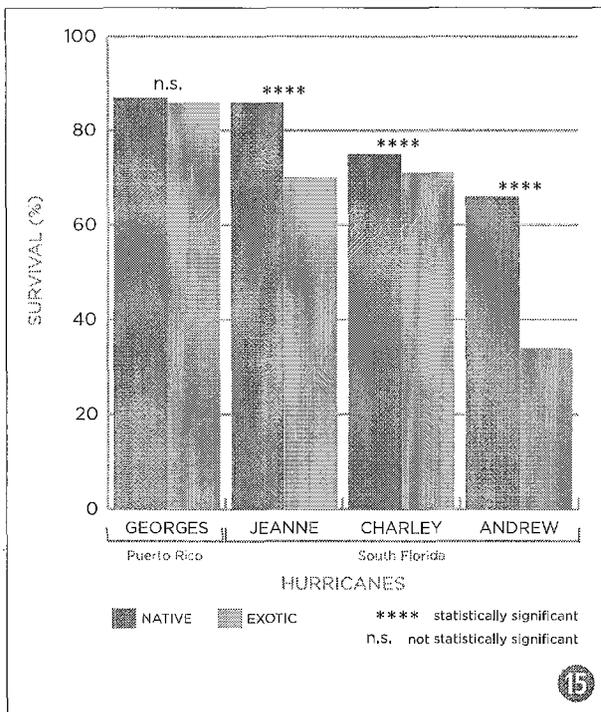
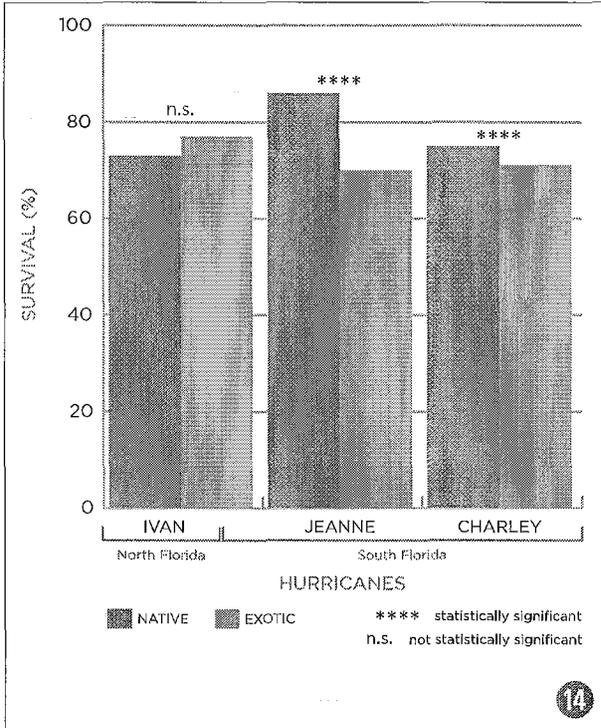


Figure 14

Native trees survived better than exotic trees in Hurricanes Jeanne and Charley but not in Hurricane Ivan.

Figure 15

Native trees survived better than exotic trees in three South Florida hurricanes but not in Puerto Rico (Hurricane Georges).

Recommendation 1

Consider life span when managing urban forests for wind resistance (Table 1).

Life spans of Tree Species in the Forest *

Short-lived (< 50 years old)	Medium-lived (50-100 years old)	Long-lived (> 100 years old)
laurel oak	African tuliptree	live oak
red bud	paradise tree	sweetgum
bottle brush	red maple	southern magnolia
Hong-Kong orchid tree	gumbo limbo	baldcypress
jacaranda	sea grape	mahogany

* Note: Trees in urban areas have shorter life spans than trees in the forest.

Recommendation 2

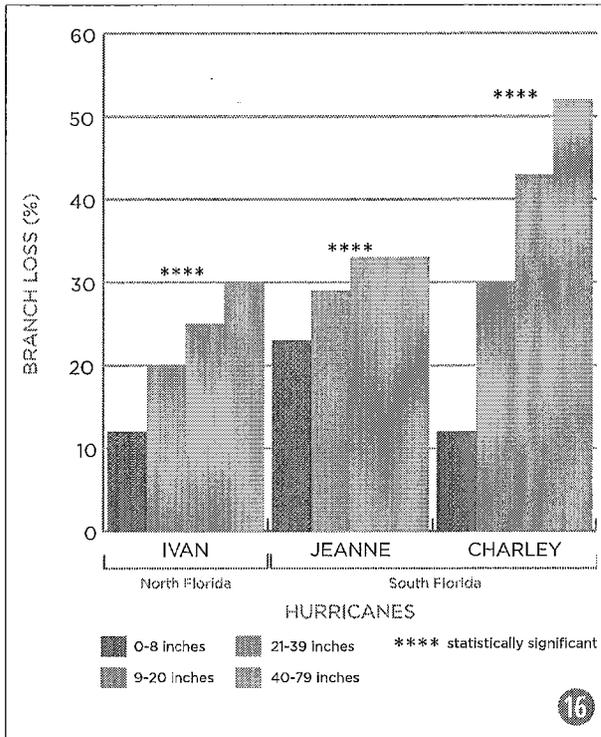
Over-mature trees that present a hazard to people and property should be removed and replaced by new trees (Figure 17). These trees should be monitored regularly for structural defects. Consult with a certified arborist or urban forester.

Lesson 7

Unhealthy trees are predisposed to damage

Old trees with decayed root systems, stem decay, or large dead branches are vulnerable to hurricanes. Decay, a major cause of tree failure, is caused by fungi that weaken wood (Figure 18). Cracks, seams, butt swell, dead branch stubs and large, older wounds suggest internal decay. They can be weak points on a trunk and increase the likelihood of tree failure.

Mushrooms at the base of the tree trunk might also indicate root problems. They can be the sign of *Armillaria* or other fungi that can decay roots, creating unstable trees (Figure 19). Root rot can be diagnosed with careful, regular inspections by qualified arborists.



Recommendation

Remove hazard trees before the wind does. Have a certified arborist inspect your trees for signs of disease and decay. They are trained to advise you on tree health.



Figure 16
The larger and older a tree is, the more branches it will lose. (**** means that larger trees lose significantly more branches than smaller trees.)

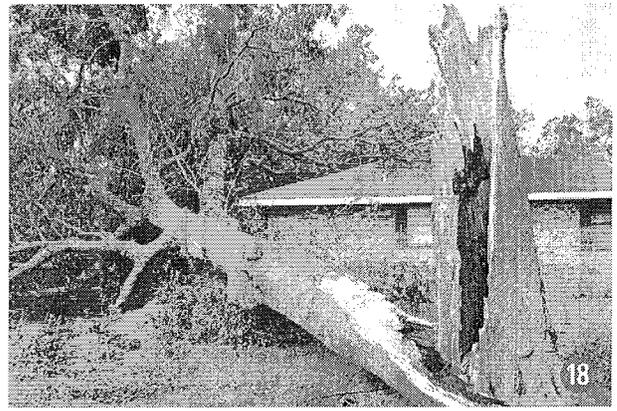


Figure 17
Many laurel oaks like this one in Bagdad, FL are over 50 years old and do not survive hurricanes well.

