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Greening Connecticut Cities and Towns, Managing Public Trees and Community Forests

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Greening Connecticut Cities & Towns



Managing Public Trees and Community Forests

Robert M. Ricard and Glenn D. Dreyer, Editors

Greening Connecticut Cities and Towns

Managing Public Trees and Community Forests

“The eastern United States is probably the greatest meeting place of people and forests in the world. The region is two-thirds forested but, at the same time, heavily populated.”

- Leon S. Minckler, Forest Ecologist

Trees are everywhere and the history of the Connecticut landscape is one dominated by them. Whether returning home from New York City via the Merritt Parkway, leaf-peeping along scenic Route 169 in Connecticut's Quiet Corner, listening to a jazz concert in Bushnell Park, or watching a baseball game at the elementary school, no one can avoid being in the presence of trees.

Public trees and community forests provide many essential benefits - clean air, purified water, increased property value, thriving tourism, wildlife habitat, reduced violent behavior, sense of history, sense of community, and beauty. But trees are threatened by assorted factors such as insects and disease, forest fragmentation, invasive plants, poorly planned development, incorrect tree management practices, ice storms, hurricanes, and neglect and indifference.

Because the environmental sustainability of the Connecticut landscape is dependent on the health of public trees and community forests, private citizens, municipal employees, public officials, and professionals are today taking action to balance the need to conserve, protect, replace, and maintain public trees while reducing tree risk.

Greening Connecticut Cities and Towns is an indispensable reference that helps its readers understand specific aspects of community forestry (tree structure and function, for example) as well as comprehensive program planning, development, and implementation. The editors and contributors are experts in landscape architecture, arboriculture, nonprofit management, volunteer development, community-based forestry, media relations, government affairs, ecological planning, environmental sustainability, ecology, and community forestry. Together they place public tree management and community forestry into a greater context of environmental sustainability and economic development as well.

Written for the both layperson and professional, *Greening Connecticut Cities and Towns* will appeal to a range of readers from local community activists and volunteers to community forestry professionals and municipal officials. This practical guide is a rich resource and fascinating study for anyone interested in getting started in community forestry as well as serving as an essential resource for the seasoned community volunteer or natural resource professional.

ABOUT THE EDITORS

Robert M. Ricard is an extension educator with the University of Connecticut Cooperative Extension System, College of Agriculture and Natural Resources. He has been responsible for state-wide outreach education in urban and community forestry for over fourteen years and founded the Meskwaka Tree Project and the Tree Wardens' Association of Connecticut, Inc. The author of more than 45 forestry and urban forestry publications, including *The Value of Trees in Connecticut*, he is past chair of the Connecticut Urban Forest Council and the New England Society of American Foresters. Ricard served on the editorial board of the *Journal of Forestry* for seven years and was elected Fellow of the Society of American Foresters in 2003.

Glenn D. Dreyer is the Charles and Sarah P. Decker '27 Director of the Connecticut College Arboretum in New London, which encompasses all 750 acres of the College campus. In 1997 Dreyer was appointed Executive Director of the College's Goodwin-Niering Center for Conservation Biology and Environmental Studies. He is also an Adjunct Associate Professor of Botany at Connecticut College. He is past chair of the Connecticut Urban Forest Council and serves on the Connecticut Tree Protection Examining Board. Dreyer is also the author of the book *Connecticut's Notable Trees* and numerous popular and professional articles.

Greening Connecticut Cities and Towns

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Edited by

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White Oak *Quercus alba*

Native to the eastern North America it is most frequently found in dry woods. The Connecticut state tree, white oak is suitable for shade and specimen planting. The species is long-lived, slow growing and becomes quite large, reaching up to 100 feet in height with a 90 foot spread. Leaves are green turning purple-red in fall. Bark is gray, scaly and becomes fissured with age. Leaves are alternate, simple, and lobed. Fruit an acorn, to 1 inch long, one-quarter enclosed in a roughened cap.



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Green Ash *Fraxinus pennsylvanica*

Native to eastern North America, its natural habitat is rich woods. This species has many cultivars and is tolerant of a wide range of urban environments. It is commonly planted in parking lot islands, buffer strips and along highways and streets. The bark is gray-brown, with narrow, interlacing ridges. Leaves are opposite, pinnately compound, entire or serrate margin, and 2 to 5 inches long. They are dark green turning yellow or sometimes purple in autumn. They require continuous pruning, especially when young, limbs are susceptible to breakage, especially in ice storms.

Foreword



The Green in front of the Elton.

Preface

Peoples' attitudes towards trees and forests vary as widely as the number of tree species in the world. Economist E.F. Schumacher, for instance, considered trees to be vital to human existence through economic and cultural means: "By means of trees, wildlife could be conserved, pollution decreased, and the beauty of many landscapes enhanced. This is the way, or at least one of the ways, to spiritual, moral, and cultural regeneration." In contrast, the poet William Blake expressed some people's ambivalence towards trees: "The tree which moves some to tears of joy is in the eyes of another only a green thing which stands in the way."

Greening Connecticut Cities and Towns is about managing public trees in Connecticut cities, towns, villages and neighborhoods. It is about *public trees* because every person in the state receives essential benefits from them and yet they are some of the most neglected resources in a community. It is about *management* because these trees grow in high-use and built-up areas where their premature decline is the norm and only through management can their health and vigor be maintained and the public kept safe. And *community forestry* is the process by which public trees can be managed well and for future generations.

The purpose of this book is not only to inform, but to motivate the reader as well. The chapters in *Greening Connecticut Cities and Towns* have been written by experts in their fields. Authors have also been intimately involved in Connecticut community forestry as professionals or as volunteers. They set out not only to provide readers with essential information, but to illustrate by example dedication to community forestry through local and state-wide assistance. Most of the chapters are written to provide an introduction to the reader on the subject and do not cover the subject with enough information to make the reader an expert. Other references will need to be read to accomplish this.

The Connecticut community forestry experience using local examples was emphasized as well. The intent was to demonstrate that a great deal has been accomplished in this state regarding community forestry and public tree management, most of it done by your friends and neighbors. Connecticut has a rich history of successful community forestry efforts and there is no reason to keep this a secret. Real-life examples are highlighted: community forestry professionals and volunteers from around the state share experiences that have worked, or sometimes haven't worked, in their communities and organizations.

The reader may, of course, open this book and read any chapter out of order and learn something. For instance, by reading the chapter on the *Essentials of Tree Pruning* by Dr. Dennis Ryan, the reader will, obviously, learn the right way to prune a tree. However, it is critical to understand that community forestry is a *process*, not a series of isolated tasks and events. The sections and chapters have been organized to assist the reader grasp the concepts and, therefore, the process of community forestry in total. And even though there is a beginning and an ending to this book, it is hoped that readers will come to realize that although there may be a start to community forestry, there is in fact no end, and that it is a process that they will want to stay with.

To help the reader segue from one chapter to the next, and to reinforce the importance of *process* in community forestry, a “transitional dialog” box presented by the editors is at the beginning of each chapter. This has been done to help the reader understand the reason why that particular chapter was written and why it falls in the order it does. It is also intended to enliven the book as well.

There are six primary sections to the book. In the first section (Part One), readers are introduced to community forestry, how it all came about, and how trees benefits society. This section provides information readers can use in helping to persuade others, such as public officials, about the importance of public trees and community forestry. The reader will also learn that community forestry is not new. It is, though, increasingly recognized and accepted as an essential, and increasingly sophisticated, and component of local government responsibility.

In the second section (Part Two) authors lay the groundwork for later chapters by presenting basic information on forest ecology, tree biology, urban soils, insects, disease and tree stress. By learning the material in this section, understanding the information in subsequent chapters will become

better understood and retained. Many things in later chapters will, in fact, seem intuitive once the reader grasps tree biology.

The third section covers basic tree care skill development. It would be fair to describe this section (Part Three) as the “meat and potato” section. Here the reader will learn tree identification, tree species selection, tree planting, tree pruning, and some additional, advance arboricultural practices. A successful community forestry program is based on the efforts of both professionals and citizen volunteers. Some tasks are best left to well-trained and experienced municipal employees or licensed arborists - cabling, for instance. Connecticut is one of a handful of states that have several hundred well-trained, licensed arborist. These professionals are critical to ensuring the trees on both private and sometimes public lands are well-maintained. Other tasks, such as lobbying and fundraising, are often best accomplished by citizen volunteers, and these are discussed later.

The fourth section (Part Four) covers community forestry management and concentrates on multi-faceted, management issues. These require significant coordination by and cooperation with (even within) the municipal government. Tree inventories, ordinances, tree risk assessment management plans, and legal issues are covered in this section and are often the primary elements that make-up an effective, comprehensive, urban forestry effort in a municipality. The critical role of Connecticut tree wardens is introduced here and cannot be ignored. Connecticut is fortunate to be one of the few states in the country that has a state law dedicated to the conservation and care of public trees and this is reflected in the tree warden laws.

Part Five covers elements of community program development. Margaret Mead observed that “a small group of thoughtful, committed people can change the world. Indeed it's the only thing that ever has.” Not since the great park and landscape era around the turn of this century has tree planting been greeted so enthusiastically. Volunteers across the nation are turning out in droves to plant and care for trees, and this section offers tips on how to use “people resources” wisely. In this section, readers will learn about working with the media, delivering effective marketing campaigns, fundraising, volunteers, committees, and government.

The last section (Part Six) helps to “put it all together.” The section helps by assisting the reader assess their municipality’s public tree and community forestry efforts. With this type of assessment,

a community can determine where their strengths and weaknesses lie, develop a plan for sustainable community forestry, and act on it. If the community has a program already in place, the reader may want to begin with the assessment first before reading much of the book.

In addition to chapters, a number of critical points and additional information is provided and appears as “sidebars.” These have been prominently displayed so that the reader cannot avoid them. Some are brief (such as the *Call Before You Dig!* sidebar), while others are larger such as the sidebar on *Leadership*. Appendices are provided at the end of the book. These provide information that the reader may use from time to time.

As we begin the twenty-first century, the challenge we face is not merely that of increasing our knowledge of the forest and urban environment. We must work with, and sometimes reform, human institutions so they are as finely tuned to the natural world as our knowledge permits. We must, as the visionary landscape architect Ian McHarg put it, design with nature.

The USDA Forest Service suggests that the success of any community forestry program is based on five key steps: *understand, plan, plant, protect, and care*. *Greening Connecticut Cities and Towns* was written for the many volunteers and professionals actively engaged in community forestry in Connecticut today. It serves as a practical guide for these dedicated people. It is hoped that this book will also serve to inspire others who are eager, but may not yet know how to understand, plan, plant, protect, and care for public trees in Connecticut’s municipal landscapes. If more public trees are managed well as a result of people learning from this book, then the effort was worth it.

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We would to thank Chris Donnelley, Urban Forester, and Fred Borman, Program Specialist, Private and Municipal Forest Lands, of the Connecticut Department of Environmental Protection, Division of Forestry, for assistance with acquiring funding and managing contracts.

Sugar Maple *Acer saccharum*

One of our most common and striking trees, sugar maple is native to the northeastern United States and grows primarily in rich woods. Also known as rock maple, the species has many cultivars. Used best where there is ample soil volume it can be planted as a shade and street tree. Leaves are opposite, simple, 5 lobed, star-shaped, deciduous, and 4 to 6 inches in length. Fall color is a most striking feature with leaves turning brilliant red-orange. The tree is also known as source for maple syrup production. Bark gray and smooth becoming furrowed with maturity. This is a large tree to 100 feet in height often with an equally wide a crown.



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Red Oak *Quercus rubra*

Native to eastern North America, red oak is known best as an important lumber species. One of the most rapidly growing oaks, it is a popular and handsome shade and street tree, with good form and dense foliage. Well suited for parking lot islands, buffer strips, highways, and streets. Sometimes called northern red oak, it is a fast-growing, large, and broad-headed tree. Leaves are elliptic, ovate and up to 8 inches long and 6 inches across, with slender-toothed lobes, turning reddish-brown in the fall. It is a tall tree that can reach up to 90 feet.



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PART ONE

What is Community Forestry?

Community forestry is the art and science of managing public trees in cities, towns, and villages. To some, community forestry is planting trees on Main Street; to others, it's leading a tour of notable trees on the town green. Knowing what it is, appreciating its history, and understanding the many benefits of trees, is a great place to start.



Glenn: Bob, I often have a difficult time explaining to people what urban and community forestry is.

Bob: As an Extension Forester I get that question all the time. So let's figure this out so we're all on the same page.



Chapter 1

Urban and Community Forestry Today

Robert M. Ricard

“This is the forest primeval. The murmuring pines and the hemlocks, bearded with moss, and in garments green, indistinct in the twilight.” So starts Henry Wadsworth Longfellow’s poem *Evangeline*. The settling of North America by people from European countries where extensive deforestation was the norm to a land of a “howling wilderness” has figured prominently in American’s world view. As a result, for many of us the words “urban” and “forest” seem contradictory. After all, urban is just another word for the city and it conjures up images of concrete, steel, and congested, noisy streets. In contrast, the word “forest” summons pacific images of quiet woodlands, trout-filled streams, and the song of thrush and chickadee. So what is an urban - or community - forest?

The urban forest consists of all trees that grow in and around cities: from the solitary spruce that struggles to survive in a concrete pot in front of a neighborhood grocery, to the stately elms on the green, to the tall pines that protect the city’s watershed. Urban trees do not discriminate. They grow in residential, recreational, business and industrial zones. They grow beside



buildings, along Main Street, in vacant lots, parks, greenways, and conservation areas.

Change is intrinsic to life in the city and as a result, the urban forest is in a constant state of adjustment. New buildings are constructed and old ones are demolished; power lines are strung and sewers are dug. Everywhere plant life struggles to adapt to the constantly shifting urban environment.

In the late 1990s, a special advisory committee reported to the president of the United States that urban trees constituted a valuable resource that was not being cared for properly. The committee advised that community forestry programs be created through the support and cooperation of the USDA Forest Service. The objective was “to protect, improve, and establish trees” in communities across the country. When the president accepted the report, urban forestry, from a federal standpoint, was born in the United States.

The State of Community Forestry in Connecticut

Community forestry evaluates the needs of the solitary spruce, stately elms, and tall pines and attempts to meet them. It recognizes and emphasizes the importance of comprehensive planning, and its objective is to provide a variety of benefits to the community from a well-managed forest. Community forestry is more than the wise management of city trees; it is also an effort to meet the array of social, physical, and even emotional and spiritual needs of the increasingly diverse populations that live and work in the urban forest.

What is community forestry? Though there is no single definition accepted by all urban and community forestry professionals and community activists, the following one is used for the purposes of this book:

It is the art, science, and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society.

Helms, J.A., ed. 1998. *The Dictionary of Forestry*. Society of American Foresters.



Note that the term “community forestry” is most often used in this book. However, “urban forestry,” “community forestry” and “urban and community forestry” are terms that have equivalent meaning. Some professionals and community tree activists express concern that the term “urban forestry” excludes rural and suburban audiences, but the ideas and principles set forth here apply equally to both rural and urban areas.

Suggested Readings

Grey, G.W. and F.J. Deneke. 1986. *Urban Forestry*. New York: John Wiley and Sons, Inc.

Moll, G. and S. Ebenreck, eds. 1978. *Shading Our Cities: A Resource Guide for Urban and Community Forests*. Washington, D.C.: Island Press.

Philips, L.E. *Urban Trees: A Guide for Selection, Maintenance, and Master Planning*. New York: McGraw-Hill, Inc.

Cordell, H.K., et al. 1984. “Urban Forestry.” Pp. 887-983. In *Forestry Handbook, 2nd edition*. K.F. Wegner, ed. New York: John Wiley and Sons, Inc.

All four of these publications provide comprehensive and complete overviews of community forestry. *Urban Forestry* and *Urban Trees* are written more for community forestry professionals. *Shading Our Cities* is directed more towards community tree volunteers. However, professionals and volunteers alike should have no difficulty with any of these publications. The chapter in the *Forestry Handbook* is quite technical and is most suitable for municipal arborists, city foresters, and tree wardens.



LEADERSHIP

How do public tree ordinances get passed? How do tree budgets get pressed before financial committees? What does it take for a citizen tree group to form? Who makes that first contact with the mayor's office? And who rallies "the troops" when the meetings become poorly attended, politicians don't return calls, the press fails to show up for the tree planting event? Who's the one who loses sleep every night?

Strong and effective community forestry efforts are based on the active involvement of many people in different positions. But doesn't it seem that it is often one person (or sometimes two or three people working as a well-oiled machine – good chemistry) who is getting "all cylinders" in an organization to fire?

No one will deny that community forestry needs the involvement of many people, but usually one person will stand out. But even though a person is the head of an agency, department, committee, commission, or organization, it does not mean that they are the leader. There is a difference between a leader and a manager and styles of leadership versus styles of management.

It has often been said that "managers are made; leaders are born." But is this really true? It is interesting to note that there have been schools of management for more than a century at many schools of business, but only recently have leadership studies been initiated. The presumption, of course, has been management is an acquired skill that can be taught. Researchers have discovered that leaders are not, in fact, genetically determined, but that some people are born into circumstances where leadership skills become learned, fostered, cultivated, and encouraged. So, evidently, there is hope for anyone interested in becoming a more effective leader since leadership can be learned.

But what does it take? What characterizes a leader? Are there different leadership styles? How do they differ? In *Environmental Leadership*, Professors John C. Gordon and Joyce K. Berry have described environmental leadership as "the ability of an individual or group to guide positive change toward a vision



of an environmentally better future.” (Note specific key words here such as “guide,” “positive,” “vision,” and “future.”)

Warren Bennis and Joan Goldsmith, in *Learning to Lead*, state that “A good manager does things right. A leader does the right thing. Doing the right things implies a goal, a direction, an objective, a vision, a dream, a path, a reach. . . . Managing is about efficiency. Leading is about effectiveness. Managing is about how. Leadership is about why and how. Leadership is about innovating and initiating.”

On one hand, learning how to write a shade tree ordinance is relatively simple; on the other, developing leaders and leadership skills, is a greater, more difficult challenge. The need for leaders with strong, effective leadership skills is critical. It is essential that community forestry volunteers and professionals rise to the leadership challenge.

Suggested Readings

Berry, J.K. and J.C. Gordon, eds. 1993. *Environmental Leadership: Developing Effective Skills and Styles*. Washington, D.C.: Island Press.

The authors have a great deal of experience in both the science and the application of environmental leadership. There is a great deal of discussion on approaches to leadership followed by excellent case studies and personal accounts. Chapter authors are leaders from all aspects of the environmental field and at different levels. This is pleasant reading without a lot of jargon.

Bennis, W. and J. Goldsmith. 1994. *Learning to Lead: A Workbook on Becoming a Leader*. Reading, Massachusetts: Addison-Wesley Publishing Company.

Bennis, W. and B. Nanus. 1985. *Leaders: The Strategies for Taking Charge*. New York: Harper Perennial.



Bennis is one of the premier experts on organizational management and leadership. He is a prolific writer with more than twenty-four books to his credit. *Learning to Lead* is a practical, workbook style book that is, basically, an exercise in helping someone determine what leadership skills they possess and to what degree. It also helps the reader define their leadership style and points out strengths and weaknesses. *Leaders: The Strategies for Taking Charge* takes a more traditional tact. It contains a good discussion on leadership then presents ways for leaders to better lead organizations.

Herman, R.D. and R.D. Heimovics. 1991. *Executive Leadership in Nonprofit Organizations*. San Francisco: Jossey-Bass Publishers.

This book addresses issues and approaches of leadership for people in nonprofit organization, principally staff and board members. Principles remain the same for people in all types of organizations. Topics are well organized and easy to understand.

Ginkgo *Ginkgo biloba*

Also called maidenhair tree, it is a native to eastern China, but is probably extinct in the wild. The unique foliage and branching pattern in winter makes this tree a distinctive addition to any landscape. Ginkgo is practically pest-free and resistant to storm damage. There are several cultivars with varied forms. Leaves are alternate, simple, lobed, fan-shaped, and 2 to 4 inches long. Only male plants should be used as the female produces foul-smelling fruit in late autumn. Fall foliage is an excellent yellow and the tree grows upwards of 80 feet.





Bob: Now that we know what community forestry is it's clear that we've been practicing some aspects of it for centuries.

Glenn: What is different is that we never had a comprehensive state-wide program until recently.



Chapter 2

The Evolution of Community Forestry in Connecticut

Glenn D. Dreyer and Robert M. Ricard

The history of our landscape is one dominated by an ever increasing human population. The area that became the state of Connecticut was first occupied about 10,000 years ago by migrants coming from the western part of the continent. Even though the first native peoples burned woodlands, tilled the land, hunted, and discarded wastes, their numbers were never large enough to cause severe degradation of land and water resources.

After the arrival of Europeans four centuries ago, human populations remained small, but commerce within and between the early settlements and exportation of goods to Europe - mast trees, lumber, furs, and fish for example - greatly increased natural resource use. From the time of European settlement until the early 1800s, most Americans lived off the land on subsistence farms. These people cut wood for heating and cooking (a single family farm could consume fifty cords of fuel wood annually), sawed boards for homes, barns and fencing, planted fields converted from cleared forests, hunted to supplement the family diet, and traded and bartered as the need arose. The result was the



clearing of the original forest from approximately ninety-five percent cover at the time of European settlement to around twenty-five percent by the 1830s. Small towns remained centers of trade and worship. Cities then were not much bigger than many small towns today.

With the dawning of the industrial revolution, the rate of natural resource degradation, especially the forest for wood, charcoal and boxes, increased significantly. Immigration also increased tremendously, with people from several countries (especially Irish in the 1840s, Germans, Italians, Polish, French-Canadians, Scandinavians and others until the early 1900s) came in search of better wages in the increasing numbers of mills and factories around Connecticut.

Most industries developed in communities strategically situated near rivers which provided power, waste disposal, and transport systems for shipping goods. Here immigrants found jobs, and these communities became Connecticut's most densely populated. They are now large cities like Hartford, New Haven, and Bridgeport; mid-sized cities like Meriden, Middletown, and New London; and smaller, tightly packed mill villages such as Danielson, Winsted, Terryville, Stafford Springs, and Putnam.

Between 1750 and 1850, those communities that had grown beyond the pioneering stage of development began to consider the need to improve the appearance of town centers through tree planting, road grading, the fencing of common land, the establishment of promenades, and new cemetery designs. These events were the earliest stages in the evolution of what became, in part, urban and community forestry. The towns planted trees and some even developed what might be called "street tree management plans." New Haven led the way with a 1733 law that offered a reward (40 shillings) for information that led to the conviction of anyone who caused injury to a public tree. This "ornamentation movement" grew to be quite fashionable with towns mimicking each other's better ideas.

Citizen forestry organizations had their start in the ornamentation movement. In Hanover, New Hampshire, the Ornamental Tree Planting Society was formed in 1843 and the Forest Tree Society was started in Keene, New Hampshire, the next year. Unfortunately, their first project was not successful due to an uproar from area merchants who feared that newly planted street trees would block the line of vision to their shops.

In the mid to late 1800s, the profession of landscape architecture began evolving rapidly. The acknowledged leader of this movement was Connecticut native Frederick Law Olmsted (b. Hartford, 1822). Olmsted, along with Calvin Vaux, is best known as the designer of Central Park in New York City.

Another important legacy was the creation of a social movement that recognized that the lives of core city dwellers, usually poor immigrants, could be improved by bringing nature into the city. Although landscape architects designed gardens for wealthy clients throughout the late nineteenth and early twentieth centuries, they also produced the first and some of America's most significant public urban open spaces (e.g., Boston's Emerald Necklace, Boston Common, New York's Central Park and Prospect Park). In Connecticut, notable public projects of this era include the Green in New Haven, and Bushnell and Keney Parks in Hartford.



Also in the later half of the nineteenth century, rural forests and abandoned agricultural lands were becoming a concern. For two centuries, forests had been stripped of their trees and converted to farmland. Now these farms were being left for more fertile soils in the American mid-west. Uncontrolled fires raged on these abandoned lands. Erosion removed the thin surface soils leaving the landscape gullied and rocky.

Many private citizens recognized the need for resource conservation during this period. For instance, in 1895 the Connecticut Forestry Association, later renamed the Connecticut Forest and Park Association, was established. While some of the key founding members were professional foresters, most were private citizens concerned with the conservation of open spaces and shade trees. Many members donated much of the lands that now constitute the Connecticut state parks system and some of the state forests as well.

In the early twentieth century, the Connecticut Tree Protective Association was founded for the purpose of conserving trees and for the promotion of scientific tree care (arboriculture) and was one of the first of its kind in the world. Another Connecticut native, Gifford Pinchot (b. Simsbury, 1865) worked hard for the creation of professional forestry through the founding of the Society of American Foresters (1900), the Yale School of Forestry (1900), and the USDA Forest Service (1905). In 1924, the International Society of Arboriculture was established in Stamford with the support of the

Bartlett family who also formed a tree care company, one of the first. Also during the early 1900s, all of the New England states passed legislation requiring the appointment of municipal tree wardens, with Massachusetts starting the trend in 1899. This tremendous burst of attention signaled the willingness of both private citizens and public officials to take seriously the planting and care of trees and forests, both rural and urban.

The fact that individual trees were being recognized as important is signaled by the 1934 publication of *Trees of Note in Connecticut* by Katharine Matthies. Today, the Connecticut Notable Trees Project, sponsored by the Connecticut Botanical Society, the Connecticut College Arboretum, and the Connecticut Urban Forest Council, documents big and historic trees with records available on the internet and in book form.

Suggested Readings

Arnold, H.F. 1993. *Trees in Urban Design*. New York: Van Nostrand Reinhold.

Arnold is a legend, albeit a sometimes controversial one, in landscape architecture and city planning circles. His book is a fine review of trees in public spaces and Arnold develops and explains many innovative concepts. For people with at least moderate community forestry training and experience, *Trees in Urban Design* will be of great interest.

Campanella, T.J. 2003. *Republic of Trees: New England and the American Elm*. New Haven: Yale University Press.

Republic of Trees is not just a book romanticizing the American elm - and lamenting its loss, it is a scholarly book containing a great deal of information on the history and origins of tree planting and community forestry. Everyone in Connecticut, or New England for that matter, involved in community forestry should read this book.



Dreyer, G.D. 1998. *Connecticut's Notable Trees, 2nd edition*. North Attleborough, Massachusetts: Covered Bridge Press.

A book that has been acclaimed throughout the state, *Connecticut's Notable Trees* is both fun and functional. People relate strongly to “big trees” and “notable trees” and information in this book can be used to help promote community forestry in any Connecticut community.

Favretti, R.J. 1982. “The Ornamentation of New England Towns: 1750-1850.” *Journal of Garden History* 2(4): 325-342.

Favretti is well known throughout Connecticut and around the country as an expert in historical landscape architecture. His research and work very specifically has focused on the landscape of the New England village in both fact and fiction. This article points out quite eloquently that urban forestry is not new. It also stresses that community forestry professionals and volunteers should and can learn from the past.

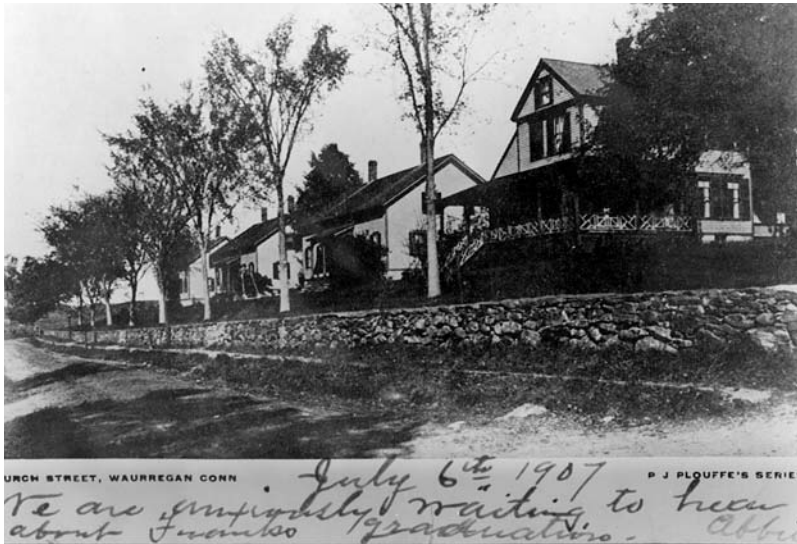
Koch, J. 2000. “The Origins of Urban Forestry.” Pp.1-10. In *Handbook of Urban and Community Forestry in the Northeast*. J.E. Kuser, ed. New York: Kluwer Academic/Plenum Publishers.

This article is primarily scholarly. It is important because it discusses community forestry in a global context and presents how people have treated public trees throughout the centuries. This is a sweeping article that is well worth reading.



Waggoner, P.E. and J.D. Ovington. 1962. *Proceedings of the Lockwood Conference on the Suburban Forest and Ecology*. New Haven: The Connecticut Agricultural Experiment Station. Bulletin 652.

Though dated, the symposium was ground breaking and this publication is, therefore, very important. It establishes that scientists in Connecticut, and elsewhere, had identified a need to develop research on the urban and suburban forest well before the federal government acted on this in the 1970s and, more completely, in the 1990s. This conference was, quite simply, a landmark event in Connecticut forestry.



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TWO NATIVE GIANTS: PINCHOT AND OLMSTED

John Alexopoulos

Gifford Pinchot

Gifford Pinchot, the father of American forestry, a name synonymous with forestry and environmental conservation, was born in Simsbury, Connecticut, on August 11, 1865. His mother was Mary Eno, whose family had been the town's oldest and most distinguished. He graduated from Yale College before studying at the L'Ecole Nationale Forestiere in Nancy, France.

Pinchot spent a life encouraging the wise-use and conservation of America's forests. He saw a forest in ecological terms, with man included, where plant, animal, and man are interwoven. He also was the first strong, politically and socially connected advocate for the application of scientific principles to forest management.

His many accomplishments included: serving as first chief of the USDA Forest Service when President Theodore Roosevelt created the agency in 1905, founded the Yale School of Forestry and the Society of American Foresters in 1900, and served two-terms as governor of Pennsylvania in the 1920s and 1930s.

"The object of forestry is to discover and apply the principles according to which forests are best managed.... The forest is the most highly organized portion of the vegetable world. It takes its importance less from the individual trees which help to form it than from the qualities which belong to it as a whole. Although it is composed of trees, the forest is far more than a collection of trees standing in one place. It has a population of animals and plants peculiar to itself, a soil largely of its own making, and a climate different in many ways from that of the open country. Its influence upon the streams alone makes farming possible in many regions, and everywhere it tends to prevent floods and drought. It supplies fuel, one of the first necessities of life, and lumber, the raw material, without which cities, railroads, and all the great achievements of material progress would have been either long delayed or wholly missed."



Although best known for his traditional forestry and political posts, Pinchot also advocated for tree planting and care in cities. “Street trees are successfully planted in great numbers in all of the most beautiful cities in the world. Washington and Paris are conspicuous examples. That such trees succeed is largely due to the great care taken in setting them out. The attractiveness of cities has come to be reckoned among their business advantages, and nothing adds to it more than well-selected, well-planted, and well-cared for trees.”

Frederick Law Olmsted

Frederick Law Olmsted, the father of landscape architecture, was a Connecticut native born in Hartford in 1822. A self-made design professional, he created a legacy that endures to this day. His active role in developing projects spanned some thirty-five years and his work was as wide in scope as the design of estate grounds and the planning of the Columbian Exposition of 1893. In every project that he developed, his reverence for nature was ever present. His first design, in collaboration with his first partner, an architect, Calvert Vaux, was of Central Park in New York. The design that endures to this day embodies principles of ecological design that were fundamental to Olmsted’s philosophy. Nature was the basis from which the design was drawn, while human use took advantage of it.

One of Olmsted’s final projects was at the Biltmore Estate in Asheville, North Carolina. It was there that he brought in as part of a collaborative team, Gifford Pinchot. Pinchot, the father of scientific forestry practices, brought his knowledge of forestry to work with Olmsted in healing the scars left by previous owners. Conservation was primary in the final plan, while the utilization of the forestry resource was enhanced without negative consequences.

Olmsted (sometimes affectionately referred to as FLO) also used C. S. Sargent, the master horticulturist, in developing the gardens adjacent the mansion. Sargent had previously developed the plans for the Arnold Arboretum of Harvard University along with the Olmsted firm. A visit to Biltmore today, more than adequately demonstrates how Olmsted’s vision was fulfilled and how successfully nature and man’s use can work together.

Olmsted’s personal work and the work of his firm can be found in Connecticut in the parks of Bridgeport, Meriden, New Britain, and Hartford. In addition, he, with his partner, Calvert Vaux, laid out the grounds for the Institute of Living in Hartford. Included in his work are numerous private estate and public institutional grounds.



Glenn: Why do you think people like trees so much? Could we be genetically programmed to respond to them?

Bob: Maybe, or is it learned? Trees certainly provide us with many tangible benefits and people certainly have a passion for them.



Chapter 3

The Benefits of Trees

Jeffrey S. Ward

It seems we have a natural yearning for homes nestled on tree-lined streets, for parks shaded by majestic trees, for avenues flanked by leafy colonnades. The question arises – why? What are the benefits that trees provide us, tangible and perceived, that make us want to live surrounded by them?

Without a doubt, part of their appeal is the aesthetic beauty and calmness they impart by softening the hard angles of our concrete and asphalt world. Their greening buds and cheerful flowers herald the arrival of spring and their brilliant colors forecast the change from summer to winter. But the trees go far beyond these contributions. They provide a broad range of personal, community, and global benefits.

Personal Benefits

Trees increase our sense of relaxation and well being. They can absorb some of the noise pollution common in an urban environment, reducing stress. At the same time, the soothing sound of leaves rustling in the wind can mask other sounds. Current research has documented the very real,

positive effects of trees in our increasingly urban environment. Indeed, a study found that girls living in Chicago public housing had better concentration and impulse inhibition when green spaces, including trees, were located outside their buildings. Trees increased their self-discipline. Another study published in the journal *Science* found that hospital patients with a view of trees recovered faster with fewer complications. Lastly, it has been reported that the simply viewing trees can help with recovery from mental fatigue.

Money may not grow on trees, but trees do provide real financial benefits. Cooling costs during the dog days of summer can be reduced by thirty-percent or more with properly planted trees. Trees cool buildings by both reflecting sunlight and by absorbing some of the sun's energy. This energy is dissipated by transpiration - the evaporative loss of water through the leaves. The cooling effect provided by trees also benefits communities by reducing the need for additional energy infrastructure like power plants. In the winter, trees along streets serve as windbreaks to reduce strong, gusty winds, especially near tall buildings.

Community Benefits

Trees in our cities and towns contribute both quality of life and financial benefits. For example, trees can reduce crime. A study in Chicago found that apartment buildings with greenery reduced both property and violent crimes by roughly half. Residents also reported higher quality of life with reduced littering, graffiti, and rowdy neighbors. It is truly remarkable that the simple act of planting trees increases a neighborhood's community spirit. Some, or all, of the money spent on caring for trees can be offset by the decreased cost of policing and cleaning garbage and graffiti.

People drive slower on tree lined streets. This increases traffic safety because increased speed is directly linked with increased accidents. It is also possible that the increased serenity provided by trees may decrease the stress of driving in congested traffic. Trees also serve as a buffer between pedestrians and traffic.

Trees increase the environmental quality of our communities. They provide habitat and shelter for urban wildlife as varied as squirrels and songbirds, chipmunks and robins. Trees reduce air pollutants by removing both aerosols (e.g., sulfur dioxide, ozone, nitrogen oxides), and up to ten-per-



cent of particulates (i.e., fine dust). Trees improve air quality by shading and cooling asphalt streets. This decreases the volatilization of the binding oils in asphalt and has the additional benefit of extending the life of paved surfaces.

Trees increase water quality in several ways. First, trees reduce storm water runoff. Soil protected by tree roots and fallen leaves acts as a giant sponge that absorbs the rain from all but the largest of storms. At the same time, the soil gently filters the water before it enters our streams, rivers, and drinking water reservoirs. Where storm drains are directly connected to wastewater treatment plants, the water absorbed by trees reduces the amount of water that has to be treated. The nitrogen, phosphorus, and other chemicals absorbed by trees reduces deleterious nutrient loading in our rivers and Long Island Sound.

Trees also improve water quality by reducing soil erosion. Soil erosion is a major cause of sedimentation in our streams and rivers. This sediment can choke aquatic vegetation by covering it with a fine layer of silt, clog vital transportation routes, and carry pesticides directly into waterways. Trees reduce soil erosion by both holding soil in place and by reducing the impact of falling rain, which can dislodge and move soil particles.

Trees provide distinct benefits for our business community. A study in seven American cities reported that trees and landscaping increased the time and money people were willing to spend in a shopping district by increasing their sense of the area's amenity, comfort, and quality. In the keen competition of today's marketplace, a small increase in customer volume can mean the difference between profitability and failure.

Trees can benefit businesses beyond the retail level. Quality landscaping, including trees, has been found to have a high correlation with building occupancy rates. Another study reported that productivity increased and absenteeism decreased in offices buildings with trees nearby.

Local governments can benefit by the presence of healthy trees. Although there are costs associated with maintaining a quality urban forest, there are real and tangible benefits. As previously mentioned, trees can help reduce the cost of road maintenance, wastewater treatment, building heating and cooling, public safety, and litter collection. An additional benefit is that real estate tax revenue may be increased because trees increase property values. A more intangible benefit is the sense

of community that trees impart, be it the American elms on the New Haven Green, the Pinchot sycamore in Simsbury, or the trees in Bushnell Park. Planting and caring for trees provide an opportunity for neighbors to work together and strengthen the community.

Global Benefits

The increase in human-generated atmospheric carbon dioxide (CO₂), and its link to global warming, has been at the forefront of environmental news. One way of reducing CO₂ is by trees absorbing the gas through their leaves and storing it as carbon in their wood. For every ton of wood a tree produces, about 1.5 tons of CO₂ are removed from the air. The organization American Forests has estimated that five-percent of annual global CO₂ production could be removed from the atmosphere if each American family planted just one tree. The simple act of planting a tree is one way of showing your commitment to the local and global community.

Suggested Readings

Nowak, D.J. and J.F. Dwyer. 2000. "Understanding the Benefits and Costs of Urban Forest Ecosystems." Pp.11-25. In *Handbook of Urban and Community Forestry in the Northeast*. J.E. Kuser, ed. New York: Kluwer Academic/Plenum Publishers.

Nowak and Dwyer are two of the most highly regarded scientists researching various aspects of urban forestry. There is much valuable and quantified information provided in this article. Readers will find plenty of information to use when developing a justification for their community forestry programs. Social values, as well as economic values, based on current research, are presented.

Ricard, R.M. and J. Alexopoulos. 1998. *The Value of Trees in Connecticut's Urban Forest*. Storrs, Connecticut: University of Connecticut Cooperative Extension System.

This book is a general and simple presentation of community forestry in Connecticut. It presents the benefits clearly, succinctly and in a logical fashion that community forestry activists can mimic and use in persuasion tools (e.g., newspaper articles, public displays, and pamphlets).

USDA Forest Service. 1990. *Benefits of Trees: Urban and Community Forestry - Improving Our Quality of Life*. Washington, D.C.: USDA Forest Service Forestry Report R8-FR 17.

This is brief but thorough pamphlet that is very useful when there is a need to extract information on benefits of public trees. It is easy to read and reference.

The Trust for Public Lands. 1994. *Healing America's Cities: How Urban Parks Can Make Cities Safe and Healthy*. San Francisco: The Trust for Public Lands.

Although this book specifically addresses the issue of public and urban parks, there arguments presented are the same for public trees in any setting. It is a particularly well-written and a pleasure to read.

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CONNECTICUT'S NOTABLE TREES

Glenn D. Dreyer

The Notable Trees Project began in 1984 as an idea for a publication by the Connecticut Botanical Society. These field botanists believed that it would be helpful to draw attention to the diversity of trees growing in our state, trees that often need protection from rapidly accelerating human development of the land. A small committee of volunteers was formed, and the process of collecting information slowly began.

Early on it was decided to include all trees – native and exotic, species and cultivated varieties, in forests and in residential lots, those with the potential to become huge and those that never could. We also agreed to collect information Connecticut's historic trees, both living and gone, and on interesting tree collections in the state. By 1986, the first, and rather short, Connecticut Big List Tree began to circulate, and each subsequent update contained more and more trees. In 1989, The Botanical Society published "Connecticut's Notable Trees" by Glenn D. Dreyer, and the book was reprinted with limited updates in 1990 and 1998.

Today, The Connecticut College Arboretum, The Connecticut Urban Forest Council, and The Connecticut Botanical Society officially sponsor Connecticut's Notable Trees. Located at the Arboretum, the project's database has grown to include over 2,600 records, in both paper and electronic form, of individual trees representing over 300 taxa (species, varieties, forms, etc.). Trees are "nominated" as potentially notable by owners, arborists, foresters, environmental consultants, tree wardens, municipal employees and anyone else who thinks they may have found a special tree. Notable Trees volunteers visit and measure potential champions, and Certificates of Commendation are issued to champion owners as verification of the tree's size and significance. The Certificate comes



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The Ginkgo oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a.

with a letter emphasizing the important role that the owners can play in preserving our natural and cultural heritage by caring for the tree.

One of the primary results of this work is the periodically updated Connecticut Champion Tree List, which includes the measurements and town of the largest record for each type of tree. The Notable Trees Archive at the Connecticut College Arboretum Office has a file on all 169 towns, in which we save letters, newspaper clippings and other information relating to significant trees both big and historic. There are also many photographic images, mostly in 35 mm slide format, which we are in the process of scanning to digital files.

The Notable Trees website (<http://notabletrees.conncoll.edu>) was redesigned in 2004 to include downloadable versions of champion tree lists by both common and scientific name; lists of all living notable tree records by town; specific locations of the 1902 Constitutional Convention commemorative pin oaks; and instructions for measuring trees.

A number of towns, inspired by the Notable Trees project, have initiated local big tree contests and events. The Newtown Forest Association sponsors a town-wide hunt for the largest example of a different species of tree each year, and offers a reward large enough to get lots of attention. In the first year they located a new state champion shagbark hickory. In Canton, the local land trust sponsored a notable trees contest, offering prizes in a variety of categories like largest conifer, largest deciduous tree, etc. We should also note that the Old Greenwich Garden Club actually beat us all to the whole idea, by doing a survey called "Trees to Treasure in and around Old Greenwich" in the 1974. They produced an update in 1988 called "Trees to Remember."

Although neither the state nor the Notable Trees Program offers protection to significant trees, this project can supply useful information to those involved in land use decisions. Conservation commissions, planning and zoning



commissions, public works departments, park supervisors, tree wardens and private citizens have used Notable Trees data to argue for the preservation of special trees involved in a wide variety of land alteration proposals, from street widening to housing projects. A local tree might not be the state champion for its species, but maybe it is the largest sugar maple in Middlesex County. That kind of information can often be used to rally public support, garner media attention and ultimately sway politicians, commissioners, and even developers.

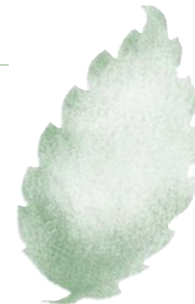


No ornamental, fruit or forest tree, standing in any public highway, nor any post or stake placed for the protection of the same, shall be cut down or removed by any surveyor of highways or other person,

Chapter 32 Section 2
An Act relating to Highways and Bridges
Connecticut Public Acts, 1845

Japanese Zelkova *Zelkova serrata*

A native to Japan, Korea, Taiwan and Manchuria, this tree is easily identified by its short trunk that soon divides into numerous upright branches. A handsome, tall (up to 80 feet) tree, with smooth bark and compound leaves that some consider a replacement for the American elm. Well suited to parking lot islands, buffer strips, and along streets and highways. There are several cultivars selected for form. The branches often rise together at one point on the trunk, forming multiple stems with included bark, potentially resulting in splitting.



A group of people are gathered outdoors in a grassy area, possibly a park or golf course. In the foreground, a person with short blonde hair is seen from the back, wearing a maroon t-shirt with the text "VOLUNTEERS FOR COMMUNITY TREES" printed in white. To their right, a woman with dark hair and sunglasses is speaking and gesturing with her hands. Other people are partially visible around them, including an older man on the left and a woman on the right. The background shows a green lawn, trees, and a white building with a gabled roof.

**VOLUNTEERS
FOR
COMMUNITY
TREES**



PART TWO

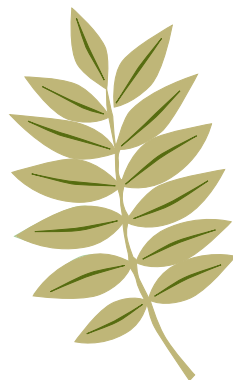
Understanding Trees and the Urban Environment

Clearly public trees play an important role in community well-being. A basic knowledge of tree biology, urban soils, pests, and ecology provides a conceptual framework for understanding the needs of trees and how they interact with their environment.



Glenn: I've spent many years trying to understand how trees grow, and there are a few things everyone should really understand.

Bob: I know what you mean - this stuff sometimes seems like it should be common sense. But it isn't common until you learn it.



Chapter 4

Basic Tree Biology: Structure, Function and Growth

Glenn D. Dreyer

In order to be successful, people involved in community forestry should have a basic understanding of the way trees are designed, how they function and how they grow. This knowledge is critical for many of the fundamental public tree program operations including choosing appropriate trees for specific sites, gauging a tree's condition and health, and prescribing proper care to correct a problem.

In many ways, plants are very different from animals, especially in how they obtain food, how they grow, and how they respond to injuries. Treating plants based on our experiences of human biology can lead to problems. Learning about how plants actually operate is the key to keeping them in good condition. This chapter is only a brief introduction to some of the more important concepts of tree biology.

What is a Tree?

Trees and shrubs can be grouped together as woody plants. In addition to the obvious fact that they both produce wood, they are also characterized by having their over-wintering buds (those that form new growth in the spring) well above the ground on stiff stems. This is in contrast to herbaceous plants – the familiar annuals and perennials of our gardens - which have soft stems and buds for the next growth cycle at or below ground level.

Shrubs and trees are very similar, but it is convenient to define shrubs as woody plants with multiple stems and an ultimate height equal to or less than fifteen feet. Trees are the bigger, usually single stemmed, woody plants. This rather loose definition leaves some ambiguity when dealing with really tall shrubs, or short trees, but in practice it works pretty well.

Structure: The Parts of a Tree

Trees can be thought of as modular organisms in the sense that they have a few basic parts that repeat over and over to create the total structure. The basic above ground parts, or modules, are:

- *Leaves and Stems* – a stem with leaves is called a shoot. Depending on their size, stems are often called a twig, branch or trunk.
- *Flowers* – reproductive organs that ultimately produce fruit
- *Buds* – embryonic, unexpanded shoots and flowers

The total mass of a tree's shoots, above the main trunk, is called the canopy or the crown of the tree.