Figure 18
Decay may be present without obvious signs, like this tree that fell in Hurricane Rita, revealing an entirely hollow stem.



Figure 19
This laurel oak had a decayed root system that made it unstable in wind.

Lesson 8

Trees with poor structure or included bark are more vulnerable in the wind.

A tree with two or more trunks or stems of equal size originating from the same point on the tree is said to have co-dominant stems. Co-dominant stems may develop bark inclusions, which are weak unions between branches and are very susceptible to breakage (Figure 20). To develop strong structure, trees need to be managed with structural pruning.

Recommendation 1

For a more wind-resistant, sustainable landscape, plant high-quality trees with central leaders and good form.

Recommendation 2

Follow with a preventive structural pruning program of young and mature trees.



Figure 20

Notice the the dark area at the top of the split: it is a bark inclusion. The stem broke in Hurricane Katrina at this point of weak attachment.

Figure 21

The tree in the photo broke at the weak point created by the decay from a poor pruning cut.

Figure 22

Pruned trees survived Hurricane Andrew significantly better than unpruned trees.

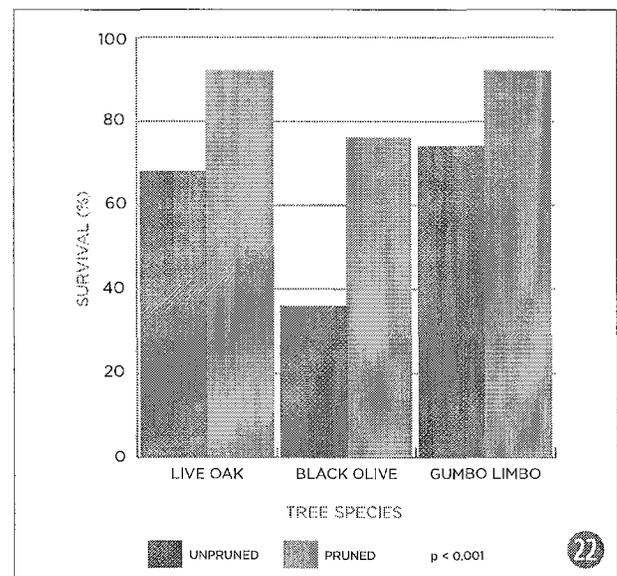
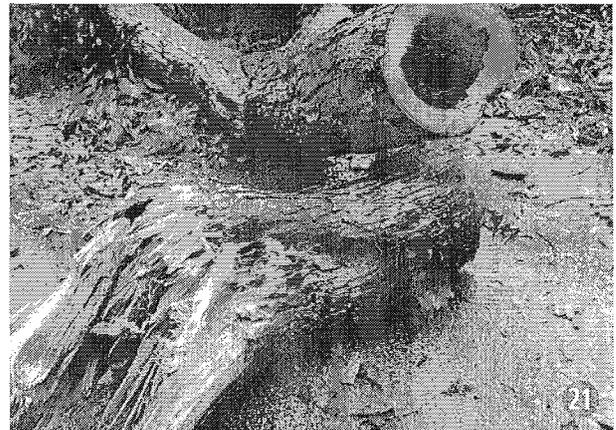
Lesson 9

Well-pruned trees survive hurricanes better than poorly pruned or unpruned trees.

Poor pruning practices, such as topping or removing large branches, make trees more susceptible to wind failure. Old, large pruning cuts can become an entry point for fungi that begin the decay process (Figure 21).

In our study of Master Gardeners after Hurricane Andrew in 1992 (Duryea *et al.* 1996), we found that trees that had been pruned properly (not topped and with more open and well-distributed crowns) survived high winds better than unpruned trees (Figure 22).

We re-analyzed this data using more broad-leaved tree species—black olive, gumbo limbo, bottlebrush, royal Poinciana, live oak, West Indian mahogany, and white cedar. Survival for pruned trees was 73% compared to 47% for unpruned trees, showing that overall, pruned trees are less likely to fail in hurricanes.

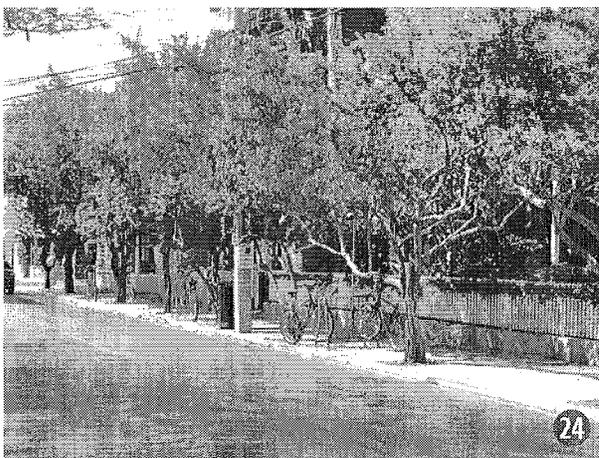
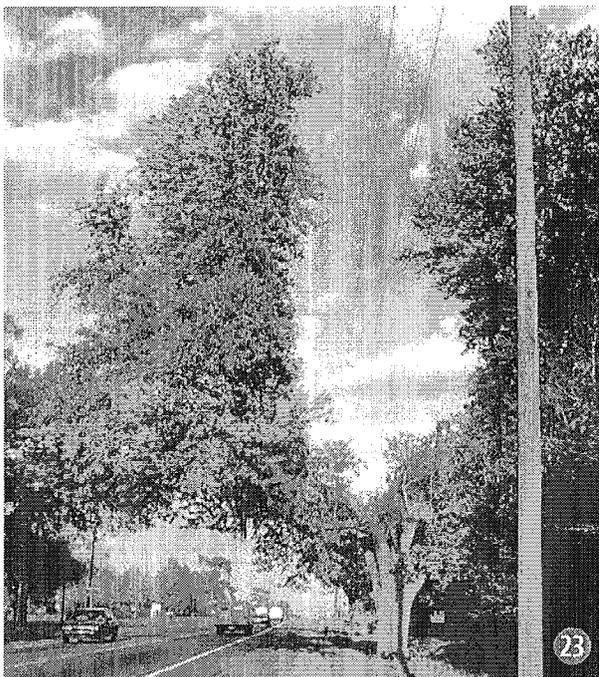


Recommendation 1

Begin a preventive pruning program for both young and mature trees. The main goal of preventive pruning is to reduce the length of branches competing with the main trunk.

Recommendation 2

Select the right tree for the right location to avoid poor pruning practices. To allow healthy crown development, plant considering the aerial space needed for a mature-sized tree (Figure 23). Under power lines, the preferred option is to plant smaller trees that will better fit the space (Figure 24).



III. Lessons about Soil and Rooting Conditions

Lesson 1

Trees with more rooting space survive better.