- *Roots* – below ground structures that are seldom seen but are as important as the more familiar above ground parts

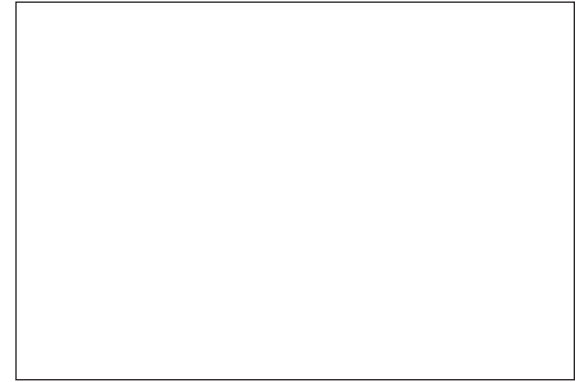


Fig. 1. An idealized tree showing the canopy, trunk, root collar, and root system. Note the shallow depth and extensive spread of the roots.

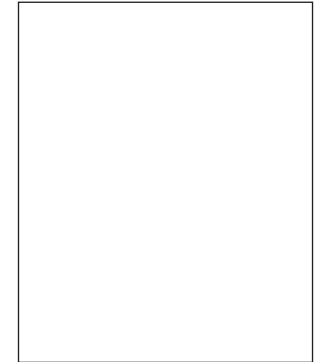


Fig. 2. An idealized tree shoot showing the typical structures and their names.

Function: What the Parts Do

Leaves

Plants have evolved to use very simple chemical compounds from the environment – water and carbon dioxide, along with some mineral elements in very small quantities - to create more complex food and energy molecules. This chemical reaction, called photosynthesis, is powered by sunlight, and it produces oxygen as a byproduct. Leaves are the organs in which most of this occurs.

Leaves are green because the pigment chlorophyll reflects green light back to our eyes – it actually absorbs photons of light energy in the blue and red parts of the spectrum to power the photosynthetic process. Other pigments are present in leaves, but chlorophyll is most abundant, and it visually overwhelms the other colors except during autumn, when chlorophyll production slows and eventually stops. Then the oranges and yellows are finally able to show through.

Leaves have a complex of veins within them that are attached to a vascular system stretching through stems and down into roots. This is the pathway that water and minerals take from the soil up to the leaf. Carbon dioxide from the air must also get inside the leaf, so it can be present with the energy and other components of photosynthesis. Leaves have tiny openings called stomata, mostly on their lower surfaces, which allow carbon dioxide to come in and oxygen and water vapor to escape. The stomata can open and close depending on time of day and environmental conditions.

Once photosynthesized sugars are produced in the leaf, they travel through the vascular system to be used as an energy source, or to form a storage product such as starch, or to form the basic building blocks of the plant's body, cellulose. Although oxygen is just a byproduct of these processes to the plant, a single, large deciduous tree can have as many as five-million leaves, and can produce enough oxygen to sustain ten people for a year.

When a deciduous tree leaf drops, it leaves a small scar on the stem at the point of attachment. Close inspection usually reveals small dots in the leaf scar which are actually the sealed over vascular connections between the stem and the leaf.



Stems

We use a variety of names like twig, branch, and trunk to refer to stems of differing sizes. One function of stems has already been mentioned, the conduction of water and minerals up to the leaves, and after photosynthesis, sugars out of the leaves to the rest of the plant body. The other major function is support. Light is a vital resource for plant survival. The woody stems of trees hold the leaves up to the sunlight, giving them a distinct advantage over the smaller shrubs and herbaceous plants that often must grow in their shade. Stems are covered with protective tissue called bark, which helps keep insects and disease organisms out, and helps keep moisture in the tree. It also protects a very important layer of dividing cells that lie directly beneath this outer covering. Bark can vary from shaggy (shag bark hickory) to blocky (flowering dogwood and black oak) to smooth (beech and yellowwood), but it all has the same protective function.

Flowers and Fruit

Flowers are the reproductive organs of the most successful group of plants on earth, angiosperms, often simply called flowering plants. Except for conifers and the ginkgo tree, all of the trees used in New England urban and community forestry are considered flowering plants. For the purposes of this book, it is not very important to understand the biology of plant reproduction, but related issues may be significant. For example, flowers and fruit provide great aesthetic and wildlife benefits, but fallen fruit – or the birds they attract - may be a problem on sidewalks or in parking areas.

Buds

Buds are unexpanded shoots (stems plus leaves) or flowers. They are often covered by small, specially modified leaves called scales. In regions with long periods during which growth stops, for example times of very low temperatures or extended periods of drought, the bud scales are

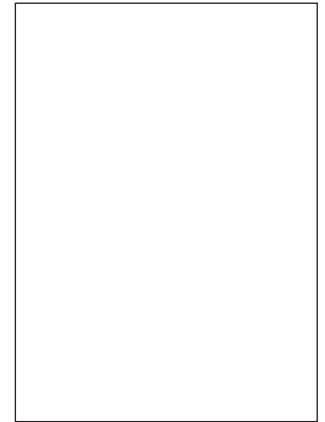
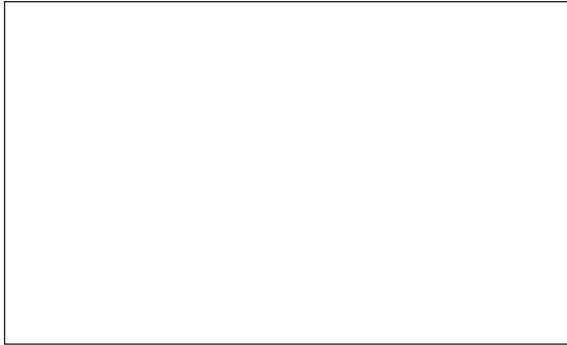


Fig. 3. A horse-chestnut tree shoot in winter with a terminal bud covered in bud scales. Note the leaf scars along the stem.

particularly important in protecting the next season's pre-formed growth tips. In New England, spring flowers on trees and shrubs come from buds formed the previous summer, and held in place on the woody skeleton over winter. Most of these have a protective covering of bud scales.

In terms of location, buds can be classified as either terminal, those growing on the very tip of a stem, or lateral, buds growing along the side of the stem. The lateral buds are located at the place on the stem where a leaf is attached. This intersection of leaf stem with main stem is called the leaf axil, and these are also called axillary buds. This general location is also referred to as a node, and the section of stem between axils is called an internode. This system of nodes and internodes is one of the main repeating modules of plant structure, as are leaves and flowers.

Fig. 4. Scale diagram of a red oak root system. Top view (above) and side view (below) are drawn to the same scale. Most roots grow parallel to the soil surface and many grow up into the leaf litter on the forest floor. Each square is 1 meter on a side.



Roots

Understanding roots and the environment they grow in – the soil – is vital to maintaining the health and longevity of trees in the human landscape. Roots serve a number of important functions in trees. Structurally, they anchor the tree in place, providing a strong and stable attachment point to the ground. Roots also absorb water and mineral nutrients dissolved in the water, and they transport these raw materials up into the stems and leaves via the shared vascular system. Roots can also store food reserves, usually in the form of starch.

The intersection of the tree's trunk and the root system is called the root collar, and typical trees will have four to ten major woody roots emanating from the collar. These major roots quickly dip down below ground level, but not too far; most growth is horizontal. Away from the root collar the major roots decrease rapidly in size and begin to branch into a network of smaller, rope-like, woody, primary roots up to one-inch in diameter. These branch, fork, and overlap in an irregular array in response to soil conditions. Together the major and primary roots form the framework of the root system. The next smaller type of roots is best called fine roots or rootlets. These grow out, and often up toward the soil surface, from the framework roots forming mats or fans of thousands

of short, non-woody roots, terminating in root hairs. It is the root hairs that do the actual work of absorbing water and nutrients. These are only one to two millimeters in length and are sometimes called “feeder” roots, but since they are not really absorbing food, this term is best forgotten. After doing extensive excavation of root systems, one scientist estimated that a mature red oak could have 500 million living root tips. That’s a lot of surface area for absorbing water and nutrients.

Roots can only survive where there is sufficient oxygen and water for growth. Since oxygen from the atmosphere can only slowly diffuse down into the soil, there is more of it near the surface than deeper down. Most water that plant roots use also comes from above in the form of rain. Thus, it should not be surprising that the vast majority of a tree’s roots are in the top two to three feet of soil. Although a few “anchoring” roots may go deeper, the bulk of a root system is very shallow compared the ultimate height of a tree. The root system extends outward seeking water, oxygen and space, and it often extends far beyond the edges of the branch canopy. Knowing where the root system is likely to be can help prevent damage to the tree during construction and other kinds of land use.

How Trees Grow

Tree growth is due to a special kind of tissue that differentiates into new cells of various kinds. This tissue is called meristematic and it is found in three distinct locations in woody plants: the tips of shoots, the tips of roots, and just under the bark of the tree. In shoots and roots, the meristem increases the length of the structure, and this is sometimes described as primary growth. In temperate climates like ours, a new round of growth is initiated each spring that can add a few inches to a few feet of shoot growth. Secondary growth, produced by new cell generation under the bark, causes an increase in the girth of the stem. Each spring a small amount of tissue is added to the circumference of each tree.

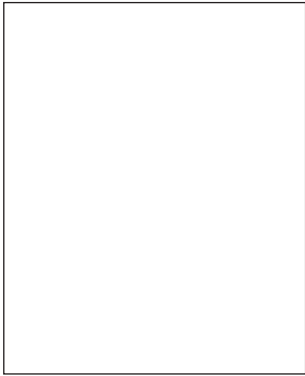


Fig. 5. A microscope longitudinal section of the region around a shoot apical meristem.

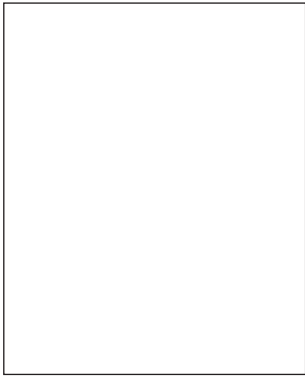


Fig. 6. Representation of a longitudinal-section of a root tip.

Elongating

In shoots and roots, the growing tissues are referred to as apical meristem, because they are at the very outer point, or apex of the growing structure. In both terminal and lateral buds, the apical meristem is a small cluster of special tissue that produces new cells behind it. These cells differentiate and grow to full size into the nodes, internodes and leaves of the new shoot. Specialized buds produce flowers in a similar manner. As the season progresses primordial buds form at the nodes, and these may eventually grow out as lateral shoots or flowers.

Terminal buds commonly produce substances transported in the vascular system that inhibit the growth of the lateral buds behind them. This phenomenon, which generally allows only the terminal bud to expand into a shoot, is known as apical dominance, and the chemical inhibitors are plant hormones. This explains why “pinching back” a house plant – or shearing a hedge - by removing the shoot tips results in bushy growth. The source of inhibition – the terminal buds - are removed and the lateral buds grow out into additional shoots.

Stems and branches grow in species specific forms and patterns, based on the location of leaves and buds and on the amount of inhibition the terminal buds generate. Many trees are identifiable from a distance by their distinctive branching pattern, especially in winter as a silhouette against the sky.

In roots, which have to negotiate their way through soil filled with mineral and organic particles of varying size and density, the apical meristem at the root tip divides into new cells in a backward direction, forming new root tissue with root hairs. Tissue is also produced forward of the apical meristem to form a protective cap over the growing tip. These root cap cells are disposable, sloughing off as they push their way past obstacles, and they help to lubricate the path the root grows through. Roots experience a very different environment than shoots, and root growth is opportunistic and unpredictable. Roots will be found wherever there is enough oxygen and water to sustain them.

Getting Wider

Directly under the bark is a type of meristematic tissue called vascular cambium. It forms a very thin cylinder or sheath of cells completely around every twig, branch, stem, trunk, and root of the woody plant. New cells are formed on both sides of this cambial cylinder, which allows the tree to slowly increase in circumference. The growth effect is like the expanding, circular ripple of water one sees when a stone is thrown into a pond – but in extreme slow motion.

The vascular cambium produces two kinds of very specialized conductive tissue cells to the inside and outside of its cylinder. On the inside the cells become xylem, which conducts water and nutrients up from the roots to the leaves. As the functional xylem cells are replaced every year with new growth, the old cells stay inside the cylinder, are less and less vascular, and eventually become the wood of the branch or trunk. The familiar concentric ring pattern visible on a cut tree stump is composed of xylem tissue cells. The spring growth of xylem wood cells is a different color than that of the summer growth. The next year the spring color cells are laid down next to the previous year's summer cells, and the pattern of each year's growth becomes visible.

Tissue cells that form on the outside of the cambium, called phloem, conduct sugars and other organic substances out of the leaves, throughout the tree and down to the roots. Outside of the phloem is another thin cell layer called the cork cambium, and this produces the bark we see on the outside of the tree. In some species bark flakes off and is replaced during each growing cycle, in others it tends to stay in place and is added to each year.

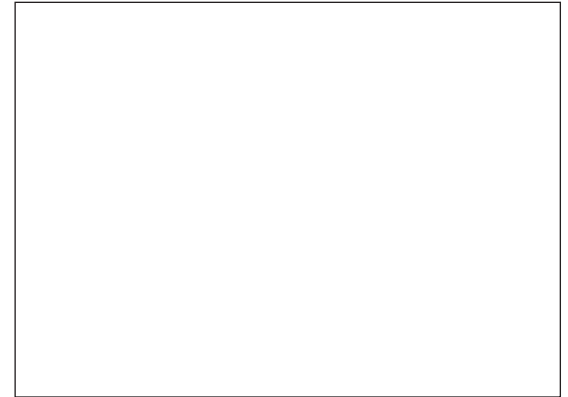


Fig. 7 Portion of a cross-section of a two-year old woody plant stem

Suggested Readings

Mauseth, J. D. 2003. *Botany: An Introduction to Plant Biology*. New York: Jones and Bartlett Publishers.

Any college level botany textbook, like this one, is a good reference on how all types of plants grow and function from the molecular to the ecological levels. Not specifically about trees. Purchase a used textbook printed within the past five years and save money.

Thomas, P. 2000. *Trees: Their Natural History*. Oxford: Cambridge University Press.

Specifically about the biology and ecology of trees, this is written for a non-technical audience. It is easy to read, and is without a doubt the best book on tree structure and function.

Shigo, A. L. 1986. *A New Tree Biology: Facts, Photos and Philosophies on Trees and Their Problems and Proper Care*. Durham, New Hampshire: Shigo and Trees, Associates.

This is an idiosyncratic, but informative tour of tree biology. The author is a world renowned tree scientist who performed the now famous “chain saw dissections” on thousands of trees. Heavily illustrated with black and white photos, it provides a unique view of what is going on inside trees as they grow and cope with various types of insults and injuries.



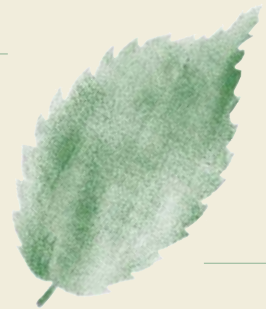
ASSESSING TREE VIGOR

Growth of meristematic tissues in temperate regions is very seasonal, happening primarily in late spring through summer. Growth is also very dependent on environmental factors, especially the amount of light and water reaching the tree during its period of growth, as well as available nutrients. One way to gauge a tree's vigor or rate of growth is to observe the amount of shoot extension during the past few years. The current year's growth is the end portion of each shoot, and the stem in this region is usually a different color than on older parts. To find the location where each year's growth began, look for the little scars left by the protective scales that fell off as the terminal bud began to expand. In this way, it is possible to look back at the amount of branch extension over the past few years to see if the plant has been stunted or was growing vigorously.

Radial growth of a tree trunk is also governed by climate and resource availability. The width of a tree's annual rings is a reflection of these factors, with relatively wider rings indicating faster growth and probably relatively abundant light and water. As trees are stressed by the shade of others, or by extended dry periods, tree ring widths are relatively smaller. Foresters often use a special hand drill to extract a slender core of wood from the trunk of a tree. In addition to being a record of the amount of growth and the environment that the tree experienced each year, counting the growth rings is also a means of learning its age.

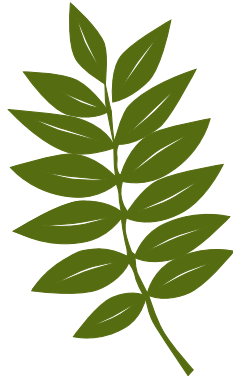
Katsura Tree *Cercidiphyllum japonicum*

Native to China and Japan, Katsura is well adapted to Connecticut. The new heart-shaped leaves emerge a beautiful reddish-purple and gradually change to bluish green in summer. Fall color varies from yellow to apricot. It has few pest problems and is suitable for a wide variety of planting sites in urban areas. Leaves are opposite with a toothed margin, and an oval to heart-shaped outline, 2 to 4 inches long, and they turn yellow, pink, or purple in autumn. Grows best in a sunny exposure and moist soil and it can reach 60 feet in height.





- Bob:** I think one of the biggest challenges to growing healthy trees in urban spaces is the poor quality and limited amounts of soil.
- Glenn:** True, tree growth in rural areas tends to be less limited by soils than it is in urban locations.



Chapter 5

Urban Soils

Robert M. Ricard

In 1782, J. Hector St. John de Crevecoeur wrote of the American soil, “it feeds, clothes us, from it we draw even a great exuberancy... it has established all our rights; on it is founded our rank, our freedom, our power as citizens.” Despite the fact that most of us give little heed to it, the soil continues to be the basis of our civilization today. As Rachel Carson, author of *Silent Spring* observed, “the thin layer of soil that forms a patchy covering over the continents controls our own existence.... Without soil, land plants...could not grow, and without plants [we] could not survive.”

When soil is healthy, it is a dynamic, ever-changing substance composed of air, water, minerals, and organic matter. It veritably teems with life - in one teaspoon of soil are billions of bacteria and hordes of creatures whose ceaseless toil allow the soil to support virtually all life. For a living tree, soil functions as a repository for mineral nutrients, an environment for microorganisms, and a

reservoir of water that allows the tree to grow. Through soil, the tree anchors itself to the ground. In cities however, the soil is generally unhealthy.

Urban soil often suffers from a loss of structure, poor aeration and drainage, elevated pH levels and temperature, interrupted nutrient recycling and loss of organic matter, and the presence of debris and various toxic substances. Loss of structure means simply that urban soil is usually so compacted that it has the density of concrete. Poorly aerated urban soil can check root growth completely and the microscopic creatures (ones that enable trees to take up nutrients by their roots) cannot live in it. Scientists point out that the single most critical factor in the success or failure of tree planting is soil drainage and aeration. Inadequately aerated soils produce sickly trees and are often a habitat for organisms that make the roots vulnerable to attack by harmful fungi; similarly, organisms that flourish in poorly aerated soils release chemicals that may also be harmful to tree roots.

Oxygen-poor soil may also harm trees indirectly: it can cause roots to develop near the surface, making the tree susceptible to blow down in a wind storm, and it can prevent roots from absorbing needed water and minerals. The latter is especially important because inadequate soil drainage kills more trees than any other factor. To some extent, the problems associated with poor drainage (most often lack of available oxygen for roots) can be offset by the planting of tree species tolerant of wet soils. For example, willows thrive beside bodies of water and cypress grow naturally in swamps. The roots of cypress are able to absorb nutrients in an oxygen-deprived environment because the tree has a peculiar adaptation to flooded conditions. Nevertheless, experts emphasize that no species grows best in a saturated environment.

Elevated pH and temperature also take their toll. Soil pH is a measure of relative acidity or alkalinity, and all plants have an optimal pH range within which they grow. Urban soils generally have



Soils Illustration



The Ginkgo oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities.

higher (more alkaline) pH as a result of the weathering of cement, mortar, and other calcium-containing masonry products; the flushing of water from buildings and sidewalks onto it; and the use of road salt. The effect is that only trees able to tolerate high pH levels can grow well in such soils (further limiting choice of trees to plant), many trees sicken because of it, and it encourages the growth of harmful bacteria. Similarly, increased soil temperature due to the heat island effect and the absorption and radiation of heat from urban glass and concrete, dries soil out, and kills necessary microorganisms. The net effect is to stress the tree.

Interrupted nutrient-recycling and lack of organic matter results in starved trees. In their natural state, trees grow in groups. Their branches touch, they shed their leaves on the forest floor, and decomposition of those leaves by microorganisms in the soil provides the ecological processes that sustain their growth. In most urban situations, leaves are removed and, deprived of organic matter, individual trees gradually sicken and die (potted trees do poorly because they rapidly deplete the nutrients in the container, dry out, or freeze).

Almost all urban soils contain manmade contaminants - bits and pieces of concrete, glass, brick, asphalt, plastic, metal - and these impede root growth and water movement. Other contaminants such as chemical residues, heavy metals, or hydrocarbons are often as toxic to trees as they are to humans and depending on their concentration, can make the soil unfit to grow anything at all.

In summary, urban soils are anything but normal; in fact urban soils usually are a mess. In *Planting New Life in the City*, author Phillip Rodbell quipped that “well-developed and well-aerated soils are as rare as chicken lips in many of today’s communities.” Since healthy soil is essential to tree growth and survival, this is bad news. It is also complicated by the fact that it is virtually impossible to predict soil conditions on any given urban site - one tree may thrive and a neighboring tree die because conditions vary dramatically not only from city block to city block, but from planting pit to planting pit. Fortunately, the obstacle of poor urban soils can often be surmounted by careful selection of “tough” or appropriate trees and by strict adherence to the latest techniques for planting properly in stressful environments.

Suggested Readings

Craul, P. 1992. *Urban Soil in Landscape Design*. New York: John Wiley and Sons, Inc.

This is simply the best book available on urban soils. Professor Craul covers everything known to date on the subject, and it is well written. The information is accessible to both the community forestry volunteer and professional, with the chapters on soil biology and ecology of particular importance. This should be required reading for community forestry professionals and volunteers.

WE FEED OUR PETS, BUT NOT OUR TREES

Leaves are sometimes called the factory of the plant, because that is where the plant's food is manufactured. It is rather misleading to refer to a fertilizer application as "feeding" a tree, since fertilizer is just supplying the chemical raw materials for the food making process. We can cause problems if we believe we are feeding trees, and we think they need this "food" on a regular basis, just like our pet dog or cat. Plants growing in sidewalk pits in urban areas or planters in malls may, like houseplants, require regular nutrient and water supplements to survive. But most trees in our municipal and residential areas do fine with what they can obtain from the soil. When in doubt, have the soil around the tree analyzed for the proper balance of nutrients before dumping fertilizer on it. Excessive use of chemical fertilizers in residential and commercial landscapes, primarily for turf maintenance but also for trees, is a significant source of ground water and estuary pollution. Over fertilization can also predispose plants to attack by insects and diseases.



Glenn: Given the fact that trees are subject to such an amazing array of problems and abuses, it's amazing they can live at all.

Bob: We can help trees deal with stress, and tree health care is the best approach.



Chapter 6

Tree Health Care: Insects, Disease and Stress

Timothy M. Abbey

Tree health care is both simple and complex. The successful care of trees involves many aspects outside the realm of traditional pest management. Tree health care incorporates proper landscape planning, including tree selection and site consideration, proper planting and basic arboriculture practices, effective pest management through the use of an integrated program, and interaction between the client and tree care professional. Each of these components could be viewed as simple, but their interactions make tree health care complex.

What is Stress?

Stress is any force that prevents a tree from reaching its full health potential. It includes biological, chemical, environmental, mechanical, or physiological factors. Stress due to an insect or dis-



ease is termed “biotic” because a living organism causes it, whereas stress attributed to a chemical or an environmental condition is called “abiotic.” Trees in an urban setting often suffer from environmental stress that negatively affects them in two ways: through shortages of essential resources such as water, nutrients or light (via excess shading or defoliation); or by limiting the uptake of resources that are present in adequate amounts – for example by air pollution and improper soil pH. Proper cultural practices are crucial for optimizing tree health and reducing the impact of abiotic stresses.

Trees use a number of methods to defend themselves from stress or injury. Thorns, foliar hairs, defensive chemicals (terpenes, phenolics, alkaloids, nitriles, and other substances), indigestible cellulose and lignin are used against insects, diseases, and vertebrates. The thorns and hairs found on bark serve as physical barriers that make it more difficult to feed on the tree. The tough cellulose and lignin can have the same effect on leaf-feeders. Protective chemicals can have a number of effects on herbivores. Some act as feeding deterrents, while others can cause physiological responses (decreased egg production in insects) or even death.

A low to moderate level of stress over the course of a tree’s life span can help it develop appropriate physiological responses, which can, in turn, help moderate or prevent severe stress. For example, a tree that receives excessive amounts of fertilizer, especially nitrogen, is not necessarily healthier than one growing under some limitations. An over-fertilized tree puts more energy into growth instead of the production of defensive resources, and can end up vulnerable. Also, many insects and diseases favor the tender, new growth produced by fertilizer applications.

Urban trees experience stressful growing conditions not found in wooded areas. Compaction of soil and damage to roots occurs from pedestrian and vehicle traffic and from construction projects. Limited soil volume for trees to grow in, unhealthy materials in the soil, air pollution, and physical damage all adversely affect tree growth. In general, a tree’s life span is much shorter if it grows in an urban environment under severe stress compared, to the same species grown at an ideal location. However, tree health care should still be based on the goal of long-term sustainability of individual trees. The effects of human activities on trees take place everywhere – along roads, in parks and play-



Hemlock Woolley Adelgid.

grounds, on town commons and in school yards. The goal should be to minimize the negative impacts from these encounters over the course of the tree's life.

What is a Pest?

Even trees that are planted and maintained correctly can still develop problems. There are numerous pests that cause trees to decline. A pest organism competes with humans or plants for resources, or has a negative impact on the environment. Tree pests include many kinds of organisms, including: arthropods: insects and mites; weeds, including non-native invasive plants; diseases caused by bacteria, fungi, mycoplasmas, nematodes, and viruses; vertebrates: voles, beavers, deer, and even human activity. It is important that those responsible for a tree health care program make correct diagnosis of the pest problem, or send a specimen to a diagnostic laboratory for proper identification. Also, the tree health care specialist should know the difference between a serious threat to the tree's health, for example Dutch elm disease on an American elm, and one that causes only cosmetic damage, like tar spot on maple leaves. The tree species, environmental conditions, pest or pests present, and the community's expectations of their tree's health and appearance determine the threshold, or tolerance level, for each pest and its corresponding damage.

Numerous insects and diseases attack trees, but some are regular offenders in our area, including: bronze birch borer; eastern tent caterpillar; hemlock woolly adelgid; honeylocust plant bug; Japanese beetle; and Sycamore lace bug. It is important to recognize the immature stage, the adult, and the associated plant damage of the more common insect pests in your town. Numerous foliar diseases may also appear. Most cause cosmetic damage and do not negatively impact long-term tree health. However, there are two vascular diseases, Dutch elm disease and Verticillium wilt, that are very serious and should be properly identified and managed.

What is IPM?

Integrated pest management (IPM) is a component of tree health care and is formally defined as "a systems-based decision making approach that uses biological, chemical, cultural, physical, and regulatory tactics to manage disease, insect, weed and other pest problems in the production and main-

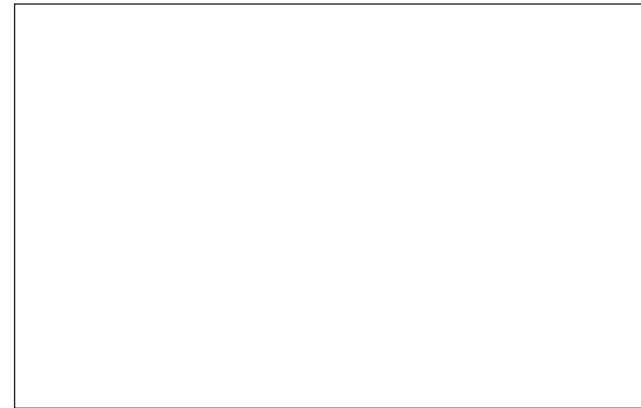
tenance of ornamental plants. The purpose is to minimize risks to human health and the environment, while improving overall pest management.” Specific IPM methods can be developed for individual pests with a focus on the short-term and long-term health of each tree. The most important component of IPM, no matter what tree species, is routine tree inspection or monitoring. Monitoring provides the opportunity to detect a pest problem at an early stage and allow for an intervention to take place. Once the pest has been identified, a decision must be made on how best to control it. This could involve the use of a beneficial organism, addressing a cultural problem, or the judicious use of a pesticide. IPM also relies heavily on evaluation after a treatment is applied. Thus, records should be kept on the observations and actions taken for each tree. This provides a history of the tree that can aid with future decision-making.

Tree health care is a comprehensive management plan for trees that is not restricted to just pest management, or in other words, it focuses on pest prevention not reaction. Unfortunately, limited budgets and personnel can curtail the amount of monitoring that is necessary for the successful IPM component of tree health care. If the best you can do is crisis management (i.e. hazardous tree removals/pruning), then IPM may not be practical.

For communities that have the ability to effectively address tree pests, there are still decisions to be made. Conduct an inventory of the trees in your community then learn how to prioritize. For example, a historically valued tree in your community or one that is in a scenic location, such as in front of the town hall, may be at the top of the priority list. These would be considered key trees and receive the most attention. Each of them should have a detailed tree health care plan and be monitored regularly.

A final important step that can be taken to ensure the best tree health care possible is good communication. Try to provide useful, educational material to people responsible for new tree selection and plantings. Let everyone involved know how poor choices and mistakes made at this early stage lead to tree health concerns in the future,

Topped tree?????????????????
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Nectaria canker on black birch.

and what the limitations or options are for dealing with a potential problem. A little common sense used early in the planning stage helps decrease the negative impacts of tomorrow's pests.

Suggested Readings

Hanson, T. and E.B. Walker. 1996. *Field Guide to Common Insect Pests of Urban Trees in the Northeast*. Waterbury, Vermont. Vermont Department of Forests, Parks and Recreation Forest Biology Laboratory.

This is a small yet excellent photo identification guide that can be kept in a vehicle glove compartment or backpack for use in the field.

Harris, R.W. 1999. *Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines, 3rd ed.* Englewood Cliffs, New Jersey: Regents/Prentice Hall.

This book provides detailed information on arboriculture in relation to integrated pest management. Chapters include: Plant Selection; Planting Site Preparation; Soil Management; Diagnosing Plant Problems; and Integrated Plant Management. The information on diagnosis is particularly useful.

Johnson, W. and H. Lyon. 1991. *Insects that Feed on Trees and Shrubs, 2nd ed.* Ithaca, New York: Cornell University Press.

Successful tree care requires quick pest identification. This is the authoritative source for learning the biology, host plants, and visual identification of insect and mite pests of trees and shrubs.

Lloyd, J. ed. 1997. *Plant Health Care for Woody Ornamentals – A Professionals Guide to Preventing and Managing Environmental Stresses and Pests*. Savoy, Illinois: International Society of Arboriculture.

This is the International Society of Arboriculture’s manual on how to take tree health care practices from theory to business implementation.

Sinclair, W., H. Lyon and W. Johnson. 1987. *Diseases of Trees and Shrubs*. Ithaca, New York: Cornell University Press.

This publication is the companion volume to *Insects that Feed on Trees and Shrubs*. It provides the same attention to detail for tree and shrub diseases.

Wadley, T.L., ed. 1995. *A Guide to the Plant Health Care Management System, 2nd ed.* Savoy, Illinois: International Society of Arboriculture.

This guide addresses both tree health care and integrated pest management (some specific pests are discussed). It is unique because it was designed with input from landscape practitioners in the Midwest states.

INSECTS AND PUBLIC TREES: NEW THREATS

Timothy M. Abbey

Many of the serious tree pests in the northeastern United States are non-native species. A few that you may be familiar with are Dutch elm disease, Japanese beetle, and hemlock woolly adelgid. What does the future hold? The threat from new invasive species to the native ecosystems of the United States continues to grow. One particular insect pest that is a major concern to tree health care is the Asian longhorned beetle (*Anaplophora glabripennis*). Since 1996, trees infected with this beetle have been detected in three states: Illinois, New Jersey, and New York. It's necessary to understand that most insect borer species attack injured or dying trees. However, the Asian longhorned beetle successfully colonizes healthy trees. Preferred hosts include maples, birches, elms, horsechestnut, poplars, and willows. More information and photographs can be found at www.aphis.usda.gov/lpa/issues/alb/alb.html.



The Ginkgo oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a.

A more recent threat to ash (*Fraxinus sp.*) trees and possibly other deciduous tree species in the United States is the emerald ash borer (*Agrilus planipennis*). This insect was first detected in southeastern Michigan and parts of Ontario, Canada in summer 2002. In early 2003, infected trees were discovered in Ohio and in August, 2003, specimens were found in Maryland. At this time, there is little published information on the biology and management of emerald ash borer. However, it is extremely aggressive on healthy trees and is of major concern. Additional information and photographs can be seen at www.na.fs.fed.us/spfo/eab/. Be vigilant for these pests and report possible infestations to the Connecticut Agricultural Experiment Station.



The decline of the American elm is one of great environmental tragedies of the twentieth century. Before it was banned from use, DDT was used to fight Dutch elm disease. Hartford's city forester and tree warden Victor Jarm recalled that "In the spring of 1951, our antiaircraft units sped into action. Our mist blowers roared through the city and sent up a thick smoke screen almost as if to hide the targets from the enemy. This was the start of our new offensive. The war was on."

Republic of Shade: New England and the American Elm,
Thomas J. Campanella



Bob: What's the difference between a rural and urban forest?

Glenn: I know this one - when a tree falls in an urban forest there's always someone there to hear it.



Chapter 7

Ecology, Ecosystems and Urban Areas

Robert M. Ricard and Glenn D. Dreyer

On a day-to-day, practical level, most people involved in community forestry are really dealing with individual tree management. Much of the work is tree trimming and removals, planning a tree planting event, talking to a reporter about an historical tree, or teaching children how a tree grows. As a result, a view of the “big picture” may be obscured.

Forestry and arboriculture are both professions concerned with trees, but the disciplines do differ significantly. Arboriculture deals specifically with the planting and scientific care of trees and shrubs, usually as individual units. Much of the information in this book is presented at the level of individual trees. In contrast, forestry embraces the science, art, and practice of creating, managing, using, and conserving forests and associated resources for human benefit. It is based on broad fields of study such as ecology, geology, and soil science. The purpose of this chapter is to draw attention to

the fact that public trees, and the people who care for them, are part of a larger, intertwined, global natural system. Studying and working in these particular living systems is called “urban forest ecosystem management,” and ecology forms the basis of this approach. A basic appreciation of ecology will prove helpful to community forestry professionals and volunteers in order to appreciate the bigger picture.

Ecology and Ecosystems

Ecology is usually defined as the study of the relationship between an organism and its physical and biological environment. It is a relatively new term, having first appeared in the scientific literature in 1866, but the concept is older: its roots reach back into the eighteenth century when a more comprehensive view of “nature’s economy” developed. This view held that all life on earth is an interwoven fabric of living organisms, their communities, and their surrounding environment. Thanks to the increase in environmental awareness and education over the past thirty years, ecology has become a household word.

Ecosystem is a term for all of the organisms in an area plus the physical environment in which they live and interact. Ecosystems are described by the things that they are composed of (plants, animals, bacteria, soil, rock, water) and the interactions among those things. Another way to say this is that ecosystems have structure and functions. For example, in a forest ecosystem, the major structure is contributed by the trees. Energy flows from the sun in the form of light, and the trees convert that energy into living tissue by photosynthesis. They produce organic substances and give off oxygen. Animals eat parts of the trees, other parts die and decay and are incorporated in the soil. Ecosystems are also described by these processes, like the flow of energy from sun to plant to animal, and the conversion of plant bodies back to minerals in the soil.

Ecologist Joseph Wood Krutch observed that “every day the science of ecology... demonstrates those more and more remote interdependencies which, no matter how remote they are, are crucial, even for us.” In urban areas, the ecological interdependencies may seem especially remote, or even nonexistent, but they do exist. While ecologists originally began their studies in what they considered to be pristine natural areas unaffected by human influence, in recent years some have moved their

research into the cities, and urban ecology is becoming an important part of the broader science.

For example, forest ecologists have long studied the ecology of the forest floor in rural woodlands. They investigate such components as soil chemistry, soil physics, microbial activity, and other aspects and elements of forest soil structure and function. All soils are subject to basic biological and chemical processes, but are these processes different in the urban soils of Central Park than those that occur in the forests of northwestern Connecticut? And if so, what are the consequences?

Consider also that if sufficient numbers of trees were planted in Hartford, they would help to decrease storm water run-off into the city pollution control system. Not only would this help drive down the cost of operating such a system, it would also decrease the amount of non-point source pollution (e.g., road salt, oil, and industrial chemicals) washing into the river. This has direct benefits to the ecology of the Connecticut River and Long Island Sound in reducing sedimentation and mitigating water pollution. In ecological terms, this is referred to as a “linkage” - ecosystems may be linked to a surprisingly diverse array of other ecosystems both near and far. In other words, even though it may be subtle, what happens in one ecosystem, even a built-up urban one, reverberates through others.

Ecosystems and Human Areas

Urban ecosystems are based on the same principles as any other ecosystem. Whether we are considering a forest ecosystem in Housatonic State Park or a new development in downtown Stamford, the ecological concepts of structure, processes and functions, linkages, and change are applicable.

Just as in a rural forest, where the structure includes the dominant trees, soil types and other elements, in an urban forest the layout of plazas, buildings, streets, trees, and parks define the ecosystem structure. One process in urban ecosystems is known as the “urban heat island effect.” In essence, this is the idea that cities are significantly warmer than the nearby rural areas due to the heat absorbing and radiating qualities of building and paving materials, and the heat given off by machinery. If there are enough of them, trees can mitigate this effect by their shading and transpiration (trees take heat out of the air in their metabolic processes). Other beneficial ecosystem functions of urban forests are the blocking of cold winds in winter, and absorption of carbon dioxide, a greenhouse gas that contributes to global warming.





Change is intrinsic to all ecosystems. No forest is the same from one decade (or even year) to the next, and the urban forest, with an average tree life span of under forty-years, changes far more rapidly than an old growth forest. In fact, the distinguishing feature of urban forest ecosystems is the constant exposure to the dramatic and rapid change characteristic of the city.

Most significantly, the urban ecosystem is dominated by humans, and we are the central element around which urban ecosystem concepts must be developed. Humans will continue to dominate these manmade systems, and it is important to consider whether we can establish and maintain urban forest ecosystems that incorporate as many natural features as possible, have the desired ecosystem functions and benefits – all at an acceptable economic cost.

In the context of urban ecosystems, sustainability can be defined as the survival of healthy urban forests with minimal human intervention. A good step toward sustainability would be urban forests composed of species well adapted to the particular climate, soils, and site-situations in which they grow. Species that are ill-suited to their physical environment need continual maintenance, or they die young, requiring costly removal and replacement and causing the diminution of forest



functions and benefits. Even carefully planted trees cannot grow in inadequate spaces, toxic soil, or in heavily polluted air.

The environmental problems that bedevil modern cities are not confined within their borders; those that concern city dwellers today will surely afflict the suburbs and outlying rural areas tomorrow. The ways we expand urban places will determine the health of our whole landscape, from inner city to remote wild lands. Planners and politicians must increasingly be aware of the importance of trees and forests in maintaining the quality of life that we all desire. They are not just an amenity, but are the providers of very important ecosystem functions. For better or for worse, urban forest ecosystems reflect human will and choice.

The Ginkgo oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a.

Suggested Readings

Abdollahi, K.K., Z.H. Ning and A. Appeaning, eds. 2000. *Global Climate Change and the Urban Forest*. Baton Rouge: Franklin Press, Inc.

This is a fine, though somewhat technical, book that first outlines current ecological understanding of global climate change, and then explores how urban forests fit into the picture. Although still politically controversial, most scientists regard global climate change as a significant problem that needs to be studied and mitigated. These authors agree and argue their point effectively.

McDonnell, M.J. and S.T.A. Picket. 1993. *Humans as Components of Ecosystems: The Ecology of Subtle Human Effects and Populated Area*. New York: Springer-Verlag.



This book is the result of a conference of leading ecologists who argued that ecological and ecosystem studies can and should take place in populated areas – cities. The premise was that ecology is not just the study of pristine areas, but should include people as well. This is a scholarly book and is for the advanced community forestry volunteer or professional.

McPherson, E.G., D.J. Nowak and R.A. Rowntree. 1994. *Chicago's Urban Forest Ecosystem: Results of the Chicago Urban Forest Climate Project*. Radner, Pennsylvania: USDA Forest Service, Northeastern Forest Experiment Station, General Technical Report NE-186.

Though focused exclusively on the city of Chicago, this report is a landmark work that relies on extensive research to demonstrate that cities contribute significantly to climate change, and that there are ways to mitigate processes such as global warming through urban forest management practices. There is much information in this report that can be used to persuade policy makers that urban and community forestry is beneficial.



The Ginkgo oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a very common tree found in Connecticut's towns and cities. The white oak tree is a.

HOW TO BE A GOOD DIAGNOSTICIAN

Timothy M. Abbey

Diagnostics is the examination process that determines the casual agent(s) of a tree problem. To be a good diagnostician, you have to enjoy investigation. The first step towards successful diagnostics is correct tree identification. Simple enough - if the tree is not identified correctly, the problem will probably not be identified. If you can recognize what a specific tree species looks like, you can then tell if it looks abnormal. The second step should be to gather information on the tree's surroundings. What season is it and when did the damage occur? What is the growing environment like – the soil characteristics, light availability, etc.? Are there a number of trees and tree species affected or just the tree in question? What is the history of the tree – past maintenance and pest problems? If a history of improper cultural practices or environmental stress does not explain the tree problem, then try to isolate a biotic causal agent. Look for active insects or diseases, or signs that they were present. A good reference library, such as the publications listed below, a hand lens, microscope, and binoculars can make identification easier and more accurate. The final step is to know when to get help. In Connecticut, there are people who can help you identify and manage tree pests.

The Connecticut Agricultural Experiment Station has two locations, the main offices in New Haven and the Valley Laboratory in Windsor. Both locations can assist with tree pest diagnosis. For directions and contact information, go to www.caes.state.ct.us.

The University of Connecticut Cooperative Extension System has an office in each Connecticut county. Go to www.canr.uconn.edu/ces/index.html for directions to the office closest to you. Master gardeners are available at each office during the spring and summer to assist with diagnosis. If they are unable to identify the problem, the University of Connecticut Home and Garden Center can provide assistance. The Home and Garden Center is located at the University of Connecticut main campus in Storrs. Contact information and directions can be found at www.canr.uconn.edu/garden/.





In the smallest village, as well as in the largest city, trees can only be protected by the creation of an intelligent public sentiment on the subject.

E.H. Jenkins and W.E. Britton, Station Scientists
The Protection of Shade Trees
Connecticut Agricultural Experiment Station Report, 1900





PART THREE

Caring for Public Trees

To maintain the health and vigor of trees, a basic understanding of identification, selection, planting, pruning, and protection is needed. Individual tree care and maintenance are essential for a healthy, safe, and sustainable urban landscape.



Bob: I remember that tree identification was one of the toughest classes in forestry school for many people.

Glenn: There are a lot of different kinds of trees out there, but only a limited number are actually encountered on a regular basis. With a little training and experience, most people will be able to recognize all the most common trees.



Chapter 8

Tree Identification: Getting Started

Glenn D. Dreyer

Being able to associate correct names with trees is a critical first step in many urban and community forestry practices. For example, it is one of the most basic pieces of information in a tree inventory, where the objective is to quantify how many trees, of what kind, of what size and in what condition make up a town's public forest resource. Knowing the correct name of a tree is needed for effective diagnosis and treatment of problems, particularly those caused by insects and diseases which are often very species specific. Understanding how to identify trees is also essential for specifying appropriate specimens for different locations, and for confirming that the correct type of tree has been purchased and installed.

Scientific and Common Names

Thanks to the hard work and constant communication of botanists' world wide, there is a universally accepted method of naming plants, and there is only one accepted scientific name for each

plant. In a world where people speak hundreds of different languages and dialects, the advantages to this are obvious.

Scientific names occasionally change, so sometimes people are still using an older one, but most tree names have been stable for a long time. An example of a scientific name is *Acer rubrum*, which in Connecticut we know by the common name red maple. Scientific names are formed according to special rules, and are in the Latin language, or else they are “latinized” words from other languages.

Unfortunately, common names of plants have not yet been standardized, and there are sometimes many names for the same plant. Common names not only vary between countries, where they are always in the native language, but there can be multiple names for the same plant in the same town. In Connecticut, the tree *Nyssa sylvatica* is known variously as black gum, pepperidge, and tupelo. A current book about North American landscape trees actually lists twelve different common names, in English, for this native tree. The advantage of having only one accepted scientific name is clear.

Scientific Name Construction

The system of naming plants is based on our understanding of how closely a plant is biologically related to another. It is a hierarchical system with the species being the most fundamental category. For plants, it starts at the kingdom level, and can distinguish groups of plants all the way down to below the level of species. It is well beyond the scope of this chapter to delve into questions about what a species is, or how the current state of scientific understanding of evolution and genetics contributes to the science of plant systematics.

A complete scientific name is composed of a genus and a species name together, and in publications they should be italicized or underlined. Most of the names of genera have direct English translations, including:

<i>Quercus</i>	Oak
<i>Acer</i>	Maple
<i>Pinus</i>	Pine
<i>Fraxinus</i>	Ash
<i>Ulmus</i>	Elm

TAXONOMIC CATEGORIES

Category

Kingdom
Division
Class
Order
Family

A Tree Example

Plantae
Anthophyta
Magnoliopsida
Fabales
Fabaceae

Category

Genus

Species
Cultivated Variety
Common Name

A Tree Example

Cercis
canadensis
'Forest Pansy'
Forest Pansy Eastern Redbud

Some genera are quite large, and contain subgroups with different common names. A good example is the genus *Prunus*, which includes cherry, plum, peach, and apricot.

The words used for species names are often descriptive (not true of generic names), and their common names may be direct translations, like white oak for *Quercus alba* (*alba* means white in Latin) and red oak for *Quercus rubra* (*rubra* means red in Latin).

For landscape planting purposes “cultivated variety,” usually shortened to “cultivar,” is the most specific or lowest ranking name in use. For instance, take *Cercis canadensis*, the eastern redbud tree. The typical wild form of this beautiful, small tree bears bright purplish-pink flowers and has green, heart-shaped leaves. The cultivated variety “Royal” is part of this species, with the difference that it has pure white flowers. The cultivar “Forest Pansy” has the typical flower color and leaf shape, but the leaves are colored purple, at least in spring and early summer. These differences are minor biologically (although major from an ornamental landscaping point of view) and not enough to separate them into a different species of their own. Other familiar examples of cultivars are the weeping European beech and weeping flowering cherry. These trees are very much like the species, but have a genetic difference that makes their branches droop instead of growing upright.

Finding the Right Name

There are a number of ways to try to find the correct name for an unknown tree. Visiting a botanical garden or arboretum with labeled plants or guided tours is one way to begin associating names with trees. There are increasingly abundant and useful resources on the world-wide-web with photographs and descriptions. And there are many books and other publications that use a variety of methods to help put a name to a plant. These vary from picture books that do not assume any previous botanical knowledge, through books with simplified “keys” to identification and good illustrations, to very technical plant “manuals” and “floras” that may have detailed scientific descriptions of all the plants in large geographic areas, along with keys to naming them. Unfortunately, many technical keys are primarily based on the characteristics of flowers, which are usually only in bloom and visible for a few weeks out of every year. Some manuals do have more useful keys for woody plants that are based on leaves or buds.