The most important factor in designing a healthy urban landscape is also probably the one most often overlooked—that is providing enough soil space for tree roots to grow. In Hurricane Georges (Puerto Rico), we measured rooting space for trees and found that with more rooting space, tree survival during winds was higher (Table 2).

Rooting Space and Survival Rate

TREE LOCATION	SURVIVAL RATE	ROOTING SPACE
Streets Parking lots Yards	64%	0 to 3 m ² (0 to 39 ft ²)
Yards Parks	73%	4 to 7 m ² (40 to 75 ft ²)
Campuses Parks Yards	91%	> 7 m ² (> 75 ft ²)

Soil should provide plenty of open space to allow growth of the trunk and development of the main flare roots. To provide anchorage for the tree, roots need to spread beyond the edge of the canopy and grow deep into the soil. Sidewalks, curbs, buildings, parking lots, driveways and other urban structures restrict root development. A strong supporting root system with adequate rooting space is the most critical factor to the ability of trees to withstand hurricane-force winds in urban landscapes.

Recommendation

Give trees enough rooting space based on their mature size:

- Small trees need at least 10 feet by 10 feet .
- Medium trees need 20 feet by 20 feet.
- Large trees need at least 30 feet by 30 feet.

Figure 23

This misshapen pruned tree is the result of selecting the wrong tree species for the location.

Figure 24

Plant small trees such as buttonwood (pictured), dogwood, crape myrtle, and wax myrtle under power lines.

Lesson 2

Good soil properties, such as adequate soil depth, a deep water table, and no compaction, help wind resistance.

Trees without deep roots can become unstable and fall over in strong winds. Trees in shallow soils are more likely to blow over than trees rooted more deeply (Figure 25).

Trees planted in compacted soil grow very poorly and are weak and unhealthy. This is especially true when the soil is poorly drained or the water table is high (Figure 26).

Recommendation 1

Make sure that planting sites have 3 feet of soil depth with a deep water table to allow healthy root system development.

Recommendation 2

Keep soil compaction to a minimum.

Lesson 3

Damaged root systems make trees vulnerable in the wind.

Roots anchor the tree. It is important that roots under the canopy are not cut because many roots are located just below the surface of the soil. Tree roots need to extend out from a tree in all directions in order to stabilize it against wind throw. When roots under the canopy are cut, trees are more predisposed to falling over (Figure 27).

Recommendation 2

Do not damage or cut main support roots during construction. Never cut roots closer than the distance of 5 times the trunk diameter. Be aware that when tree roots are cut, the anchoring system of the tree may be harmed and compromised.

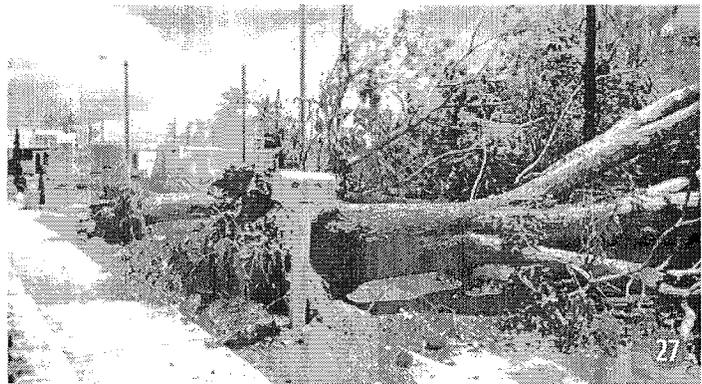


Figure 25

Shallow soils (less than 1 foot deep) in Miami-Dade did not help this tree develop an adequate root system to anchor it in Hurricane Andrew.

Figure 26

The high water table in this yard did not permit deep root development and resulted in trees being more vulnerable to the winds of Hurricane Rita. Few roots were deeper than 12 inches due to a high water table.

Figure 27

The roots on these trees were cut to build a new sidewalk, making the trees vulnerable when Hurricane Georges struck Puerto Rico in 1998.

IV. Final Considerations

A healthy and more wind-resistant urban forest depends on managing existing trees well, and, at the same time, establishing new trees properly. Follow these recommendations when managing older trees or planting new trees:

Older Tree Management

- Consider life span when managing urban forests for wind resistance. Over-mature trees should be removed and replaced by new trees.
- Remove hazard trees before the wind does. Have a certified arborist inspect your trees for signs of disease and decay in trees.
- Consider removing tree species that have demonstrated poor survival in hurricanes, especially if they are over-mature and endangering lives and property.
- Be careful not to damage or cut main support roots during construction. Be aware that when the tree roots are cut, the anchoring system of the tree may be harmed and compromised.
- Establish a preventive structural pruning program of both young and mature trees.

Planting

- When a tree fails, plant a new tree in its place.
- Plant tree species that have been shown to be more wind resistant.
- To reduce your risk, maintain diversity in your yard and community by planting a mixture of species, ages and layers of trees and shrubs.
- Plant trees in groups as opposed to individually.
- Give trees enough rooting space based on their mature size: small trees need at least 10 feet by 10 feet, medium trees 20 feet by 10 feet, and large trees 30 feet by 30 feet.
- To allow healthy root system development, make sure that planting sites have 3 ft of soil depth with a deep water table. Keep soil compaction to a minimum.
- To allow healthy crown development (instead of misshapen pruning) under power lines, plant small trees such as buttonwood, dogwood, crape myrtle, and wax myrtle.
- For a more wind-resistant, sustainable landscape, plant high-quality trees with central leaders and good form. Begin a structural pruning program for young trees.

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For More Information on:

Wind-Resistant Urban Design

Chapter 6: Urban Design for a Wind Resistant Urban Forest

Wind-Resistant Species

Chapter 8: Selecting Southeastern Coastal Plain Tree Species for Wind Resistance

Chapter 9: Selecting Tropical and Subtropical Tree Species for Wind Resistance

High-Quality Trees

Chapter 10: Selecting Quality Trees from the Nursery

Structural Pruning Program

Chapter 12: Developing a Preventive Pruning Program in Your Community: Young Trees

Chapter 13: Developing a Preventive Pruning Program in Your Community: Mature Trees

Urban Forest Management

Chapter 14: Developing an Urban Forest Management Plan for Hurricane-Prone Communities