Keys are written tools that are specifically designed to find the name of an unknown plant. At each step in the key there are typically two, or sometimes more, questions or observations about the plant one is trying to identify, and the idea is to pick the most correct answer. For example, a pair of phrases in the key might be

Leaves greater than six inches long, leaf margin toothed
Leaves less than six inches long, leaf margin entire

By choosing the phrase that best describes the specimen to be named, and proceeding to the next set of phrases, the process eventually ends in a name. In some keys the number of the next set of descriptive phrases to consider is at the end of each line. In others, the paired phrases are indicated by the location to which they are indented in the page, and the following set are indented a little further underneath each pair that precedes it. A simple key to roadside trees in Connecticut is included at the end of this chapter, both as an example of what a key looks like and as resource for naming some common trees.

Some Basic Concepts to Aid in Tree Identification

A good tree identification system will use simple, easy to observe visual characteristics to separate plants into increasing small groups until a single type is reached. Knowing about the following concepts and terms should help to make using tree keys easier.

Native vs. Exotic Plant – This is an important distinction because many identification books only deal with native trees. Looking for the name of an imported landscape tree growing in a park or yard in such a reference can be very frustrating. Also, since some non-native trees have escaped cultivation and are considered invasive and undesirable, it is important to know which these are. Native is descriptive of where geographically the plant originated in the wild, and when using the term it is important to include a geographic modifier, like “native to Connecticut,” “native to New England,” or “native to the eastern deciduous forest zone.” Most reference books include the native geographic range of each tree in their descriptions.

Evergreen versus Deciduous Leaves – This is a fundamental way of visually separating all trees into two big groups. Evergreen plants do not drop their leaves after one growing season, and do have foliage during the winter months. The leaves do not survive for the life of the plant, but may last from one to five years, depending on the species. Foliage on deciduous plants die, eventually turn brown, and most drop off at the end of the growing season. In some species, particularly on younger individuals, the leaves will stay attached for most of the winter in a dead, brown condition. Most trees in Connecticut drop their leaves by late November.

There are three general types of evergreen tree leaves: broad-leaved, needle-leaved, and scale-leaved. The latter two are of a shape and design all their own, and include the well known pines, spruces, firs, hemlock, cedars, etc. Broad-leaved evergreen leaves resemble deciduous leaves during the growing season and are sometimes harder for beginners to pick out. Here are some hints for determining “evergreen-ness.”

Figure 1. Typical evergreen tree leaves.



Look for older leaves, produced one or more years previously, by following the stems back into the tree. Leaves of the current year are on the end section of the shoots and the leaves are usually lighter in color than the older ones. The current year’s stem growth is often a different color and less woody than older stems. Evergreen leaves are almost always much more sturdy and leathery than the shorter lived deciduous ones. Luckily, while there are quite a few broad-leaved evergreen shrubs (mountain laurel and rhododendron for example) there

are only American and English Holly (*Ilex opaca* and *Ilex aquifolium*) that are broadleaved, evergreen trees in our region.

Leaf and Stem Arrangement – The location or arrangement of leaves on stems and of stems growing out of other stems is another useful way to separate trees into groups for identification purposes. The two main types are those with alternate arrangement and those with opposite or whorled arrangement. In opposite trees (such as dogwood), the leaves, and the buds located directly above the leaf



Figure 2. Arrangement of leaves and buds (which can grow into new stems and leaves) can be alternate, opposite, or whorled.

attachment point, are found in pairs opposite each other on the stem. This location of leaf and bud attachment is called a “node.” In trees with whorled arrangement, which is very unusual in temperate trees, there are three or more sets of leaves and buds at each node. In alternate trees (such as maples), there is only one leaf and bud set at each node.

Since new stems grow from buds, and buds are located at the base of leaves, stems have the same arrangement pattern, alternate or opposite or whorled, as their leaves. In winter, minus the leaves, look at the branching pattern, look for the bud arrangement, and look at the scars on the stem where the leaves used to be attached. Be sure to look at a number of different leaves and branches, especially on opposite arranged plants. If a leaf or branch is missing on an oppositely arranged tree, it can appear to be alternate. Also, extremely slow growing stems, which have very little stem length between nodes, can be alternate, but be so compressed as to appear opposite or whorled. Finally, be sure you are looking at the arrangement of leaves, and not the leaflets on a larger, compound leaf (see below).

Simple and Compound Leaves – This is yet another way of grouping trees by their visual appearance. A simple leaf is composed of one continuous surface, like a typical flowering dogwood, sugar maple, or white oak leaf. It may be toothed or lobed around the edges, but it is one single piece of leaf tissue. A compound leaf is composed of two or more separate pieces, called leaflets. White

Figure 3. The edge or margin of the leaf can be entire, which means smooth, or it can have various sized serrations, tothing, and lobing. Some are illustrated here.



ash, horse chestnut, and tree of heaven are common examples of trees with compound leaves.

The key to telling whether the tree has lots of small simple leaves, or a compound leaf composed of multiple parts, is the location of buds. Buds only grow in the axil or attachment point of a leaf with the stem. Everything above the bud is a leaf, no matter how many parts it may have. There are no buds at the attachment points of the leaflets on a horse chestnut or white ash leaf.

The Leaf Edge – Some keys will use characteristics of the edge of the leaf edge - also called the leaf margin - as a diagnostic factor. Leaves can be entire, having a smooth edge like flowering dogwood. They can have various kinds of teeth-like edges; small as with American elm leaves, or large as with American beech leaves. The leaf edge can also be lobed, meaning it has deep cuts (sinuses) and large outcrops (lobes) like the sugar maple or white oak. And of course a leaf can be both toothed and lobed, like many maples.

Winter Identification – During winter, tree identification is harder because there are no or few leaves on the trees. Be sure to look around under the tree, since it might be possible to tell which leaves, or fruit fell down from it. There are special keys for winter identification that rely on characteristics of twigs, buds, and leaf scars (these are the scars on the stem at the location where a leaf was once attached). It is challenging but not terribly difficult to learn winter plant identification.

Field Work Tips

When heading out on a tree identification project, bring along gear that will make the task as easy as possible. Be sure to look at a number of leaves and branches, look for flowers and fruit both on the tree and on the ground. Also, look for things that are a little different, like thorns or prickles, odd looking or colored stems, unusual fruit, anything that might give away the identity early on. Scratching the bark off a twig and smelling for a characteristic odor can identify some trees, including black birch, black cherry and sassafras.

Be sure to get to know poison ivy (*Toxicodendron radicans*) in both summer and winter. It is often found growing up the side of trees as a vine with hair-like “hold-fasts” that attach it to the tree trunk. It can also grow over the ground and mix with other ground cover plants, and can grow into a medium sized clumping shrub, especially along the shoreline in sandy soils. Not everyone is allergic, but many people react badly to the oils from the leaves and stem.

After working at tree identification for a while, it becomes easier mainly because, although you may not know what tree it is, you know lots of things it isn't.

Suggested Readings

Graves, A.H. 1992. *Illustrated Guide to Trees and Shrubs: A Handbook of the Woody Plants of the Northeastern United States and Adjacent Canada, revised edition*. New York: Dover Publications.

Unlike many references, this identification guide includes both native and many non-native, planted trees and shrubs, thus allowing one to find names for specimens in parks, cemeteries and campuses, as well as those in the forest. With over 300 excellent pen and ink drawings of leaves, twigs and buds, complete with keys for both summer and winter, and a price of less than \$10, all tree people should have one.

Symonds, G.W.D. 1973. *The Tree Identification Book*. New York: William Morrow and Company.

This book uses the most simple identification system – photos of all tree parts. The first half has photos of tree parts grouped together, for example, all photos of tree leaves, followed a section of flowers, then fruit, twigs, then bark photos. The second part has “master pages,” which put the various photos all together on one page for each species. It covers the common native trees of the eastern half of the United States; no exotic trees are included.

Field Guides. There are a number of other good identification guides to native trees including those in the Peterson and Audubon field guide series. Those who identify trees as a hobby or profession use many different references (sometimes all at once) depending on the location, time of year and the degree of difficulty.



Pin Oak *Quercus palustris*

Also known as swamp oak and Spanish oak, a native to damp soil from Massachusetts to Delaware and west to Wisconsin and Arkansas. This large tree is probably the most widely planted oak, is tolerant of urban soils and is relatively resistant to wind damage. It is a straight-trunk tree with spreading to horizontal branches that are very slender and a broadly conical crown. Pin oak is named for the many short side twigs or pin-like spurs. Leaves are deeply lobed, elliptical to oval in outline, to 6 inches long and 4 to 5 inches wide. The tree may grow as tall as 100 feet and the leaves turn a showy copper or red in the autumn.

KEY

This key was written specifically for teaching purposes in the Meskwaka Tree Project sponsored by the University of Connecticut Cooperative Extension System and held each year at the Connecticut College Arboretum. It is not comprehensive, but is an example of how keys work.

Each pair or triplet of observations to choose between are indented to the same location from the left edge of the page, and have the same number in front of them. If the phrase that best fits an unknown tree does not have a name to the right of it, proceed to the next numbered group below. For example, when trying to identify a spruce, the choices would be:

First #1 (Foliage Evergreen)

Second #2 (Foliage shorter, flattened compared to first #2)

Second #3 (Cones larger than ca 1/2")

First #4 (Cones hang downward from branches)

A Key to Common Roadside Trees in Connecticut

1. FOLIAGE EVERGREEN

2. Foliage slender, round in cross section, needle-like, longer than 2" **Pine**

2. Foliage shorter than 2", flattened needles

3. Cones small, ca 1/2" **Hemlock**

3. Cones larger than 1/2"

4. Cones hang down from branches **Spruce**

4. Cones stand up on branches **Fir**

2. Foliage very small, of overlapping scales less than 1/2" long

3. Fruit looks like blue berry; common in old pastures **Redcedar**

3. Fruit like small wooden flower or cone; small to medium height tree
often used as tall hedge **Arborvitae**

**TREE IDENTIFICATION
GEAR LIST**

- Ten-power hand lens
- Six inch ruler
- Plastic bags for bringing back unknown specimens
- Small notebook,
- Binoculars to see high into trees,
- More than one tree ID book
- Camera (optional)

1. FOLIAGE DECIDUOUS AND “BROAD”
 2. Leaf and Branch Arrangement Opposite
 3. Leaves compound **White or Green Ash**
 3. Leaves simple
 4. Leaves lobed, maple-like
 5. Sap milky, leaves green, or on some trees burgundy **Norway Maple**
 5. Sap clear
 6. Twigs, flowers, buds, fall leaf color red **Red Maple**
 6. Parts not red
 7. Buds sharply pointed **Sugar Maple**
 7. Buds blunt, lvs. deeply cleft, silvery-white below **Silver Maple**
 4. Leaves not lobed, flowers with large, white, showy, flower-petal-like bracts
 5. Fruit in dense clusters, but individually distinct; native; blooms mid May **Flowering Dogwood**
 5. Fruit combined into raspberry-like head, not individually distinct; blooms after native in June **Kousa Dogwood**
 2. Leaf and Branch Arrangement Alternate
 3. Leaves Compound
 4. Leaflet edge distinctly toothed **Mountain Ash**
 4. Leaflet edge not toothed
 5. Branches thick, lf. scar large, lvs have rank odor when crushed . . . **Tree of Heaven**
 5. Branches thinner, may have thorns, fruit a long pod **Honey-locust**
 3. Leaves simple
 4. Veins radiate from stem attachment point, leaves either fan shaped or lobed like maple
 5. leaves fan-shaped, many veins **Ginkgo**
 5. leaves maple-like (but alternate) **Sweetgum**



- 4. Veins radiate from central midrib like teeth on a comb, leaves not fan shaped.
 - 5. Leaves lobed
 - 6. Lvs. 3-4" long, deeply cut; lower, main branches droop;
 - small acorn w/ flat cup **Pin Oak**
 - 6. Lvs. larger, fuzzy beneath **Black Oak**
 - 6. Lvs. smooth beneath, also larger **Red Oak**
 - 5. Leaves not lobed
 - 6. Leaves very unsymmetrical at base, sharply serrate; large tree **Elm**
 - 6. Leaves symmetrical, toothed; small tree
 - 7. Twigs and lvs. with characteristic bitter flavor/smell **Cherry**
 - 7. Not as above, fruit like a small apple
 - 8. Fruit under 1/2" **Shad or Service berry**
 - 8. Fruit over 1/2"
 - 9. Young stems smooth **Pear**
 - 9. Young stems hairy **Crabapple**

Sweetgum *Liquidambar styraciflua*

A large and aromatic tree with a straight trunk and conical crown, Sweetgum is native to the eastern United States. An important timber tree in the south, it is suitable for many urban planting sites including parking lots, buffer strips, reclamation sites, and along streets and highways. Distinctive star-shaped leaves turn brilliant scarlet to purple in the fall. They resemble maples, but leaves and branching is alternate. There are several cultivars including ones with variegated leaves. Interesting prickly seed balls about 1 inches diameter may be a nuisance in some locations such as school grounds and along sidewalks. It is a large tree, often growing as tall as 75 feet on the best sites..





Glenn: The right tree for the right place is a cliché, but it is a fundamental concept that we all must remember.

Bob: I agree - behind the cliché is the fact that not every tree is adapted to every situation.

Glenn: And, not every place needs a tree.



Chapter 9

Tree Selection and Site Considerations

John Alexopoulos

There are so many factors that negatively affect trees in the urban environment that it is a wonder that they survive at all. Indeed, trees in the urban environment live shorter lives than their more rural brethren. The stresses that exist in urban situations limit the choices of trees so much that a few have been overused extensively and dangerously, most notably honeylocust, Norway maple, and Bradford pear. It is very important to provide better choices for urban sites. Careful planning increases a tree's life span and, therefore, its value. In addition, good choices reduce the cost of long-term maintenance as well as the cost of replacement. The focus of this chapter is how to choose trees that are appropriate for growing along streets, in plazas, parking lots and in a variety of other city spaces.

Assess the Situation

Recently, a street tree plan was developed for a small historic town. When the inventory of existing trees was completed, it was found that the majority of trees were maples (some sixty-eight per-



cent). Most were Norway, with some silver and sugar maples. None of these species should have been planted in the locations where they were found: within sidewalks and very close to the building facades. The Norway maples had grown into the buildings, as had the silver maples. Other trees leaned out, reaching for the sunlight in the middle of the street. Many were deformed because of utility line trimming and the Norway maples had heaved up the sidewalks throughout town. The sugar maples were nearly all dying or in poor condition due to old age and many urban stress factors. In addition, a great many historic and attractive buildings were hidden behind the foliage of these trees, to the extent that the local character and sense of place were diminished. This town is not atypical, and it offers many lessons in what to plant and where. There are both overall design considerations and arboricultural considerations when developing a planting plan. The design cannot disregard site conditions, nor can it disregard the characteristics of the trees that are planned.

Design Considerations

Trees in urban environments contribute more than their mere physical properties, but when used appropriately, can also enhance the local character, history, and sense of place. First, people intending to plant trees in the public right-of-way need to look around the site before selecting a species. Overall design considerations should come first, before considering the soil conditions or a maintenance plan. Consideration should be given to the context of the planting site; that is the tree should be seen as part of a larger plant population. This approach will avoid the over planting of one species (planting just one species is called a “monoculture”) with the inherent danger of losing the entire system to disease or insect infestation. In addition, with careful selection, a “neighborhood” character can be established, one that extends out from the site. It is always best to consider the “big picture” first. The objective then, is to create a broader system of planting, one without a monoculture, with a variety of species of different ages, using a clearly stated and well-defined overall plan.

Spacing and Pattern

The spacing and the pattern in the placement of trees is a critical step in the process of species selection. Probably the most frequent problem with spacing is overcrowding. It seems that people



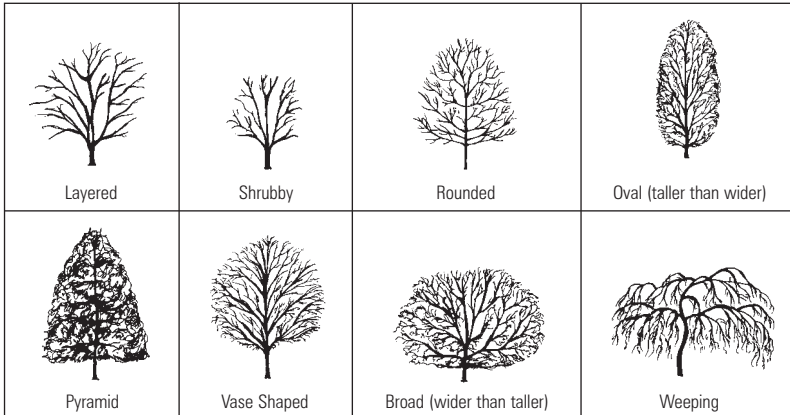
want to have “instant mature landscape” which means there is a strong tendency to over plant. Perhaps this is because of the small size of nursery stock, with new plantings having the apparent lack of initial impact. This close together spacing looks right in the early years, but later, when trees are really becoming effective in displaying their best characteristics, they are distorted by crowding. When grove-like plantings are desired, the species selected should be those that are able to withstand crowd-

ing. Trees with more open branching characteristics, such as London plane tree and honeylocust have been among some of the better performers. Trees with dense branching and even drooping bottom branches such as pin oak will suffer the most. Large shade trees in general ought to be spaced no closer than forty feet.

While spacing is very important between trees, it is extremely critical in regards to distance from a building. Plant a large shade tree close to a building and not only will the branches grow into the structure, but the trunk will have a decided lean away from the building. Select a tree that will fit the space. If a smaller tree species is not desired, then select a cultivar of a large shade tree that is more upright or even columnar. The normal size and

spread of the proposed tree must be considered where spacing is related to the near maximum expected spread of that species.

Planting patterns are largely determined by spacing. In street tree plantings, consideration might be given to interrupting the spacing in order to better reveal an important building, adjacent space, such as a park or plaza, or for an important view. Existing trees or other plantings also influence planting patterns. In street tree planning, existing trees remain until they die and are only then replaced with a species from the new scheme. While this doesn't always result in the perfect design, the overall plan is bettered by the value of the mature tree.



Selecting the right Tree:

Various tree shapes
and sizes?????



Form

The selection of a proposed tree based on its form may be more critical in streetside or plaza plantings than in parks or other green spaces. Available space for branches is probably the most important determining factor. Select narrow or smaller trees for narrow above ground spaces. In addition, for plazas and streetscapes, select trees that do not have branches low to the ground. If a species does have low growing branches that interfere with pedestrian traffic, then it must be pruned up to allow people to walk beneath the branches. Generally, an under canopy height of at least six feet is necessary, and seven feet is better. Pruning up is not always possible at the time of planting, since removing the lower branches of young trees can be detrimental to its health. If species types with drooping, lower branches must be used, then perhaps they can be placed in planters or other areas where people will not be walking beneath. Parking lot end islands, if wide enough, are places suitable for these plants. Aesthetic decisions regarding form can be made by a design professional.

Native Trees and Their Value

In the attempt to use plantings that will survive and flourish over the longest period, it is worthwhile to consider native species. Having an understanding of what naturally grows in your region is important for many reasons. Native trees have evolved in a particular climate in particular moisture and soil situations. These are plants that, for the most part, have demonstrated longevity. Whether some of them are suitable for the more hostile urban environments needs to be determined. Natives such as red maple, pin or red oak, birch or green or white ash are some of the few that have proven very successful. Continued development of cultivars of these and other natives is very important because the list of suitable urban trees is still too short.

Invasive Species

One of the most successful and often used urban trees is Norway maple. Because it survives so well, it is also overused. As these extensive plantings become monocultures, catastrophic disease or insect infestations, like those that devastated the American chestnut or American elm populations, become increasingly possible. Norway maple also is one of the more invasive species of introduced



There are many tree shapes and forms. These fastigiate sugar maple fit nicely in the narrow space between a pruned hedge and power line. Little or no pruning will be necessary to keep the branches out of the utility power lines.

trees. This tree is found naturalized (growing on it's own outside of cultivation) not only on property boundaries and in vacant lots, but also in public parks and other green spaces where it has replaced a variety of native species. Other trees that are highly invasive in Connecticut include sycamore maple and Amur maple.

St. Joesph's Cathedral??????????

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?St. Joesph's Cathedral??????????

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Plant and Soil Considerations

Of all the critical factors affecting an urban tree's long term survival, available root zone is one of the most limiting. The volume of soil available to roots determines growth potential and affects tree health. Plant a large shade tree in a location that has little space for root growth and the tree will die in a few short years. Research has shown that an average shade tree needs a minimum of 600 cubic feet of soil volume. This requires a location with soil four feet deep and eight feet wide by eighteen feet long. This rooting space can be shared with the next tree. While this is not usually a problem in parks or other green spaces, it is a severe limitation in plazas and in streetscapes. If there is less soil space available than this, then the species needs to be reduced in size. It is better to provide larger planters where several trees are able to share the soil than to have each one tree in its own, smaller planter.

Soil Condition

Along with having enough volume, it is also important that soils have the proper pH, fertility, aeration and drainage. Urban soils are notorious for being poor in each of these categories, and often having the added problem of compaction. The planner must know the existing soil situation. If the available soils are inadequate, then it must be replaced. Drainage and aeration must be provided in some way – usually by underdrains installed during a construction process.

In any event, the plant species must be selected based on the best fit. Poorly drained, infertile soils will only support certain species, as will soils that are well drained or droughty. A few trees, such as red maple and pin oak, are able to survive in a relatively wide range of conditions.



Microenvironment

The “microenvironment,” that is the environment immediately around the tree, certainly needs to be considered in urban species selection and location. Stresses such as wind or the lack of it, heat and glare, air pollution and runoff pollutants (for example de-icing salts) have considerable negative effects on the health of a tree. Trees planted near building corners, and in wind tunnels created by tall buildings, can suffer from excessive drying. On the other hand, the lack of wind caused by the blocking action of buildings may be a more common problem. Without the benefit of air movement, the detrimental effects of air pollution are enhanced, especially when accompanied by the build-up of heat. These conditions alone contribute to poor tree growth and even tree death for a number of species. Evergreen trees seem most sensitive to air pollutants in these situations, but other species such as sugar maple do not fare well either. Urban trees further suffer when located in areas adjacent to or surrounded by pavement or next to building walls. Aside from the obvious lack of water, the warming effect of heat and glare compound the stress. With the addition of road de-icing salts in the runoff, it is no wonder that the list of trees capable of thriving in these common situations is so small.

Compaction

Compaction is a tree killer and a major problem in urban environments. There really are no species available that withstand soils that are heavily compacted by foot traffic. At best, a species that does well in heavy, poorly drained soils can be used. Such trees include red maple, hornbeam, black gum, and pin oak. In the streetside environment, protection is often attempted through the use of tree grates. These metal frames may prevent compaction, but the tree will suffer due to a restricted root zone. Some success might be obtained through the use of porous paving materials that allow the infiltration of air and water, yet restrict compaction. Pea stone or even stone dust might work in some instances. In designing in an area with high levels of human activity, locating the trees where people are not likely to walk is the best preventative.