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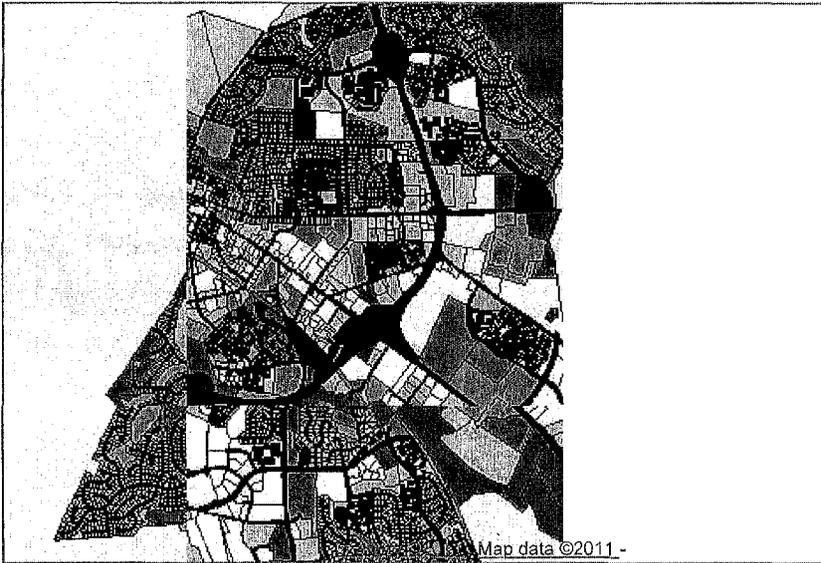
Tree Canopy

While we may not think of trees in cities as a typical “forest”, these trees provide valued services to our daily lives by improving water quality, saving energy, lowering city temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits. Scientists now have the ability to qualify and quantify the benefits of Urban Tree Canopy (UTC). An increase in UTC brings an associated increase in the UTC benefits indicated, and the below maps represent the Town’s Existing and Possible urban tree canopy.

- [Factsheet: Room for Trees \(PDF 1.5M\) - An Assessment of Leesburg's Urban Tree Canopy](#)
- [Report: Leesburg’s Existing and Possible Urban Tree Canopy \(PDF 1.9M\)](#)
- [Existing Urban Tree Canopy in Leesburg map and description](#)
- [Possible Urban Tree Canopy in Leesburg map and description](#)

Existing UTC

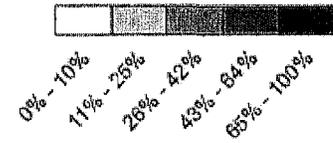
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Description

Parcel-based UTC metrics for the Town of Leesburg, VA. Existing UTC (UTC-E) is the percent of tree canopy in a given parcel when viewed from above. The information presented here is current as of October 7, 2007.

Parcel Existing UTC



Possible UTC

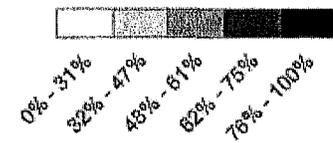
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Description

Parcel-based UTC metrics for the Town of Leesburg, VA. Possible UTC (UTC-P) is the percent of land that could theoretically support tree canopy in a given parcel when viewed from above. Possible UTC consists of vegetation and man-made features that are not water, buildings, or roads. The information presented here is current as of October 7, 2007.

Parcel Possible UTC



Room for Trees

An Assessment of Leesburg's Urban Tree Canopy



Why is Tree Canopy Important?

While we may not think of trees in cities as a typical "forest," these trees provide valued services to our daily lives. These benefits include: improving water quality, saving energy, lowering city temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits. Scientists now have the ability to qualify and quantify the benefits of UTC. An increase in UTC brings an associated increase in the UTC benefits listed above.

How Much Tree Canopy Does Leesburg Have?

Every few days 280 miles above the earth the Quickbird satellite passes over Leesburg, Virginia. With its advanced imaging system the satellite is capable of taking pictures with a 2 foot resolution, pictures so detailed that lines on a tennis court can be detected. The advanced imaging system onboard Quickbird detects near infrared (NIR) light, which is ideal for mapping tree and other vegetation. Researchers involved in this project used Quickbird imagery acquired in October of 2007 to map land cover in Leesburg (Figure 1). Using this information it was determined that 27% (2044 acres) of the Town of Leesburg is covered by tree canopy (Figure 3).

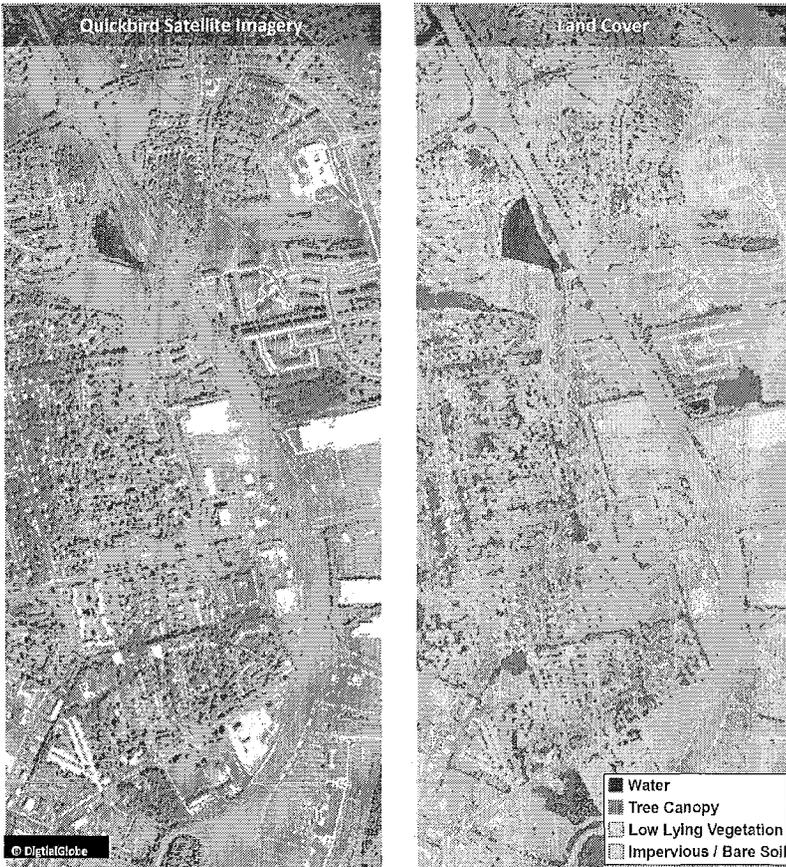


Figure 1: Land cover mapped from satellite imagery. The satellite imagery used for this project was acquired by the Quickbird satellite in October 2007 at a resolution of 60 centimeters.

Key Terms

UTC: Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above.

Land Cover: Physical features on the earth mapped from satellite imagery such as trees, grass, water, and impervious surfaces.

Existing UTC: The amount of urban tree canopy present when viewed from above using aerial or satellite imagery.

Possible UTC: The amount of land that is theoretically available for the establishment of tree canopy. Possible UTC excludes areas covered by tree canopy, roads, buildings, and water. Possible UTC is subdivided into **Vegetated Possible UTC** (grassy and shrubby areas) and **Impervious Possible UTC** (parking lots, driveways, and bare soil). Possible UTC serves as a guide for planning as it would be neither economically feasible or socially desirable to establish tree canopy on all this land.

How Much Tree Canopy Could Leesburg Have?

By integrating the land cover information with other mapping data from the Loudoun County geographic information systems (GIS) database it was determined it would be theoretical possible to establish tree canopy on 57% (4392 acres) of the town's land (Figure 2). Of this Possible UTC the majority is vegetation, primarily grassy areas. The remaining Possible UTC is impervious or bare soil, consisting of features such as parking lots and driveways. While it would not be feasible to establish tree canopy on all of the land classified as Possible UTC this analysis shows that Leesburg does indeed have room for more trees.

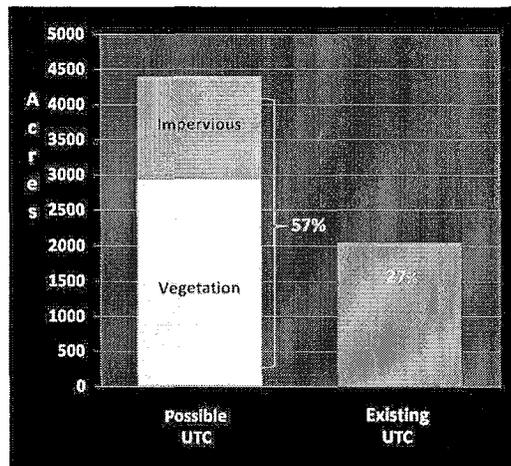


Figure 2: Possible UTC and Existing UTC estimates.

Property-Based Analysis

The results from the UTC assessment were integrated into the town's geographic information systems (GIS) database. The use of GIS allows decision makers to evaluate each property parcel in the town based on its Existing and Possible UTC (Figure 4).

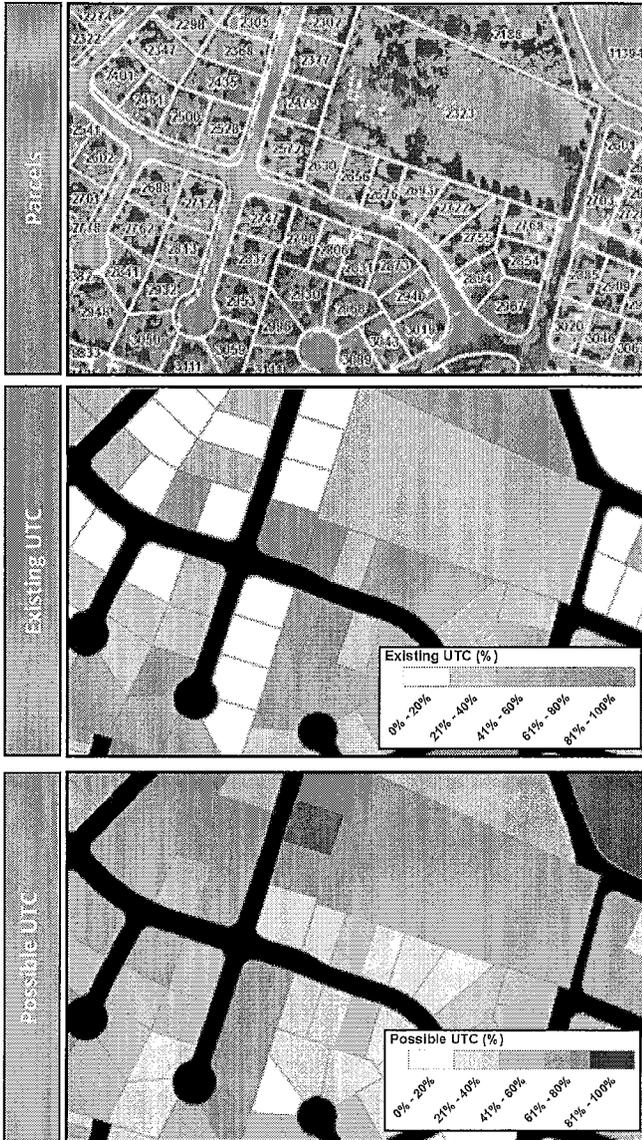


Figure 3: Estimates of Existing UTC and Possible UTC are displayed at the parcel level using the town's GIS database.

Who "Owns" the Tree Canopy?

The majority of Leesburg's tree canopy and the majority of the land available to plant new trees is on land zoned for residential use (Figure 4). Leesburg's residents will play a crucial role in preserving Leesburg's current tree canopy and in increasing Leesburg's future tree canopy. Although residential land has the greatest amounts of Existing UTC and Possible UTC, its Leesburg's institutional land (schools, hospitals, etc.) that have the most potential. This study showed that land zoned for institutional has only 12% of its surface covered by tree canopy.

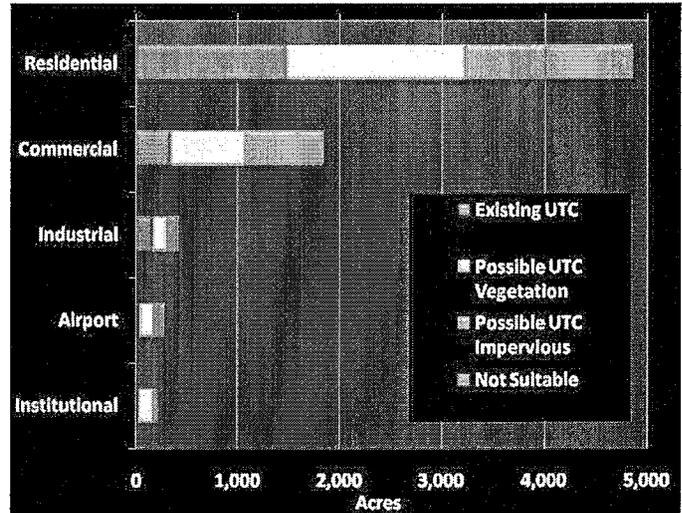


Figure 4: UTC metrics summarized by zoning land use category. It should be noted that although the airport has room for trees it would not be desirable to plant trees due to safety concerns.

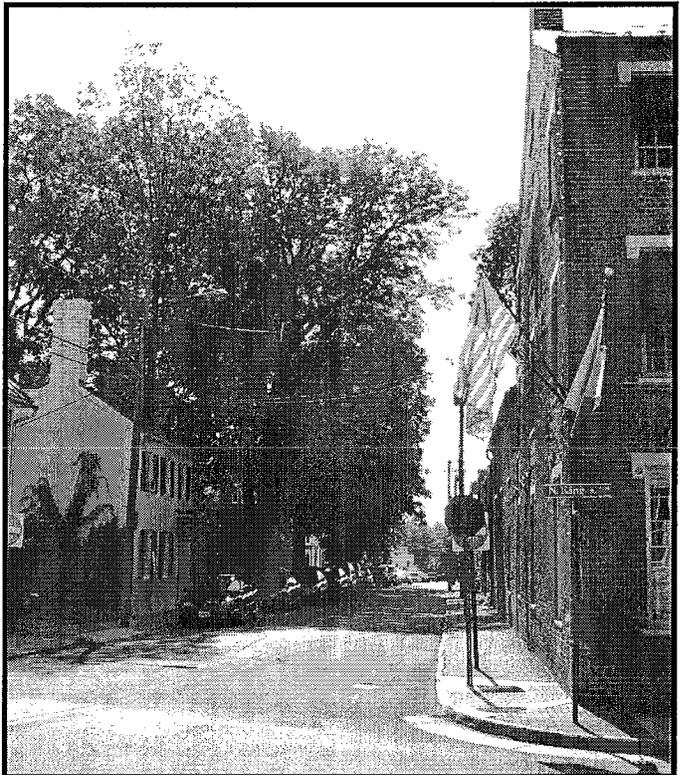


Figure 5: The town's tree canopy provides aesthetic, economic, and environmental benefits.