Planning for Maintenance

To have living things in urban areas requires effort. The benefits of having trees where people live, play, and do business should offset their costs. Careful selection of species and their place-



Selecting the right Tree:

Various tree shapes

and sizes???????

ment can increase the benefits and reduce the costs of maintenance. Knowing species characteristics will help the planners to avoid higher maintenance trees and higher maintenance situations. For example, oaks drop acorns and dent the hoods of cars and often surprise passers-by. Little-leaf lindens drop aphid honeydew that turns black and sooty with fungus. All trees drop leaves in the fall, and no tree is maintenance free, except perhaps those in a forested park. Finding cultivated varieties that are seedless, like the green ash cultivars ‘Summit’ and ‘Patmore’, can help. Other species, while not seedless, don’t present major problems. Hophornbeam and hornbeam are two of these, while little-leaf linden is similar. Messy fruited trees should be kept away from sidewalks, but can be used where the fruit will drop onto a surface that isn’t walked upon. Careful planning will result in the benefits of a wide variety of species while minimizing impact and cost.

Leaf pick-up in the fall is unavoidable. While some species produce smaller leaves and somewhat less volume, leaf removal is always necessary. Honeylocust, however, is an example of a species that produces less leaf volume than most other species. With its small leaflets that shrivel to small size and its high survival ability, is one of the most useful and widely planted trees in cities. Of course, the danger of monoculture certainly pertains to this species.

Sidewalk heaving is another problem that may occur with any tree after a long period of time. While planning can avoid Norway maple, the most likely to heave, expect any large shade tree to eventually cause this problem. Planning ahead is a must, by either providing the space for large, surface roots, or by selecting species with a smaller ultimate size.

Avoid Long-term Problems

It is fair to say that that most, if not all, problems caused by public trees in urban areas are due to improper planning. To avoid the problems mentioned above, a thorough analysis of the existing and future site and situation must be done, before developing a plan with clear objectives. Careful planning results in the greatest value over time and results in the least cost.

St. Joseph's Cathedral??????????

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Suggested Readings

Craul, P. 1992. *Urban Soil in Landscape Design*. New York: John Wiley and Sons, Inc.

One of the best texts that address what really happens and needs to happen with planted trees in cities. This text is filled with analysis and conclusions and is one of the leading works on trees in cities. Fertility, contamination, compaction, drainage, site assessment and site preparation are major topics covered in addition to the nature and property of urban soils.

Zion, R.L. 1994. *Trees for Architecture and the Landscape, 2nd edition*. New York: John Wiley and Sons, Inc.

This is still one of my favorite references on tree selection. It begins with seventy pages of “centerfolds” of trees both with and without leaves, in black and white, with the emphasis on form. Many overlook this aspect of selecting trees, and this presentation allows the planner to visualize the tree in the future location. Zion includes basic design data on each recommended species, while offering knowledgeable commentary on where the tree might do best. Included in the last part of the book are numerous lists by state, of trees in categories such as habit, color, soil tolerance, and pest resistance.

Dirr, M.A. 1998. *Manual of Woody Landscape Plants, 5th edition*. Champaign, Illinois: Stipes Publishing Company.

It is hard to get by without this leading text on landscape plants. Dirr’s work is an essential reference for all the cultivated trees and shrubs that a planner might use in an urban situation. Not only are the basic characteristics included, but Dirr always adds personal comments about a plant that are very useful in making design decisions. While this book has only line drawings of leaves, he also produced *Dirr’s Hardy Trees and Shrubs*, Timber Press, 1997, with color photos and shortened information on each plant. This is also available as a CD-ROM.



TREE SPECIES DIVERSITY: THE “TEN PERCENT” SOLUTION

To make Connecticut communities hospitable places in which to live and work, it is important that our community forests consist of diverse tree populations. There is a great deal of scientific literature that points out the dangers of monocultures (though some examples do exist, they are rare). Biological diversity is a sign of ecological good health, and in areas of acute environmental stress, where there are few species the risk of severe loss is high.

The classic example of biological tragedy in the urban forest is, of course, the story of the American elm. Once planted or retained in large numbers for centuries, American elm was the most preferred urban tree in Connecticut and New England. But a blight changed all that. With towering elms growing in parks and along streets close together one after another, the blight took tree after tree after tree mostly because these trees were the dominate species – a monoculture - in urban situations.

As our towns and cities evolve and new planting sites for trees are created, we need to guard against catastrophes like Dutch elm disease. Dutch elm disease and blights such as Anthracnose, which affects ash, sycamore, maple, white oak, and other species, have taught us that it is wise to plant a variety of trees to minimize the impact of disease and pests.

Community forestry experts generally agree that many Connecticut communities have over-planted Norway maple and Bartlett pear. Norway maple was the tree of choice a generation ago as a replacement tree for American elm (to fill vacant space only – the tree, of course, could not replace the American elm in terms of form and function). Now the trees have reached maturity, and problems have become apparent across the state. Norway maple was readily available, is a rapid grower, was believed to be well-adapted to urban environments and proved to be a successful transplant. But it has many insect pests, is an invasive species and falls apart after only forty or so years. And it simply occupies too many miles of streets and park space.

Bartlett pear has also become over-planted. It is a tree that flowers bountifully each spring for about one week and in groups puts on a spectacular show. However, it can, at the same time, look visually monotonous. It also has much included wood causing branches to break apart at a young age.



Connecticut will benefit from a diverse tree population. In our backyards and our neighborhoods species diversity is a guard against extensive devastation by disease and insect pests. Tree monocultures are an invitation to disaster. (Some urban forest scientists assert that twenty to fifty trees of the same species planted on a few city streets do not constitute a monoculture. In fact, research suggests that trees planted in small “blocks” where the planting site has been prepared properly and the soil is adequate do better than solitary street trees. Many city foresters go by the ten percent rule: that is, no more than ten percent of any tree species should be planted in the community. No single tree species should predominate.



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London Plane Tree *Platanus x acerifolia*

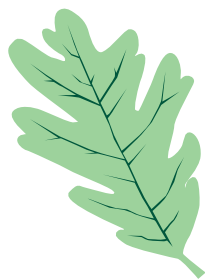
This large hybrid tree has an attractive, olive-green to creamy bark that flakes off in patches. It is very tolerant of urban conditions, and grows up to 100 feet in height. There are many different cultivars. The tree is planted in parking lot islands, buffer strips, sidewalk cutouts and along highways and streets because it is tolerant of urban conditions. Leaves are alternate, simple, lobed, ovate shaped and 6 to 10 inches long.





Glenn: Incorrect planting is one of the best ways to kill a tree, or at least doom it to a slow death. And yet, planting a tree is one of the things people enjoy doing the most.

Bob: We do plant trees for the next generation, so we should learn to do it right, or we might as well not do it at all.



Chapter 10

How to Plant a Tree Correctly

Robert M. Ricard

A properly selected, correctly planted, and well-maintained tree will provide a multitude of benefits for generations. An ill chosen, incorrectly planted, or neglected young tree will die in but a few years, and may even become a risk and a hazard before it goes. This chapter describes current understanding of proper new tree planting and early tree care methods.

Establishing the Planting Hole

The depth of the planting hole will always depend on the location of the tree's trunk flare, also called the root collar. The trunk flare is the location where roots begin to branch from the trunk. The top of the soil in a root ball or nursery container is not always at the trunk flare. Be sure to fold back burlap, and remove excess soil or mulch until the root flare is exposed. The depth of the planting hole should be the same as the distance between the level of the trunk flare and the bottom of the root ball. The planting hole should be roughly three times wider than the root ball or spread of roots.

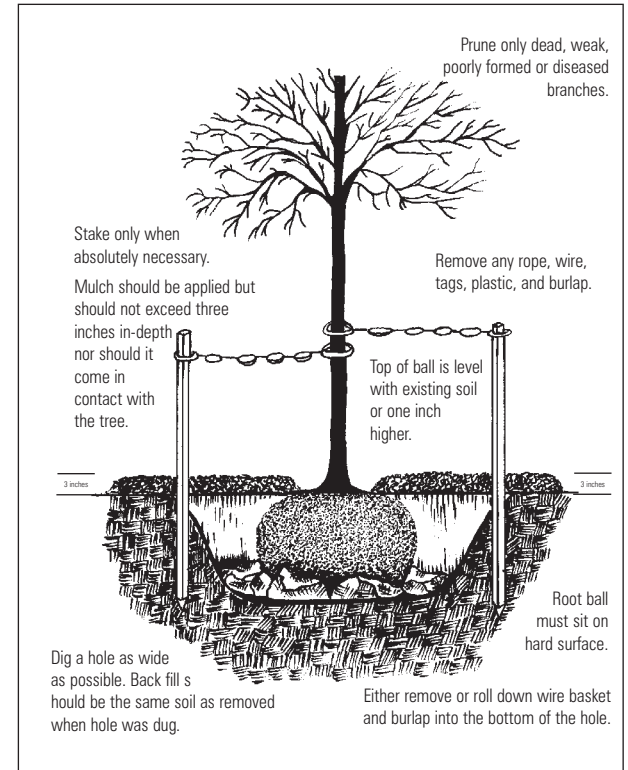


Dig the hole so that it is saucer or bowl-shaped, with the sides sloping gradually. Do not cultivate the bottom of the planting hole in any way. This will cause the root ball to settle, making the tree sink deeper into the hole. Do not amend the soil with fertilizer, topsoil, or manure, unless planting in soil heavily compacted or damaged by construction.

Planting the Tree

With the burlap (and wire basket, if there is one) still on the root ball, place tree upright in the center of the hole by handling the root ball, not the trunk; orient tree in hole to achieve optimum visual balance. Clip and either roll-down or remove the wire basket if present. Remove burlap and nylon string from the top and sides of the root ball to allow roots to grow beyond the planting hole into adjacent soil. It is an old myth that burlap decays fast enough in a few years allowing root growth. Do not remove the burlap from the bottom of the ball if there is a risk of the root ball crumbling; root hairs could be damaged as a result. Prune cleanly any dead or crushed roots and straighten or cut encircling roots.

Fill the soil around and underneath the root ball. Do not stomp on the soil to pack it tightly. Instead gently tamp with a stick to remove air pockets. Once the hole has been backfilled, about halfway, fill the hole partially with water to evenly settle the soil. Continue back filling once water has drained but never plant too deep; this may kill the tree. Backfill until the trunk flare of the tree is level with the perimeter of the top of the planting hole (at grade). Any tree wrap, tape, or string on the trunk should be removed. These materials should only be used to protect the tree during transit to the planting site. Stake and brace trees only when planted in high pedestrian traffic or windy areas. If deemed necessary, support the tree in a way that allows it to move or sway in the wind, while preventing the root ball from shifting in the ground.



Tree Planting Details



Over mulching has become a major tree problem around Connecticut. This practice cause the declina??? of death of hundreds of trees each year.

The Problem of Over-Mulching

A recent, destructive and easily avoided trend has been the over-mulching of trees and shrubs. Though mulching has many benefits, trees are, quite literally, killed by over-mulching. Mulch piled high around and in contact with the stem or trunk causes slow death. It is also a waste of money and labor. Why over-mulching has become a common landscape practice is unclear. What is absolutely certain, however, is that over-mulching is a practice that needs to stop.

Over-mulching kills trees by:

- Oxygen starvation
- Inner bark death
- Nitrogen deficiencies
- Lack of micronutrients
- Excess heat
- Disease susceptibility
- Rodent infestation

Caring for Newly Planted Trees

Water a newly planted tree at least twice a week for two months and during dry spells thereafter. Soak the soil by allowing the water to run slowly at the perimeter or edge of the planting site. Create a mulch circle around the tree that is three times the size of the root ball. A mulch circle will keep lawn mowers and string trimmers away from the tree thereby avoiding trunk wounding. Even the smallest wound could potentially cause disease that could kill the tree.

Mulch lightly and evenly with three inches of composted material to three times the size of the root ball - do not mulch up to the trunk. Instead, leave a three inch circle of bare soil around the trunk. Avoid mulching excessively, or above three inches; deep layers of mulch will only harm the tree.

Replace mulch as needed, and keep grass and weeds out of mulched area. Grass and weeds compete for the same water and nutrients as the tree. For this reason, it is best not to plant flowers around the base of the tree.

Remove stakes, if present, after one year unless site is extremely windy. Do not stake longer than two years.

It is critical to encourage the best possible branching pattern of a tree, which is best achieved when it is still young. Remove all crossing branches and if possible, do not allow for more than one branch to originate at the same location. There is no need to prune live branches to decrease leaf surface area. This is an old myth that still pervades in the green industry. Do, however, prune branches that are dead, diseased, broken, touching other branches, or form weak “V”-shaped crotches. Branch unions shaped like the letter “U” are much stronger.

Suggested Readings

Craul, P.J. 1992. *Urban Soil in Landscape Design*. New York: John Wiley and Sons, Inc.

Professor Craul is one of the leading authorities on tree root systems and his book is the best reference to date on the subject. Despite its academic style, *Urban Soil in Landscape Design* is easy to read for serious professionals and volunteers.

Himelick, E.B. 1988. *Tree and Shrub Transplanting Manual*. Savoy, Illinois: International Society of Arboriculture.

Tree transplanting big trees is a very specialized part of community forestry, a technique that is practiced only occasionally and by professionals. It is usually cost inefficient and requires specialized equipment. This manual explains transplanting well and is a standard on the subject.

Reynolds, M.K. and H.S. Ossenbruggen. 1992. *Planting Trees for Communities*. Durham, New Hampshire: USDA Forest Service, Northeastern Area State and Private Forestry.

This is a handy brochure that is great to have when tree planting – it even is made of tear resistant paper. It also provides much information in preparing for tree planting events.

Watson, G.W. and D. Neely. 1994. *The Landscape Below the Ground*. Savoy, Illinois: International Society of Arboriculture.

Extensive research on tree root systems has been conducted over the past decade, and a new understanding of tree roots has led to improved planting systems. This publication brings together papers by many leading experts on tree roots. If someone argues with you about where roots grow, have them read this book.

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CALL BEFORE YOU DIG

CALL BEFORE YOU DIG is a state regulated, nonprofit organization comprised of all public utilities within the state of Connecticut. The purpose of CALL BEFORE YOU DIG is to function as a state-wide, one-call notification system that provides excavators and the general public with the ability to inform multiple owners and operators of underground facilities of proposed excavation. State law requires that you contact CALL BEFORE YOU DIG prior to digging. Contact them at least 48 hours in advance and remember, if you damage underground utilities, you are liable.

In Connecticut call toll free at 1-800-922-4455.

Frequently Asked Questions:

Q. Who must notify CALL BEFORE YOU DIG?

A. Anyone using power or mechanized equipment who disturbs the earth on or below the surface must call the clearinghouse for a location request.

Q. If I am hand digging, am I required to notify CALL BEFORE YOU DIG?

A. No, however, it makes good sense. Utility lines and cables can be easily broken or damaged with a spade, shovel, fence post digger, or pick-axe.

(Source: Call Before You Dig web site)



- Bob:** Glenn, who do you think should prune public trees?
- Glenn:** Well-trained volunteers can do some of the work, but in most cases, professionals must do it, if only for liability reasons.
- Bob:** I think you're right. For example, volunteers can be trained to prune young trees to develop proper branching structure.



Chapter 11

Essentials of Tree Pruning

H. Dennis P. Ryan

Understanding the basic concepts and practices associated with tree pruning is important for anyone involved in community forestry. Improper pruning causes lasting problems that can easily be avoided through proper training and education. When trees are improperly pruned they can rot and die, and the investment in them is lost.

Natural and Artificial Pruning

Pruning is a natural process that takes place in all plants. Nature prunes tree branches and tree tops in two major ways—environmental and biotic. Light, moisture, and physical force are the environmental factors that cause natural pruning. Trees growing close together in the forest or park do not have sunlight reaching the lower branches. As a result, the branches die back starting at the bottom of the tree. Trees grow only if they receive sufficient light. Trees that receive insufficient water will start to die back at the top as a result of drought or root injuries. Wind and the weight of snow or ice are physical forces that can break off the tops and branches of trees. Biotic factors resulting in natural pruning would include damage caused by insects, diseases, and animals.



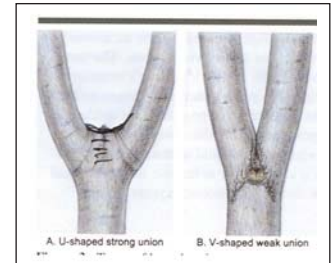
In artificial pruning, plant parts are removed to speed up or modify the natural pruning process and produce a healthier, more attractive plant.

Why Prune Municipal Trees?

Health, aesthetics, and safety are the three major reasons for pruning municipal trees. Pruning for health involves the removal of crowded branches in order to increase the air circulation through the tree. By improving the airflow, wind breakage is reduced. As a result of the increased emphasis on Integrated Pest Management, pruning is increasingly being used to reduce insect and disease problems such as Dutch elm disease and tent caterpillars. Trees growing in urban conditions are often mechanically damaged, so pruning is used to correct or repair the tree. Preventive pruning can be used with success on young trees to prevent future growth problems such as weak crotches.

Weak or tight crotches will often split apart as a tree matures, leading to severe damage. Identifying weak crotches and pruning the branch to encourage the growth of a branch with more potential is essential. Check the tree for narrow, angled branches and branch unions that contain included bark. Included bark is a basic structural problem in a tree. In a strong attachment, bark is forced up between two branches. In contrast, included bark is forced down into and pinched between them. This produces a very weak union that often damages the tree.

Safety pruning is critical in urban forestry. Safety pruning includes pruning to accommodate utility lines, and pruning dead or dangerous branches that could fall and injure someone. Much of the safety pruning that takes place is the result of careless planting. The wrong tree planted in the wrong place—for example, a tree that grows too large for a site—can cause utility and municipal infrastructure damage and will require pruning. The expense can easily be avoided by planting the right tree in the right place.



Tree A has a branch attachment that is strong and probably will not cause a problem. Tree B has included bark which will eventually split the crotch.

When to Prune

There are several factors associated with the timing of pruning work. Year round pruning is common for a variety of reasons, but there are seasons when it can be harmful and should be avoided if possible. When economically feasible, pruning should be done when it contributes to the overall health of the plant.

Spring flowering plants are best pruned immediately following flowering; summer flowering plants just before spring growth begins. For example, if pruned during their dormant season or in early spring, “bleeders” such as maples and birch can be unsightly in the spring time. Bleeding is the heavy spring sap flow that is normal in all trees, but any wound to the bark of bleeders results in a heavy sap flow down the trunk. This is not a serious health problem for a tree, but it can alarm the uninformed and lead to complaints. Prune bleeders in the summer and fall, not in late winter or spring.

Avoid pruning at the time leaves are forming and during leaf fall because the tree is in a state of dramatic change. It is best to prune during the dormant season or after the leaves have matured.

Water sprouts can be a serious nuisance problem on some trees. They sap energy from the tree, are weak, and never develop into strong structures. Excessive pruning and winter pruning will stimulate the excessive production of water sprouts. Pruning during the summer will reduce the production of suckers during the following season.

Pruning can in some cases transfer or attract serious diseases or insect problems. Pruning should not take place when these pathogens or insects will be attracted to the tree. Research indicates that insects carrying Dutch elm disease and oak wilt are attracted by fresh wounds during the growing season and trees should not be pruned at this time if the disease is a problem in the area. Many disease causing fungi and bacteria can be transferred to fresh wounds by unclean pruning tools. If disease is a potential problem, prune only during dry weather and disinfect the tools between trees. Tools can be disinfected with seventy-percent denatured (rubbing) alcohol, a ten-percent solution of household bleach, or in a pinch, and chainsaw gasoline. Disinfect frequently, even between cuts where serious diseases such as fire blight are a concern.



Economics, instead of tree physiology, often determines when trees are pruned. Pick the time that comes closest to ideal. Light pruning and the removal of dead wood can be undertaken at any time. Municipal arborists, tree wardens, and golf course superintendents with limited budgets who contract out their pruning work to commercial arborists will get the best bids in the winter, when residential work is slow and tree companies are looking for work.

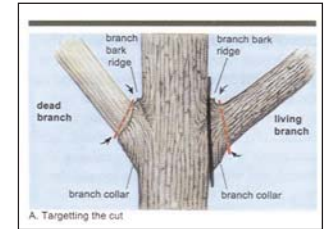
Pruning Cuts

As a result of his research on pruning cuts and on how wounds heal, Dr. Alex Shigo of the USDA Forest Service developed a method of pruning that is less damaging to the tree. Shigo found that the best way to prune is to take advantage of a tree's natural defenses against decay. This natural defense process is called compartmentalization. Prior to this research it was standard practice to prune with a flush cut—that is, a branch was removed by cutting it off flush to the trunk or primary branch—but Dr. Shigo learned that this practice compromises a tree's natural defenses.

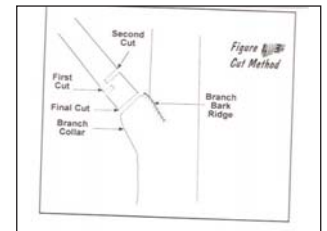
The correct way to prune is to remove the branch from the tree without cutting into the trunk or primary branch of the tree (no flush cuts). This is what Dr. Shigo calls natural target pruning. Natural target pruning increases the chance that the tree will be able to compartmentalize the effects of the wound, and decreases the chance of internal defect problems (decay columns) associated with wounds caused by flush cuts.

Natural target pruning requires identification of the branch bark ridge. The branch bark ridge is the flair of wrinkled bark at the junction of a branch. Cuts at the branch bark ridge assure that a tree's natural defenses will remain intact. It can then begin to seal off the wound.

In most cases the removal of branches can be accomplished with three cuts of the saw. By using three cuts instead of one top cut, ripping of the bark down the trunk of the tree can be minimized. To prevent bark tearing when pruning large branches, the weight of the branch will also have to be supported with a lowering rope. Bark rips are quite common in the spring time if the person pruning the tree is careless. Some species are more susceptible to tearing than others.



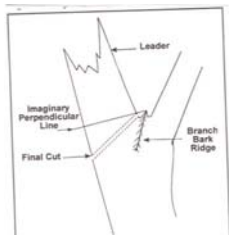
The dark line is where the traditional flush cut would have been made (an improper practice); the branch should be pruned off at the natural target branch collar.



Three point cut, lateral: Lateral branches are cut in three places so as to avoid ripping the bark on the trunk. First is an undercut about one-third of the way through the branch, the second cut is from the top further out along the branch so that the branch will release without tearing the bark. The final cut is a collar cut.



Topping results in decay, excessive suckering, and sunscald spreading down the branches where the cuts were made.



Drop crotch pruning reduces the length of a leader or branch back to a lateral branch that is at least one-third to one-half the diameter of the leader being reduced.

The Twenty-Five Percent Rule

Even professional arborists have a tendency to over-prune. Over-pruning can be extremely damaging to trees, resulting in sunscald, excessive suckering, a loss of photosynthetic area, and even death. If a tree has not been pruned for a long time, the tendency is to prune too heavily. This can cause serious problems.

Removing dead and weak wood will always benefit a tree, but removing too much live wood removes leaves that are necessary for photosynthesis. Most arborists recommend that no more than twenty-five percent of the live wood should be removed from a tree at any one time. If a tree needs serious corrective pruning it should be done over a period of two or three years. The end result will be a healthier and better looking tree.

Pruning Methods

There are three general types of pruning: heading back, drop crotching, and thinning out. Some trees will require all three types of pruning; others will require only one type.

Heading back (sometimes called cutting back) is the cutting back of a stem or branch, resulting in crown reduction. Heading back reduces the size of a tree in height and spread. There are several heading back methods that can be used, but most destroy the natural shape of the plant.

Topping is the severe reduction of branches, and in extreme cases, even the reduction of portions of the trunk. This practice almost always causes severe damage to the tree. Decay, excessive water sprouts, and sun scald are common following topping. Professional arborists seldom engage in topping a tree.

Drop crotch pruning is sometimes called natural pruning or crown reduction pruning by the utility industry. Drop crotch pruning is the removal of a leader or branch back to a lateral bud or branch. While drop crotch pruning is still considered heading back, it is the preferred method to use if a tree must be reduced in size. It is recommended that the leader be drop crotched to a lateral branch that is at least one-third to one-half the size of the leader being cut.