More Information

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A Report on the Town of Leesburg's Existing and Possible Urban Tree Canopy

Summary

An analysis of Leesburg's urban tree canopy (UTC) based on high resolution satellite imagery found that 2044 acres of the town is covered by tree canopy (termed Existing UTC). This corresponds to 27% of Leesburg's land area (land area refers to all areas not occupied by water). An additional 57% (4392 acres) of the town could theoretically be improved to support urban tree canopy (termed Possible UTC), although the amount of land where it is desirable to plant trees is less.

The majority of Leesburg's Existing UTC (72% of all tree canopy, 1469 acres) is located in areas zoned for residential land use. Residential land also contains most of the Possible UTC (58% of all the possible, 2535 acres).

UTC enhancement in Leesburg will most efficiently be realized by maximizing protection and maintenance in combination with new plantings and natural regeneration. The town should consider setting a UTC goal and focus on reallocating public agency resources (funds, staff, etc.) to enhance UTC. UTC increases will be easiest to make on institutional lands (schools, government). On private lands, a combination of education and outreach, landowner and redevelopment incentives, and refocusing of regulatory mechanisms to specifically achieve the objectives of the UTC goal will likely be required.

Project Background

The analysis of Leesburg's urban tree canopy (UTC) was carried out at the request of the Town of Leesburg. The analysis was performed by the Spatial Analysis Laboratory (SAL) of the University of Vermont's Rubenstein School of the Environment and Natural Resources in consultation with the USDA Forest Service's Northern Research Station

The goal of the project was to apply the USDA Forest Service's UTC assessment protocols to the Town of Leesburg. The UTC assessment protocols make use of high resolution geospatial datasets (satellite imagery, property boundaries), enabling UTC metrics to be computed at the parcel level. UTC metrics provide detailed information on a community's urban forest, and form the basis for UTC goal setting.

This project sought to leverage existing investments in geospatial data made by the town, enabling the analysis to be completed at a reasonable cost.

High Resolution Land Cover

Readily available land cover datasets lack both the detail and accuracy to effectively map tree canopy in urban areas. The National Land Cover Dataset's (NLCD) tree canopy layer is very valuable for regional analysis but with a relatively coarse resolution (30 meters) it fails to capture all of the tree canopy in Leesburg's urban forest (Figure 1). NLCD 2001 estimates put the town's tree canopy at 11%. The 27% estimate presented in this report was derived using high resolution (60 centimeters) imagery acquired by the Quickbird satellite in October 2007. State of the art image processing routines were used to automate the development of a high resolution land cover dataset (Figure 1).

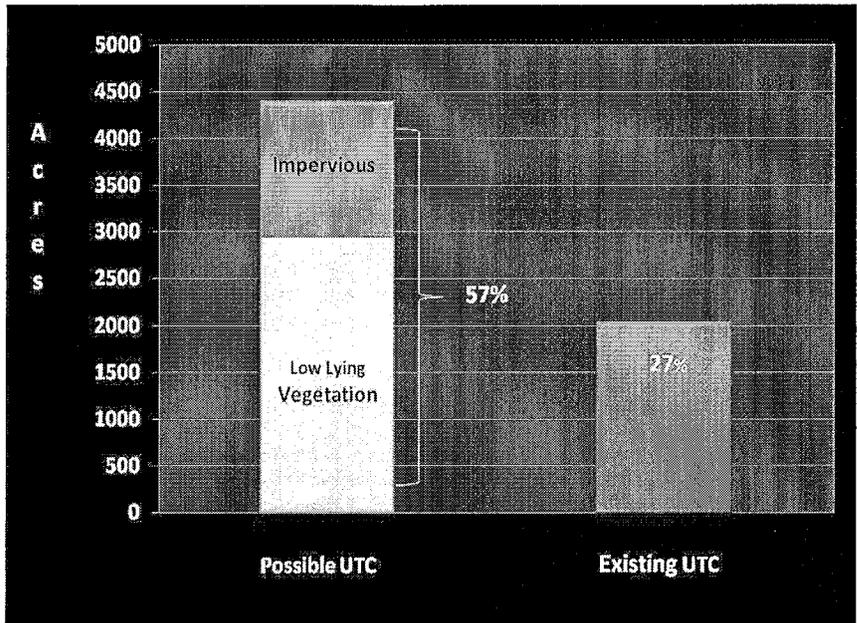


Figure 1: Comparison of the high resolution land cover dataset developed as part of this project to NLCD.

Town UTC Metrics

Based on October 2007 Quickbird satellite imagery Leesburg is estimated to have 27% of its land area covered by tree canopy (Existing UTC). It would be biophysically feasible to establish tree canopy on another 57% of the town's land (Possible UTC). Possible UTC is further broken down into Impervious Possible UTC and Vegetated Possible UTC. Impervious Possible UTC consists primarily of parking lots and driveways, areas where only small improvements in tree canopy could be made. Establishing tree canopy on the Vegetated Possible UTC, which consists of grass and shrubby areas will be much easier.

Figure 2: UTC town-wide metrics. Percentages are based on % of land area in the town. Possible UTC is land where it is biophysically feasible to establish tree canopy. Possible UTC excludes structures, roads, and water; it is divided into two subcategories: impervious and vegetation.



Existing and Possible UTC

UTC metrics for the Town of Leesburg were computed using the UTC assessment protocols. The UTC protocols integrate the land cover layer with existing GIS data layers from the town's GIS database.