All of the heading back techniques reduce the overall size of a tree. If a tree has to be reduced,



the drop crotch method is preferred over topping or shearing. While some drop crotching will open up a tree, the long term result is usually a bushier tree. The thinning technique of pruning will produce a healthier tree with less decay and suckering than will drop crotch pruning. The pruning rotation will also be longer when a tree is thinned out as compared to any of the heading methods.

Thinning out is the removal of lateral branches back to where they originate on the parent stem. A well-thinned tree allows increased air flow but it will not look like it has been pruned. A thinned tree maintains its natural shape and keeps a large quantity of leaves in the crown, which is necessary for photosynthesis. When a tree is pruned using the thinning technique, the height and spread of the tree is not reduced. Tree pruning is best accomplished using thinning instead of heading back methods.

Pruning Standards

What one individual considers a light pruning, another individual may consider excessive. In order to sell or contract out professional tree pruning and other arboricultural work, municipal managers such as tree wardens, need to standardize the bidding process for the same type of work. The tree care industry has published a standard for arboricultural work practices. This ANSI A300 standard is available for pruning, cabling, bracing, guying, fertilizing, and lightning protection. Tree wardens and other municipal officials contracting out tree work should refer to ANSI A300.

The following is an introduction (in a listed format) of the A300 Pruning Standard.

Branch Size - A minimum or maximum diameter size to be removed should be specified in all pruning operations. This establishes how much pruning is to be done.

Pruning Objectives - This should be established prior to beginning any pruning operation. The A300 provides two basic objectives:

- **Hazard reduction pruning** is recommended when the primary objective is to reduce the danger to a specific target caused by visibly defined hazards in the tree. For example, hazard reduction pruning may be the primary objective if a tree had dead branches over a park bench.



- **Maintenance pruning** is used when the primary objective is to maintain or improve tree health and structure, and includes hazard reduction pruning. An example might be to perform a maintenance pruning operation on a tree in a front yard.

Pruning Types - Hazard reduction pruning and maintenance pruning should consist of one or more of the following pruning types:

- **Crown cleaning** shall consist of the selective removal of one or more of the following: dead, dying, diseased or weak branches, and suckers/watersprouts.
- **Crown thinning** shall consist of the selective removal of branches to increase light penetration, air movement, and to reduce weight.
- **Crown raising** shall consist of the removal of the lower branches to provide clearance.
- **Crown reduction** decreases the height and/or spread of a tree. Consideration should be given to the ability of a species to sustain this type of pruning.
- **Vista pruning** is the selective pruning of a crown to allow a view from a predetermined point.
- **Crown restoration pruning** should improve the structure, form and appearance of trees that have been severely damaged.

Street Trees

Street trees are located along heavily used public ways. Therefore it is important that there be:

- Sufficient clearance over the street for trucks to pass under the lowest branches.
- Sufficient clearance over the sidewalk for someone on a bicycle to clear the lowest branches.
- No branches blocking overhead street lights.
- No branches blocking street traffic signs.



To avoid these problems, an A300 pruning contract must write the standards to take the street tree environment into consideration. Most street tree pruning contracts call for hazard reduction pruning and maintenance pruning, depending on the budget and the location of the streets where trees are to be pruned. The contract will require the eleva-



tion of branches so that the tallest expected object (such as a salt and sand truck with a raised dump-body or a bus) can clear the tree without ripping off a branch or injuring a pedestrian. Remember that tree branches in the winter will droop lower when wet, bearing snow, and when the tree has leafed out. Trees blocking street lights or signs will have to be pruned to provide the necessary clearance, and any suckers on the lower trunk should be pruned off to avoid starting new branches close to the street or sidewalk. Since many of our municipalities are having serious financial problems, economics, instead of tree biology, will most likely determine how often street trees will be pruned.

Utility Pruning

Tree pruning around utility lines is required to insure reliability of the utility system and safety for the general public and utility line workers. Most utility pruning is a combination of hazard reduction pruning and crown reduction pruning with some modifications. All utility pruning in a municipality requires a permit from the tree warden. A meeting between the utility company arborist, the line clearance contractor, and the tree warden should take place before any work is permitted on municipal trees.



Tipping of trees can cause rapid decline in health and vigor, eventually increase risk of hazard to the public.

Suggested Readings

Harris, R.W. 2004. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 3rd edition*. Englewood Cliffs, New Jersey: Prentice Hall.

This book is a thorough scientific review of arboriculture. Much of the latter half contains extensive information on tree insects and disease.

Shigo, A.L. 1991. *Modern Arboriculture: A Systems Approach to the Care of Trees and Their Associates*. Durham, New Hampshire: Shigo and Trees, Associates.



This entertaining, easy to understand book is an excellent guide to the hows and whys of tree pruning.

Bedker, P.J., et al. 1991. *How to Prune Trees*. Newtown Square, Pennsylvania: USDA Forest Service, Northeastern Area State and Private Forestry. NA-FR-01-95.

This brochure is a basic reference that contains simple diagrams. The easy to understand text make it ideal for community forestry volunteers who possess limited training.

In certain cases tree pruning must be done by a well-trained, licensed arborist.





No town can fail of beauty, though its walks were gutters, and its house hovels, if venerable trees make magnificent colonnades along its streets. Of all trees, no other unites, in the same degree, majesty and beauty, grace and grandeur, as the American Elm.” The Elms of New England! They are as much a part of her beauty as the columns of the Parthenon were the glory of its architecture.

Norwood; or Village Life in New England

Henry Ward Beecher, 1876





- Glenn:** It seems to me people assume they are doing the right thing by using fertilizer, but they are often applying it indiscriminately
- Bob:** True, over-fertilizing can cause tree decline and pollute ground water, so a better approach would be to test soils first to see if nutrients are needed.



Chapter 12

Advanced Tree Maintenance

Robert M. Ricard

Occasionally, public trees require the application of advanced tree care methods. For example, a tree of historical significance has been heavily damaged during an ice storm. The town's well-trained tree crew has pruned the tree, but points out that many of the remaining large, healthy branches may now be more prone to failure. Unfortunately, the tree is located beside the sidewalk leading to the front door of the town hall. An arborist recommends cabling. For another example, trees on a town green may appear to be under stress. A licensed arborist determines that soil nutrition is inadequate and recommends fertilization.

This chapter introduces some advanced tree care practices that will occasionally be necessary for public trees.

Cabling

Most communities do very little cabling of trees for two reasons: liability and high cost. The



installation of a cable is an acknowledgment that there is a weakness in the tree. A properly installed cable can extend the life of a tree for many years, and if the tree is regularly inspected, should not pose a significant risk. While it may not be worthwhile to cable a tree of average importance, the money spent cabling a historically significant tree might be worth it.

Cable Location

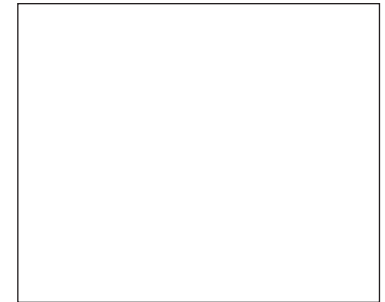
The vast majority of cables are installed in trees to support a weak or co-dominant, V-shaped crotch that has included bark at the union. Most trees that do not have *included bark* in the union do not need to be cabled. (Included bark is forced down into and pinched between two branches, producing a very weak union that often damages the tree.) The improper location of cables in a tree is a common error. The cable should be installed two-thirds of the distance from the weak crotch to the top of the tree branches. The goal is to reinforce the weak crotch union. Most cabling is installed in big, old trees and therefore, eyebolts should be used in all large wood and any branches that contain decay. Lags bolts should never be used.

Install all cables according to the ANSI - A300 Standard. It is not recommended that the new synthetic systems such as the Cobra or the Osnabruck system be used.

Fertilizing

Trees and shrubs in their natural habitats rarely display symptoms of nutrient deficiency. This is because nutrients are naturally recycled in wild conditions and because plants survive only where they are well adapted to local conditions or have a competitive advantage.

Nursery, street, and landscape plantings are, for the most part, artificial habitats. Soils may be vastly different from those of the native habitat of a given plant, and nutrient recycling systems may be altered or greatly diminished as a result of planting schemes (e.g., planting in turf areas) or maintenance practices (e.g., collection of fallen leaves). For these reasons, periodic applications of fertilizer to soil beneath ornamental trees and shrubs are sometimes needed to replenish essential mineral elements and to promote healthy growth. Keep in mind that in most cases, newly planted trees should not be fertilized.



A properly installed cable is installed two-thirds of the way up the tree from the crotch.

It is important to select species which are best suited to a particular site. A program of cultural practices that sustains or replenishes soil organic matter and nutrients should also be established. These practices might include incorporating compost into soils at the pre-planting stage, applying organic mulches, and cover cropping. Proper maintenance of soil fertility and attention to plant nutritional requirements is at the heart of an effective Integrated Pest Management within a Plant Health Care program.

Soil pH

A fertility program for woody plants begins with an analysis of soil pH, or the level of acidity. Soil pH is measured on a scale of 0-14 with 7 being neutral. Soils with a pH below 7 are considered acidic while those above 7 are alkaline. Adjusting pH levels is important because specific plants grow best within a certain range of pH. This is because soil pH affects the availability of both major and minor plant nutrient elements. Furthermore, soil pH influences the level of microbial activity in soils. Microbes involved in mineralization (chemical break down) of organic matter are most active between a pH of 6 and 7. At extremes in pH, many nutrients occur in forms unavailable for uptake by plant roots.

Analysis of soil pH levels should be routinely done prior to any planting in nursery soils or at landscape sites. Urban soils are typically alkaline due to leaching of limestone from buildings and sidewalks. When soil is too acid, limestone is often used to “sweeten” the soil by adjusting the pH upward. On the other hand, sulfur is used to lower the pH. It is best if these materials are incorporated into soils prior to planting since surface applications are slow to affect pH levels. Most liming and sulfur recommendations are based on the assumption that the material is worked in to depths of eight inches. Deeper incorporation of either limestone or sulfur will require adjustments in rates to accommodate larger volumes of soil.

What Minerals to Use?

Basic plant nutrition involves the uptake of sixteen mineral elements essential to plant growth. In addition to carbon, hydrogen, and oxygen, which are obtained from air and water, the elements



nitrogen (N), phosphorus (P), and potassium (K) are required in greatest abundance, and are referred to as “macronutrients.” Formulations with all three macronutrients are called “complete” fertilizers. Research in woody plant nutrition has shown that nitrogen is the element often in short supply in the soil. Addition of nitrogen to the soil also yields the greatest growth response in trees and shrubs. For this reason, high nitrogen fertilizers with N-P-K ratios of 4-1-1, 3-1-1 or 3-1-2 are generally recommended for feeding established woody plants. These include fertilizers with analyses such as 8-2-2, 15-5-5, 24-8-16 and other, similar formulations. The analysis refers to percent nitrogen, percent phosphorus (as P₂O₅), and percent potassium (as K₂O) in the fertilizer.

Phosphorus, potassium, and essential elements other than nitrogen are slow to be depleted from soils. Provided these nutrients are at recommended levels, a fertilizer program for established woody plants can consist of applications of nitrogen sources alone. Under normal conditions, complete fertilizers may be used every four or five years to ensure a supply of the other essential nutrients.

Application of slow-release forms of nitrogen provide the most efficient use of this nutrient because root growth and nutrient absorption can occur anytime soil temperatures are above 40o F. On fertilizer labels, slow-release nitrogen is described as Water Insoluble Nitrogen. Isobutylidene diurea, ureaformaldehyde, sulfur-coated fertilizers (e.g., sulfur coated urea), and resin-coated fertilizer (e.g., Osmocote) are the commonly available sources of slow-release nitrogen or water insoluble nitrogen.

Nitrogen in slow-release form may also be obtained from natural, organic fertilizers. However, industry standards defining “organic” and “natural” are currently nonexistent and a great deal of variability in terms of their composition exists in these products. For those adhering strictly to “organic” methods, the label of a given product should be examined for organic certification either by the state agriculture department or organizations such as the Northeast Organic Farmers Association. The term “natural” is used here to indicate fertilizers that are not synthesized but are derived from naturally occurring materials.

Before applying natural fertilizers, the user must be aware of the nutrient analysis of N, P, and K by percent, and the rate of release of the nutrients. Often, mineral elements in natural materials, whether organic or inorganic, are released slowly. This can benefit plants if nutrient release is steady and continuous over a long period of time. However, these materials may be of little immediate value

in correcting nutrient deficiencies. Generally, slow release materials must be applied in large amounts so that a balance exists between the rate of release and amount of nutrients available at a given time for absorption by plant roots. Unfortunately, objective information on rates of release of mineral elements from natural materials is often lacking in part because rate of release is a function of highly variable environmental factors.

Compost, well-rotted manures, and sewage sludge may be used to fertilize woody plants, although their nutrient composition is quite variable. Forms of compost, manure, and treated sewage sludge that are sold commercially as fertilizers will have nutrient analyses listed on the product package. When buying bulk quantities of compost materials, a nutrient analysis of the product should be requested. These materials can supply some nutrients and contribute significant amounts of organic matter to improve soil structure and fertility and should be a part of a soil and fertility program. Compost guidelines for the Northeast suggest applying finished compost at a rate of no more than four cubic yards per 1,000 square feet (three-quarters of an inch thick layer of compost).



Tree roots and the trunk often grow in odd ways.

Frequency of Application

Frequency of application depends on the general vigor and growth of the plant. Woody plants growing in rich soils with continual replenishment of nutrients from decomposition of organic matter may not need regular fertilizing. However, plants that are in a nursery production cycle, and landscape plants that show either abnormal leaf size and color, little or no annual growth, or significant amounts of dead wood within the plant, should be fertilized annually.

Time of Application

Fertilizers are best applied from late August through September. Root absorption of nutrients is most efficient in late summer and remains so until soil temperatures approach freezing. Nitrogen

absorbed in the fall is stored and converted to forms used to support the spring flush of growth. The next best time to fertilize woody plants is early spring before the onset of new growth.

Benefits of Irrigation Systems

The increased use of underground irrigation systems, including the use of the drip-irrigation method, has greatly expanded the variety of plant materials that can be used in the community landscape. In addition to turfgrass, shrubs and trees can benefit through the use of a well-designed and operated irrigation system. Irrigation is critical to a good tree maintenance program and should be considered when developing a strategy for the care and maintenance of trees growing in any landscape. Since drought stresses in many parts of the country are often cyclical, their occurrence should be planned for during the development of any tree management strategy.

Water is often the most important factor limiting tree growth. Trees growing in urban conditions are generally more susceptible to damage from lack of moisture than from inadequate soil volumes and poor soil structure. Underground irrigation systems can help trees withstand stresses such as insect and disease infestations. Reducing drought stress through the proper use of an irrigation system can increase the likelihood that newly planted trees will reach maturity, and can provide older trees with a consistent source of moisture during droughty periods.

Damage to Trees

Underground irrigation systems can help to establish trees in the landscape, but improper installation and use of these systems can create serious tree health issues. Root damage and overwatering are the most common problems associated with underground systems that are installed to irrigate trees or turfgrass.

Root Damage

Research has shown that tree roots can travel a distance from the trunk over two-and-a-half times the height of the tree and that over eighty-five percent of the root growth occurs within eight-



There are a number of ways to make sure young trees are watered properly and sufficiently.

een inches of the soil surface. Roots are often severely damaged or entirely destroyed during the installation of underground piping for an irrigation system.

In many cases, trenching, vibratory plowing, or earth sawing operations produce vertical cuts through the soil to depths over twenty inches, cutting any tree roots growing in their path. The damage this does to trees may not show up until months or years later, and because the root severing took place underground - out of sight of the property owner or contractor - it may be very difficult to diagnose.



Tree roots are too often disregarded when construction takes place. Great care and planning is required to prevent root damage.

Tree wardens and other landscape managers should develop a tree protection plan to minimize potential impacts to the root zones of the trees during the installation of any underground system. Without planning for the protection of trees growing in the vicinity of the installation of an underground irrigation system, tree root damage is likely to occur.

Horizontal directional drilling is one of the most useful, tree-friendly techniques for installing irrigation or other utility piping. Trenchless technology involves the use of a specialized boring head that tunnels beneath a tree's root zone and limits damage to its underground life support system. Since most tree root growth occurs in the top eighteen inches of soil, directional drilling is used to pull piping or conduit at depths safely below the root zone. Today a wide variety of affordable trenchless technologies are available from several manufacturers.

Over-watering

Another serious problem affecting trees that results from underground irrigation systems is over-watering and soil saturation. Many times irrigation systems are installed and then programmed for automatic operation. Since many of them are installed primarily to water turfgrass, the effect on nearby trees is not considered. This can cause over-watering of the root zones of trees and result in reduced oxygen saturation or shallow root growth. Shallow root systems are prone to a variety of problems including wind throw and reliance on artificial watering regimes. However, it is possible for

trees and turfgrass irrigation regimes to coexist successfully. Proper watering for good turfgrass growth can compliment healthy tree root growth. Deeper and less frequent watering can encourage healthier root growth for both turfgrass and trees.

Suggested Readings

Harris, R.W. 2004. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 3rd edition*. Englewood Cliffs, New Jersey: Prentice Hall.

A tree care classic, this book provides a thorough scientific review of arboriculture. Much of the latter half contains extensive information on tree insects and disease.

Shigo, A.L. 1991. *Modern Arboriculture: A Systems Approach to the Care of Trees and Their Associates*. Durham, New Hampshire: Shigo and Trees, Associates.

Based on the author's many years of scientific inquiry into tree healing processes, this book is an excellent guide to understanding the "how and why" of proper tree pruning. It is not too technical and is very entertaining.

American Elm *Ulmus Americana*

Sometimes called white elm or soft elm, it is native from Newfoundland to Florida, west to foot of the Rockies. Historically this tree has been regarded as the best tree for urban sites. Although once the most commonly planted shade tree in America, many have died due to Dutch elm disease. There are a number of cultivars with varying degrees of resistance to the disease. The tree grows quickly when young, often forming a broad to upright, vase-shaped silhouette. Leaves are alternate, oval to oblong in shape, 3-6 inches long with double serrations on the edge and an uneven base. This is a tall tree growing up to 80 feet with yellow fall color.



CONNECTICUT DEPARTMENT OF TRANSPORTATION AND PUBLIC TREES

R. Bruce Villwock

Public safety and the conservation of public trees along roads and highways can be precarious at best. Hundreds of thousands, perhaps millions, of trees that vary greatly in species, age, height, diameter, form, health, and condition help define the character of Connecticut's landscape. In fact, the Connecticut tourism industry is highly dependent on trees. And where does the visiting tourist first spot the state's majestic giants? On our roads and highways.

The Connecticut Department of Transportation maintains 5,700 miles of multi-lane and secondary highways throughout the State of Connecticut. Because trees are subject to the vagaries of our tough New England climate - ranging from lengthy droughts to devastating ice storms - keeping roads safe to travelers is a profound and difficult challenge that requires maintenance of associated vegetation.

To accomplish this, Connecticut is divided into four maintenance districts. District offices are located in New Haven, Norwich, Rocky Hill, and Thomaston. In addition, there are fifty-one highway maintenance facilities located throughout the state. From these facilities, equipment and personnel perform highway-related maintenance operations, including snow and ice removal, in addition to vegetation management.

One Landscape Designer is assigned to each district. The District Landscape Designer is in charge of care and maintenance of trees and vegetation within the Department of Transportation's right-of-way. Overseeing the District Landscape Designers, from the administration building in Newington, is a Staff Maintenance Landscape Designer.

The Staff Maintenance Landscape Designer provides technical support to the department and to the District Landscape Designers. The Staff Maintenance Landscape Designer is a member of Scenic Road Advisory Committee and Connecticut Urban Forest Council. The four district landscape designers and the Staff Maintenance Landscape Designer are Certified Tree Wardens. Connecticut Urban Forest Council, Connecticut Tree Protective Association, and the Tree Wardens' Association of Connecticut provide the landscape designers with additional education and a working relationship between the Connecticut Department of Transportation and people interested in the care of public trees.



The Connecticut Department of Transportation plays a very specific and critical role in the retention, maintenance, and replacement of public trees along state highways and roads. The department recognizes its responsibility for increasing our quality of life. This is the common goal the agency shares with others who are responsible for, and interested in, Connecticut's urban and community forests.



No telegraph, electric light, or telephone company shall cause to be cut down or injured any tree growing on the highway, for the purpose of constructing or maintaining therein any telegraph or telephone fixtures or wires, without the written consent of the adjoining proprietor.

Chapter 118, Section 1

In Act for the Protection of Trees growing on Highways

Connecticut Public Acts, 1886



- Bob:** We often think of community forestry as planting new trees. But just as important is protecting those that are already established.
- Glenn:** Yes, it's very easy to damage existing trees and their roots during construction projects.
- Bob:** It's also easy to avoid damaging trees.



Chapter 13

Tree Protection during Construction

Robert M. Ricard

Construction projects routinely cause extensive and irreversible damage to public trees. Road and sidewalk grading, trenching for underground utilities, new buildings, additions to existing ones, and the construction of recreational facilities all put stress on trees. Roots are severed and suffocated, trunks are bruised and gouged, branches are torn off, and soil is compacted. It is, however, important to realize that measures can be taken that will minimize damage to trees during construction.

Start Early

The most effective and least expensive tree protection programs are those that include planning for tree protection even before construction begins: Tree protection must be part of the construction planning process. Choosing where the project will actually be located on the ground should take into account the natural resources, including community trees, which will be affected by its construction. It should be kept in mind that many development projects on private land do negatively impact the community forest, especially by the location and design of new roads, sidewalks, and utilities.



It is important to have a person who is well trained and experienced in tree protection methods participate early in the construction planning process. This person might be the municipal tree warden, the tree board chair (or representative), or a hired contracted, licensed arborist. Unfortunately, it is often poor interagency communication, as well as insensitive construction techniques, which cause damage to or destruction of public trees.

Here's an example of an actual event. A municipal planning and zoning commission approved a site plan for a new development. The plan included a new road that merged into an existing municipal road. A healthy, vigorous white oak tree was located in the public right-of-right, right where the new road was proposed to join the existing town road. The construction chief called the tree warden for permission to remove the tree. The tree warden refused – which is their prerogative - since the tree was sound and since they believe the road could have been sited twenty-feet away from the tree. The construction company complained to the zoning enforcement officer and the planning and zoning commission. They, in turn, contacted the tree warden. The first selectman was also contacted by the company's attorney and a complicated situation turned political. The construction company was losing money from the delay and sued the town for compensation. And so on, and so on.

This problem could have been avoided if there had been effective interagency communication right from the start. The planning and zoning commission should have asked the tree warden to participate in the review of the site plans. The developer's design professionals should have been more sensitive to retaining trees.

The lesson is clear: Be sure that all the related and affected state agencies (e.g., Connecticut Department of Transportation), utilities (electric, gas, and communications) and local departments, commissions, and officials (e.g., planning and zoning, conservation, inland wetlands, public works, water and sewer, and tree warden) are communicating in an effective and timely manner.

Evaluate the Resource

Having an up-to-date community tree inventory that indicates size, condition, and location, and also recognizes historic or otherwise notable trees is a great asset in evaluating the potential effects of new developments. Remember that not every tree is worth preserving and removal of trees can

sometimes be an opportunity to plant more appropriate ones, or to enhance the diversity of the community forest. Keeping the 999th Norway maple in town, or a half-dead white ash tree, may not be in the community's best interest. Requiring construction design drawings to accurately document the location of all tree trunks and driplines by species within the project area is very helpful in the evaluation process. It may also be appropriate to appraise the monetary value of the trees that will need to be removed for the project.