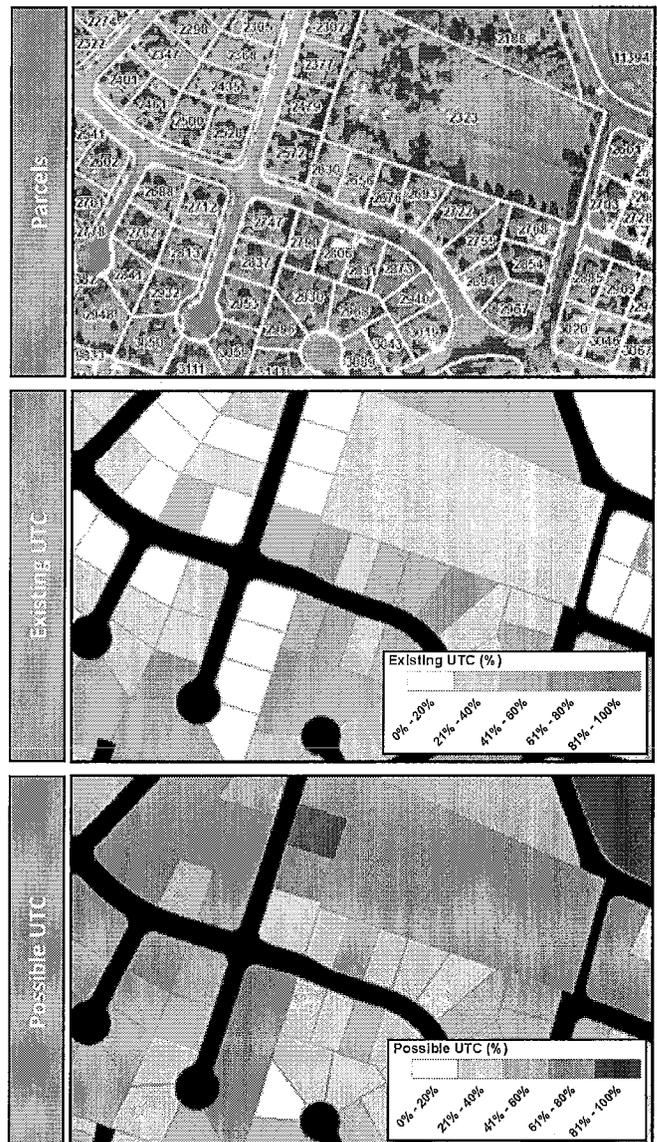
Existing UTC was computed by simply summarizing all features identified as "tree canopy." Two types of Possible UTC were computed: Vegetated Possible UTC and Impervious Possible UTC. Vegetated Possible UTC was computed by finding all areas in the land cover dataset identified as "low lying vegetation." Impervious Possible UTC was computed by summarizing all land cover in the "impervious/bare soil" category, excluding roadways and buildings. Those areas that did not fall into either the Existing UTC or Possible UTC categories were classified as "not suitable." Not suitable areas consist of buildings, roads, and water.

Parcel & Land Use Summary

Following the computation of the Existing and Possible UTC the UTC metrics were summarized for each property in the town's parcel database (Figure 3). For each parcel the absolute area of Existing and Possible UTC was computed along with the percent of Existing UTC and Possible UTC (UTC area / area of the parcel).

An updated land use layer was generated using the town's zoning layer in combination with the 2007 Quickbird satellite imagery. This land use layer was used to summarize UTC by land use category (Figure 4). Table 1 presents a more detailed summary of the UTC land use metrics. For each land use category UTC metrics were computed as a percent of all land in the town (% Land), as a percent of land area by zoning land use category (% Category) and as a percent of the area for the UTC type (% UTC Type). For example, residential areas have the most Vegetated Possible UTC in raw acreage (23%, % Land), but institutional lands have the greatest percentage of their land (80%, % Category) as Vegetated Possible UTC (Table 1).

Figure 3: Parcel-based UTC metrics. UTC metrics are generated at the parcel level, allowing each property to be evaluated with respect to its Existing UTC and Possible UTC.



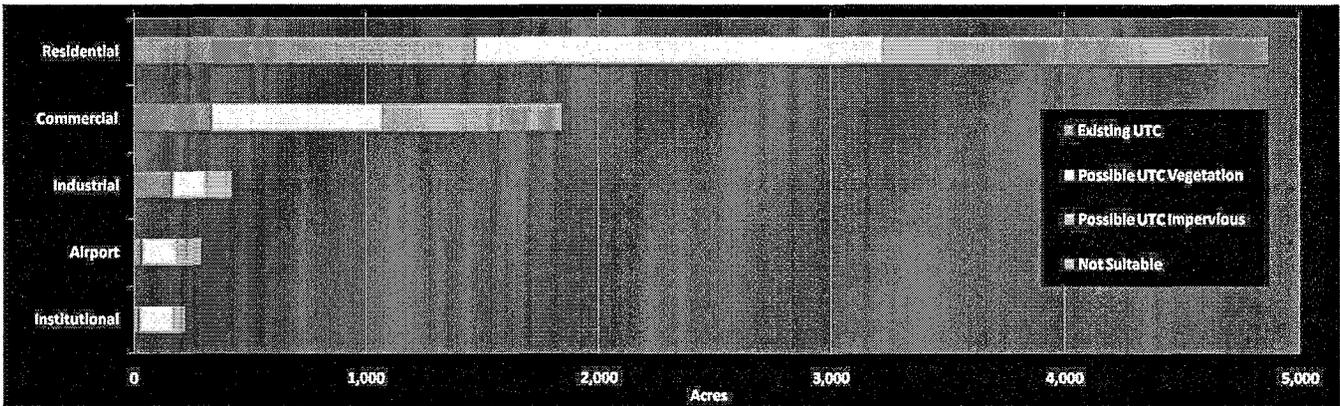


Figure 4: UTC metrics summarized by land use. Land use was determined for existing zoning districts based on 2007 satellite imagery.

Land Use	Existing UTC			Possible UTC Vegetation			Possible UTC Impervious		
	% Land	% Category	% UTC Type	% Land	% Category	% UTC Type	% Land	% Category	% UTC Type
Residential	19%	30%	72%	23%	36%	60%	10%	16%	27%
Commercial	4%	19%	17%	10%	40%	25%	7%	28%	17%
Industrial	2%	39%	8%	2%	35%	5%	1%	20%	3%
Airport	0%	12%	2%	2%	52%	5%	1%	13%	1%
Institutional	0%	12%	1%	2%	63%	5%	0%	16%	1%

$\% \text{ Land} = \frac{\text{Area of UTC type for specified land use}}{\text{Area of all land}}$

$\% \text{ Category} = \frac{\text{Area of UTC type for specified land use}}{\text{Area of all land for specified land use}}$

$\% \text{ UTC Type} = \frac{\text{Area of UTC type for specified land use}}{\text{Area of all UTC type}}$

The % Land Area value of 19% indicates that 19% of Leesburg's land area is tree canopy in areas zoned for residential land use.

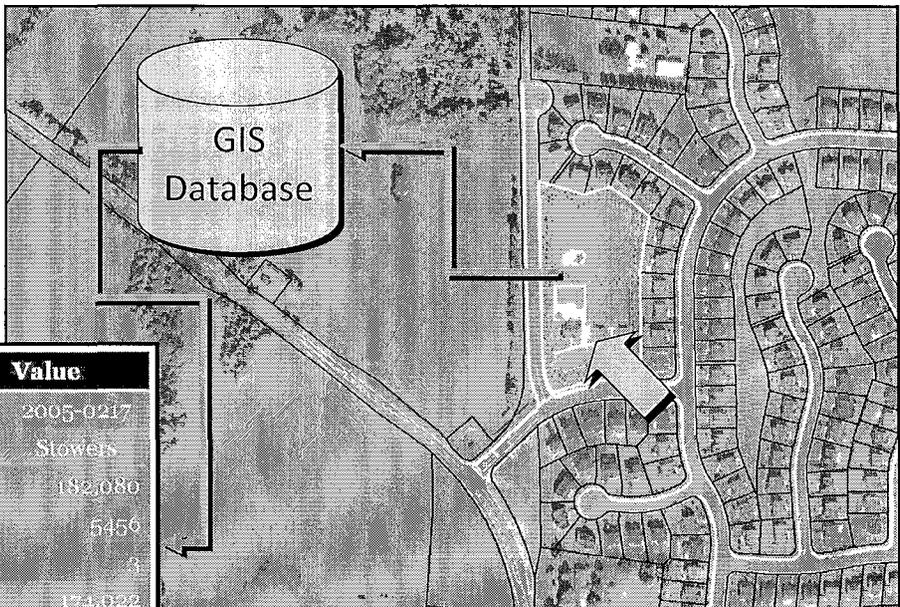
The % Land Use value of 30% indicates that 30% of residential land is covered by tree canopy.

The % UTC Type value of 72% indicates that 72% of all Existing UTC lies in areas zoned for residential land use.

Table 1: UTC metrics by type, summarized by land use. For each land use category UTC metrics were computed as a percent of all land in the town (% Land), as a percent of land area by zoning land use category (% Category) and as a percent of the area for the UTC type (% UTC Type).

Decision Support

The parcel-based UTC metrics were integrated into the town's existing GIS database. Decision makers can use GIS to find out specific UTC metrics for a parcel or set of parcels. This information can be used to estimate the amount of tree loss in a planned development or set UTC improvement goals for an individual property.



Field	Value
PLAT NUM	2005-0217
Subdivision	Stowers
Legal Square Footage	182,080
Existing UTC Area	5456
Existing UTC Percent	3
Possible UTC Area	174,022
Possible UTC Percent	95
Possible UTC Vegetation Percent	64
Possible UTC Impervious Percent	31

Figure 5: GIS-based analysis of the parcel-based UTC metrics for decision support. In this example GIS is used to select an individual parcel. The attributes for that parcel, including the parcel-based UTC metrics, are displayed in tabular form providing instant access to relevant information.

Results

- 27% of Leesburg's land area is covered by tree canopy (Existing UTC), a total of 2044 acres.
- It is biophysically feasible to establish tree canopy (Possible UTC) on 57% (4392 acres) of Leesburg's land. However, it would neither be socially desirable or economically feasible to plant trees on all of this land. Of the Possible UTC the majority (67%) consists of grassy areas where it would be relatively easy to plant trees.
- The greater part of the town's land (63%, 4868 acres) is land zoned for residential use. In pure acreage, residential land has the majority of Existing UTC in the town at 72% (1469 acres). 33% (2535 acres) of residential land is available for the establishment of new tree canopy.
- Land zoned for industrial use is the most densely stocked with tree canopy. 39% (168 acres) of industrial land consists of Existing UTC.
- Institutional land is the least densely stocked with tree canopy. Only 12% (28 acres) of institutional land is comprised of Existing UTC. 80% (182 acres) of institutional consists of Possible UTC, most of which is open grassy areas.

Conclusions

- Leesburg's urban tree canopy is a vital town asset; reducing stormwater runoff, improving air quality, reducing the town's carbon footprint, enhancing quality of life, and serving as habitat for wildlife.
- The town's Existing UTC percentage is lower than cities that are more established such as Annapolis, MD and Burlington, VT, but higher than comparable communities such as Frederick, MD (Figure 6). The amount of Possible UTC indicates that there is the requisite land area to support a sizable increase in tree canopy in the town.
- Leesburg's residents control the vast majority of the town's tree canopy. Programs that educate residents on tree stewardship and incentives provided to residents that plant trees are crucial if Leesburg is going to improve its overall UTC percentage.
- Increases in UTC will be most easily achieved on institutional lands, where there is the highest relative amount of Possible UTC and where the government can most readily implement policy.
- Development pressures will make it imperative that the town preserve its existing trees and seek out new planting opportunities.
- Tree plantings in Leesburg's rights-of-way (street trees), should be continued due to the numerous benefits they afford, but street tree plantings alone will not be able to substantially increase UTC in the town.
- With Existing UTC and Possible UTC summarized at the parcel level and integrated with the Town's GIS database, individual parcels and subdivisions can be examined and targeted for UTC improvement.

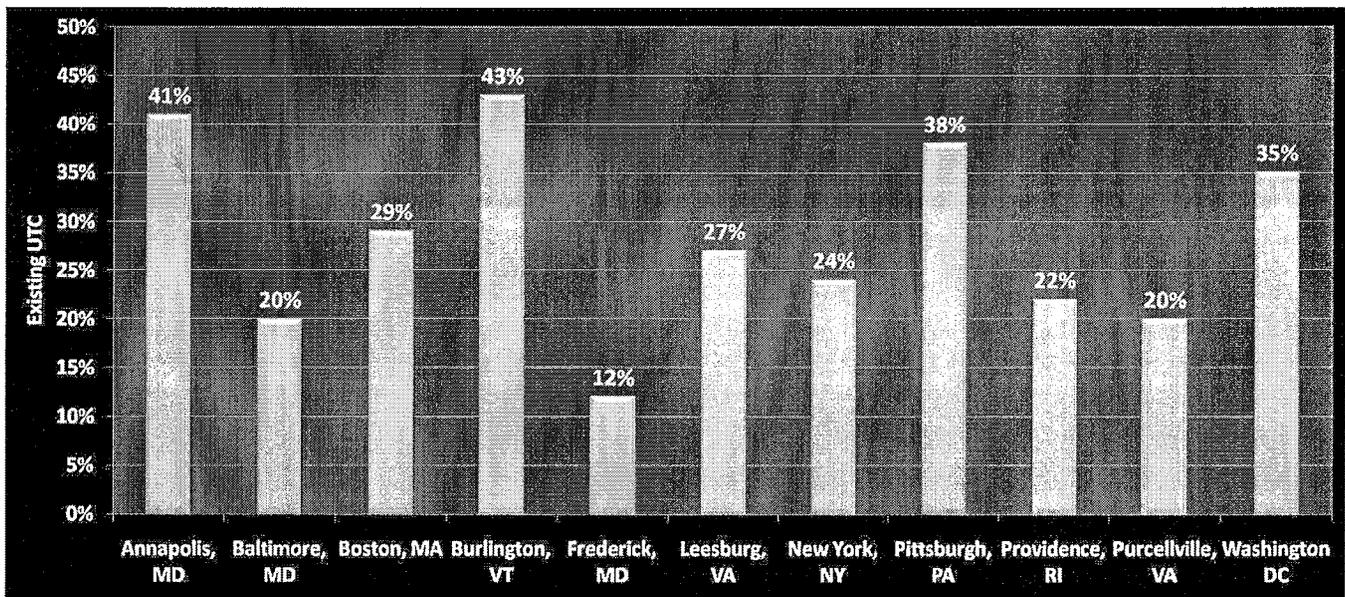


Figure 6: Comparison of Existing UTC among cities that have completed UTC assessments.

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