How Construction Projects Can Damage Trees

It is pretty obvious that breaking tree limbs and branches, and smashing tree trunks with equipment should be avoided. What is not so obvious is the impact of construction on the root system. Being ripped apart during earth moving activities, including digging for foundations, digging trenches for utilities, and during site grading operations, can all seriously damage roots.

Another even less obvious construction danger to roots is compaction. Tree roots need air, water, and space to grow in. Soil is composed of little particles of minerals and organic matter, and there is often a relatively large amount of space, called "pore space" between the particles. It is through these pores that surface air diffuses into the soil and rainwater also percolates down through it. Pores also provide the space in which roots can actually grow between solid soil particles. Application of heavy weight to the soil surface crushes the particles together and reduces the amount of pore space in the soil. Roots die when they can't get enough air and water to survive, even if they aren't actually crushed themselves by the weight. Since a majority of a tree's root system is usually located within the upper two feet of soil, damage by compaction can drastically affect a tree's ability to take up water and dissolved minerals through its root system. If enough roots die, the tree's structural stability can also be affected.

Soil compaction is difficult to reverse and the best strategy for protecting root systems is to avoid it as much as possible. Compaction can occur by driving heavy vehicles over the root system, especially rubber-tired ones like cement mixers. Tracked vehicles spread their weight over a much larger surface area and tend to cause less compaction damage. Repeated driving and parking of pas-





The Olin Pin Oak was protected before, during, and after construction on the Connecticut College campus.

senger vehicles and pickup trucks can also damage soils. Stockpiling of heavy materials on root zones of trees to be preserved should also be avoided, as should procedures that can introduce toxic substances into the soil, like fueling vehicles or changing oil in machines.

Site alterations such as changing the grade of the ground around trees can also have profound effects on tree growth. Since much of the rootsystem is so close to the surface, adding or removing even six inches of soil over the root zone can be very detrimental. Large-scale cuts and fills should be avoided around trees, or it must be realized that trees can't survive for very long in their presence. Alternative strategies like removing the trees if the grade changes are absolutely necessary, or redesigning with retaining walls or other mitigating structures should be considered.

Establish a Tree Protection Zone

After deciding which trees simply must be removed, protection measures should be developed for those that will remain. Such measures may include pre-construction pruning to remove branches or parts of root systems that will actually hamper construction activities. Then one or more Tree Protection Zones should be established. These are areas fenced off to protect the trees, and especially a reasonable amount of roots, from damage during the construction process.

A common question is “How large should the Tree Protection Zones be?” The simple answer is that there are no simple answers. This is because we never really know where the roots are located. We do know that roots grow mostly in the upper two feet of soil and they grow out as far from the trunk as water, air, nutrient availability, genetics, and time allow. It should also be recognized that healthy



Trees especially trunks and root, are often damaged during construction.

trees can sustain some damage to their root system and survive fairly well, albeit with retarded growth for a period of some years afterward.

It would be ideal to keep construction activities and materials completely away from any areas that might have tree roots. Since this is not economically feasible, the goal is to reach an economic and ecological compromise. A good rule-of-thumb is that the Tree Protection Zone should be, at minimum, the size of the area under the tree or tree stand's dripline for broad canopy trees like oaks and maples. For more slender trees, like many conifers, one-and-one half to two times the area of the dripline is more appropriate. Some professionals recommend that the radius of a circular Tree Protection Zone be equal to the height of the tree.

In terms of the type of fencing used to isolate the protection zone, six foot tall chain link is a much more noticeable and substantial barrier to large construction equipment, compared with more typical four foot plastic snow fencing that can be so easily violated.

Other Considerations

In situations where there is clearly some root loss on trees to be preserved, mulching and supplemental watering both during and after construction should increase chances of healthy survival.

For trenching projects like the installation of water, gas, or sewer lines, there are techniques available to auger a channel beneath tree root systems rather than digging away the soil and roots from the top down. These alternative techniques are more expensive and time consuming, and may not be necessary if the trench is far enough away from the trunk. Remember, however, that if the trench is very close to the trunk, the tree could be losing fifty percent of its root system, severely reducing both its ability to survive and its physical stability.

Construction documents should clearly state, and show in detailed drawings, all tree protection measures required on a given project. On larger jobs, it will prove very valuable to have a tree care specialist on site during construction, as a person who can both train the construction personnel in tree protection protocols, and deal with daily tree protection issues.

Selected Readings

Metheny, N. and J.R. Clark. 1998. *Trees and Development: A Technical Guide to Preservation of Tree during Land Development*. Savoy, Illinois: International Society of Arboriculture.

Trees and Development has a technical, but not overly specialized approach, to tree preservation and is the best resource available to date. Aimed at design and tree care professionals, it is still written in an accessible style with lots of good illustrations, photos, and plan drawings.

Watson, G.W. and D. Neely. 1995. *Trees and Building Site*. Savoy, Illinois: International Society of Arboriculture.

This book approaches the subject from the perspective of damage to trees (five articles), building and infrastructure damage caused by trees (six articles), and tree protection and preservation (eight articles).

Connecticut Council on Soil and Water Conservation. 2002. *Connecticut Guidelines for Soil Erosion and Sediment Control*. CT-DEP Bulletin 34. Hartford: Connecticut Department of Environmental Protection.

Chapter five, section one is all about tree protection in this recent update of a handbook that should be a primary reference for all construction site design and activities in Connecticut. It is a well-illustrated overview of the subject. The rest of the book has much that also impacts the urban and community forest.





PART FOUR

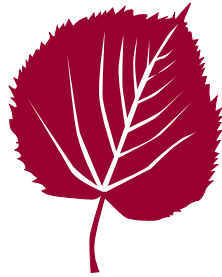
Managing Community Forests

Forestry is managing trees in large units. Understanding why a community needs to manage its public trees as a system, and then how to do, is critical for the long-term sustainability of the urban ecosystem. Knowing what the resource is composed of, what its value is, the risks associated with it, and the laws that govern it, is essential.



Bob: Knowing the location, species, and condition of public trees is often a first step in planning for a community's forest.

Glenn: And it's often a great way to get the public actively involved in their community.



Chapter 14

Tree Inventories: How to Quantify the Community Forest

Robert M. Ricard

Knowledge of tree species, age, location, health, management needs, wildlife potential, new planting locations, tree risk, affects on sidewalk, and degree of insect and disease infestation is all information that can help in the community forestry planning process. A tree inventory may include all, or more typically, only some of this information. A tree inventory might just be for street trees, or it might include trees on other municipal lands like schools and cemeteries. It might even incorporate all the trees within the political boundaries of the community and include both public and private trees – a very large, often cost prohibitive, task. In short, an inventory might include one-hundred percent of the resource, or, just a portion – a sample.

To decide whether or not an tree inventory is required for your community forest program (and if it is required, on what scale), it should be kept in mind that the inventory is not an end in itself

but forms the basis for better community forest planning and management. In other words, an inventory can be the best one ever completed, but if it just sits on a shelf, it is worthless. Even worse, the time, money and labor that went into doing the inventory might have been better applied to another community forestry effort.

Knowledge of the number, species, and condition of the trees in an area can provide the answers to such questions as “what do we have to do to get this forest into better shape” and eventually, “how much funding, equipment, and personnel will it take to reach this improved condition?” In addition to serving as a basis for community forest management, it can even be used to educate policy makers about the value and importance of the community forest. When integrated into powerful geographic information systems, data from inventory and geographic information systems generated maps can be a powerful public policy persuasion tool.

There is also value in the inventory process itself, which can be an excellent way to garner volunteer participation and thereby secure public acceptance. Through volunteer participation, members of the public will evaluate hundreds of public trees, and they will discuss their observations and experiences with other public-spirited citizens. In this way, important allies are found for the community’s forestry program.

Types and Methods of Inventories: Complete versus Sample

There are two basic approaches to conducting a tree inventory: a complete, full-scale inventory of the community forest resource (tree population), or a representative sample of it. Both approaches can be effective, and the goal of each is to produce an accurate description of the community forest. The difference between these two approaches is largely time and money - a partial sample is cheaper and takes less time than a complete inventory. While a complete inventory may be more precise, a properly done sample can be accurate enough for the communities’ needs, when resources are limited. The success of sampling depends upon how well it is designed. If the sample is not actually representative of the population as a whole (the total community forest) the information will be inaccurate.

A down side of sampling is that, regardless of how representative the sample of the population is, there will always be some uncertainty associated with the results. For example, public opinion polls, which are a familiar type of representative sampling, are always qualified with an error factor of plus or minus several percentage points. Samples of the urban forest population would have a similar error factor.

In designing a sample to be both reliable and cost effective, one must balance the number of trees counted with the degree of uncertainty that is acceptable. In general, the more trees there are in the population as a whole, the fewer trees one needs to count to achieve the same degree of reliability. The cost and efficiency benefits of using sample methods to survey community trees are apt to be greater for a larger city than they would be for a medium-size city or a town.

Inventories, in which every tree is counted, have several benefits that cannot be realized by using sampling techniques. For one, the degree of reliability is much greater with a complete inventory, since the only errors are apt to be those that occur in data gathering or in recording the data. Secondly, a complete inventory allows individual trees to be tracked opening up many possibilities. For example, inventory data can be located on a map as individual record points, and these record points can be digitized and incorporated into a geographic information system. This data on individual trees can be updated as tree work is done. When information is sought on individual trees, such as when there is an opportunity to assess the impacts of town projects on specific trees, this information is immediately available. If information on individual trees is kept up to date, then potential changes in the community forest can be rapidly evaluated. Unfortunately, it is often difficult for towns to continuously update the inventory as tree removals, replacements, and maintenance occur.

Professional Consultants versus Volunteers

There are essentially two ways to get the work done: contract with a consulting group or do the survey with in-town resources (i.e., staff and volunteers). If immediate results are paramount, it is probably best to hire a professional consultant. Their experience and ability to put in long hours and their access to state-of-the-art equipment helps ensure that the inventory gets done.

On the other hand, research conducted by Dr. David Bloniarz of the USDA Forest Service has shown that properly trained volunteers can perform an inventory that is both timely and reasonably accurate. The key to success is to have volunteers with sufficient training to match their enthusiasm working with a skilled, well-trained, and experienced professional consultant as the inventory proceeds. Organizing a volunteer based inventory requires the clear setting of program goals and clarification of the methods that will be used to achieve them. For example, if the goal is to inventory all street trees in a municipality by species, size, condition, and impacts with other infrastructural features, then state that explicitly. If the data will be incorporated into a town geographic information systems map, then decide how this will be accomplished. Will the volunteers mark tree locations on a paper map? Will they be equipped with a geographic positioning system unit? It is important to plan ahead before assembling the individuals to perform the work.

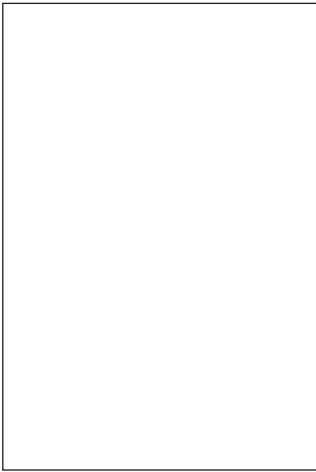
Before fieldwork begins, equipment choices must be made. Data may be recorded on paper or may be input directly into a portable electronic device, such as a personal digital assistant or handheld computer. The measurement of tree diameter (commonly referred to as diameter at breast height or DBH and defined as four-and-one-half feet up the trunk of the tree) might be done by means of a Biltmore stick, diameter tape, or calipers. Equipment decisions are often based on what is already available and what individual team members are familiar with.

Volunteer Training

Ideally, volunteer training should involve at least twelve hours of combined classroom time and field experience. It should start with a short, half-day or evening session that introduces the various aspects of a tree inventory including what volunteers need to know and what they should expect during the project. This should be followed by a daylong session in which all of the inventory details are explained. Actual proficiency in gathering data during an inventory does not usually occur until the volunteers have spent some time in the field looking at trees and recording data. Experienced volunteers can be very valuable to new volunteers at this point.



Learning to measure tree diameter simple.



Chris Donnelly in orange vest with group of people.

Inventory volunteers typically work in teams of three, with one person functioning as the tally person, to record the data as it is collected, one person measuring the tree diameter, and one person assessing condition. A suggested routine for a team is for the tree measurer to walk immediately up to the trunk of the tree and measure diameter at breast height. The tree measurer then calls out the species and diameter at breast height which the tally person records. Meanwhile, the tree assessor walks around the tree examining it and, after the measurer is done, calls out the overall condition of the tree (e.g., good, fair, poor, dead) and any of the other specific conditions that might be requested on the survey form (e.g., the presence of weak forks, interfering overhead wires).

The completion of an inventory or a sample without the assistance of a computer is difficult to imagine. There are so many records to keep track of (there are, for instance, as many as 10,000 to 20,000 street trees in moderately sized Connecticut towns) and so many calculations needed to obtain the desired statistics, that the project would be otherwise impractical for most communities without computer resources.

This leads to questions about what software programs to use. The choice of software will largely depend upon the ultimate number of records, the degree of manipulation desired and the purposes for which the information will be used. Readily available programs such as Microsoft Excel and Access work in most cases, but may have limitations for a particular community's needs. For example, they may have to be programmed to handle specific calculations and other data manipulations. More sophisticated database programs may be required to handle larger inventories, or inventories involving more complex data manipulation. One way around this difficulty is the use of "off the shelf" inventory programs specifically developed for street and public tree inventories – and there are many of these available free or for a fee. If data is collected on paper field sheets, data entry to the computer program may be another excellent volunteer opportunity.

After the First Inventory

It is important to remember that, just as trees are living, growing organisms, populations of trees are dynamic and always changing. Inventories and samples start getting out of date the moment

that they are completed. Inventories in particular begin to lose accuracy as the trees grow, die, are damaged, are pruned or removed, and as new trees are planted. Unpredictable events, such as ice storms or hurricanes, can significantly affect a tree population overnight, and dramatically reduce the accuracy of an inventory or sample.

For these reasons, inventories, like trees, must be maintained. Plans should be made to do periodic resurveys to keep the inventory current. If the inventory is integrated into the record keeping process used by the municipality for maintenance, removal and replanting, this may also be a way of keeping records up to date.

Suggested Readings

Miller, Robert W. 1988. *Urban Forestry: Planning and Managing Urban Greenspaces*. Englewood Cliffs, New Jersey: Prentice Hall.

Miller provides an excellent overall textbook on urban forestry, with a strong chapter on street tree inventories. Also, there are good chapters on planning and managing the community forest.

National Arbor Day Foundation. 1994. *How to Conduct a Street Tree Inventory*. Tree City USA Bulletin No. 23. Nebraska City, Nebraska: National Arbor Day Foundation.

This organization has for years provided simple yet excellent references for public tree management and care. One of the more important publications is on street tree inventories. Although simple in format and content, this publication provides readers with an excellent introduction to the subject.



Identifying the tree by genus and species name is the first information to gather.

THE CONNECTICUT URBAN FOREST COUNCIL

The Connecticut Urban Forest Council, Inc., is a state-wide, nonprofit organization that provides advice, assistance, educational opportunities, information, and support to urban and community forestry professionals, associated professionals, municipal, state and corporate leaders, and volunteers. The board of directors of the Council consists of representatives from Connecticut environmental state agencies, universities, research institutions, corporations, professional interest groups, and community forestry and environmental volunteer organizations.

The Council seeks to:

- Increase the number and quality of urban and community forestry programs in Connecticut towns and cities.
- Inform community decisions makers, legislators, and the public about the essential benefits derived from public trees and community forests.
- Provide continuing education and make educational resources available to arborists, tree wardens, foresters, elected officials, volunteers, municipal employees, and others practicing urban and community forestry in Connecticut.
- Develop policies designed to promote progressive and appropriate urban and community forestry programs and practices.
- Serve to coordinate and direct urban and community forestry efforts in Connecticut.

The Connecticut Urban Forest Council sponsors an annual state-wide conference. Each year experts from Connecticut, the region, and nationally provide participants with information on the most current research findings and on progressive community forestry programs. In addition, at the conference people share success stories and common problems and issues. The Council also recognizes exceptional community forestry volunteers, professionals, and communities through the Council awards program.



There are thousands of young trees which have sprung up along roadsides which could be easily pruned to such heights and developed into excellent shade trees. Often they are thought of simply as brush and unwisely or indiscriminately removed. Some brush cutting is necessary along the roadsides, but it can easily be carried to excess.

Publication No. 18, *Roadside Shade Trees: A Manual of Roadside Improvement for Tree Wardens and Others Interest*, Connecticut Forestry Association, January 1928



Bob: When people think of tree benefits, they usually think of environmental ones. But public trees also have economic value which can be quantified.

Glenn: People can use this information in a variety of ways - from computing the replacement cost of the shade tree in their front yard, to estimating the total value of the community forest.



Chapter 15

How to Value Trees

Scott Cullen

Ecologists tell us that trees and all other living things have value based on their functions in an ecosystem. This is sometimes called intrinsic value. A sense of such basic value may underlie a community's appreciation of and desire for trees. In community forestry, however, we often need more tangible and specific human benefits to encourage and secure support for trees by the public and elected officials. The purpose of this chapter is to discuss ways to define the value, monetarily and otherwise, of a community's public tree resource.

Qualitative and Quantitative Benefits

Values such as "shade is nice" are subjective and qualitative. While some people may consider the shade of a sugar maple in a park to be nice on a steamy day, others may find that same shade on the community vegetable garden or wading pool not at all beneficial. Some residents would prefer that there were no leaves to rake.

It is better to discuss benefits in more specific terms. We can, for example, report that trees reduce summer cooling and winter heating costs, clean the air, and reduce the costs of storm water

management. These benefits can be quantified in terms of both monetary savings and physical units, like the quantity of pollution particulates intercepted. The USDA Forest Service has done extensive research to back up these benefits with hard, scientific data. Valuation tools are available from USDA Forest Service research stations. American Forests (a national non-profit forest conservation organization) has also developed CityGreen[®] - a computer modeling program - for urban ecosystem analysis. These tools look at entire populations of trees, public and private. When considering the value of a community's trees, we must be aware that most of the trees are likely to be privately owned.

We can assert, qualitatively, that trees add to property value. Many residents understand this intuitively. A survey of Connecticut Realtors[®] by Arbor National Mortgage in the 1990s confirmed it. A pioneering study at University of Connecticut in the 1970s actually quantified this contribution. Various studies have found that landscapes contribute from about four percent to about twenty-four percent to the value of residential property. Trees are typically a significant part of the landscape. This fact should encourage residents to plant and care for trees. From the community perspective, higher property values mean a higher tax base.

We can also state, qualitatively, that trees contribute to the quality of life. Social scientists have started to focus on these benefits and have documented, for example, increased spending in retail districts and reduced crime in public housing because of trees.

Tree values can also be quantified in explicit, monetary terms. A typical reason would be for compensation if a public tree or shrub is removed or damaged, for example, by trespass, a vehicle accident or unauthorized works. The Connecticut Legislature recently amended the General Statutes Section 23-65 to allow fines up to the appraised value, as well as civil liability, for damages to public trees or shrubs. The statute requires public officials with appropriate jurisdiction to determine appraised values according to regulations adopted by the commissioner of the Connecticut Department of Environmental Protection. The statute and current Connecticut Department of Environmental Protection regulations allow appraisals in accordance with the *Guide for Plant Appraisal*. The Guide must be applied by a qualified specialist. Some, but not all, tree wardens, licensed arborists, forest practitioners, or registered landscape architects may have the necessary qualifications. If a municipality or other public agency does not have a qualified appraiser on staff, it is



Tree lined streets increase pride
in community.

appropriate to use a qualified outside appraiser. Even if a public official is qualified, it is often appropriate, for example if litigation is anticipated, to use an independent expert.

There are other reasons to estimate monetary values for public trees. The *Guide for Plant Appraisal* is an appropriate tool in these situations as well. If particular specimens or groups of trees are subject to unauthorized damage during authorized public works, they can be valued ahead of time and the public agency and responsible contractors can enter into agreements specifying the amount to be paid, with or without additional penalties, if trees are damaged.

If particular specimens or numbers of trees require greater than routine maintenance expenditures, these can be compared to the estimated value of the trees before and after the expenditures to determine if there is sufficient potential benefit to justify the expenditures.

If a community undertakes a tree inventory, the entire population can be valued using a simplified implementation of the *Guide for Plant Appraisal*. This aggregate valuation can be used, for example, to estimate the cost to replace all or part of the population after a natural disaster, justify routine or extraordinary maintenance budgets or capital replacement budgets, or to estimate a community's vulnerability to pests such as Asian long horned beetle or emerald ash borer. Connecticut has already experienced extensive and very expensive loss of American chestnut and American elm trees from chestnut blight and Dutch elm disease.

Connecticut state statutes relating to the value of privately owned trees are currently much less explicit than Connecticut General Statutes Section 23-65. If individuals or community groups have a need to appraise the monetary value of privately owned trees in the event of damage or loss, they should seek qualified legal advice.

In summary, trees provide demonstrable benefits and value. We may consider these values in a general, qualitative sense to promote awareness and justify community tree management. We can understand and communicate these values simply by being well read. We may also consider these values in a quantitative and monetary sense. Explicit, quantitative values may require specific tools and expertise. In any case, an understanding of tree value is an essential element of informed and effective community tree management.



Trees in the landscape can increase property value 10 to 50 percent.

Where would you rather live?

Suggested Readings

Carey, A., C. Donnelly, R.M. Ricard and C. Berger. 2001. *Connecticut General Statutes and Regulations of Interest to Arborists, Tree Wardens and Forest Practitioners*. Storrs: University of Connecticut Cooperative Extension System.

Also known as the “Connecticut Tree Law Book,” this is a handy compendium. Of particular interest in this context are CGS 23-65(b) (pp. 88-89) which covers the monetary valuation of damaged public trees and CGS 52-560 (p. 106) which covers the monetary valuation of damaged private trees and additional penalties for damaged trees whether public or private. The reader should always seek competent and current legal advice.

Council of Tree and Landscape Appraisers. 2000. *Guide for Plant Appraisal, 9th edition*. Savoy, Illinois: International Society of Arboriculture.

“The Guide” is the generally accepted reference for the monetary valuation of landscape or amenity (non-forest product) trees. It is specifically referenced by Connecticut General Statutes 23-65a. The Guide must be applied by a qualified plant appraiser using current, local plant cost and suitability data. It is an indispensable reference for the legal professional or urban forest manager who must rely on qualified plant appraisers. The user should always refer to the most current edition.

Miller, R., ed. 2003. “Social Values of Trees.” *Journal of Arboriculture*. 29(3): 1- 87.

The *Journal of Arboriculture* is the peer reviewed periodical of arboriculture and urban forestry in the United States. This particular issue contains a series of articles that focus exclusively on the economic and social values of trees. An article by Wolf deals with urban retail districts and highways. Another article by Kuo focuses on arboriculture and social ecology. And a third article by Westphal looks at the social benefits of urban greening. Together they cite a broad range of relevant literature.



- Bob:** After I attended my first hazard tree/risk assessment workshop, I never looked at trees the same way.
- Glenn:** I know what you mean, all trees are potential hazards. But since they provide so many essential benefits, we need to effectively manage for risk.
- Bob:** So the object is to balance tree conservation with public safety.



Chapter 16

Tree Risk Management

David V. Bloniarz

Tree wardens, municipal arborists, and urban foresters are responsible for maintaining public trees that are safe from problems or defects that could lead to property damage or personal injury. The protection of the public from “risk trees” must be a major component of any community forestry program. Additionally, trees growing on private property can also present a risk if they exhibit characteristics that meet the criteria outlined here. There is a general consensus among professionals as to what classifies a tree as a risk and how to rectify the problem once it is identified.

By definition, a risk tree must contain both a structural flaw – which could cause the tree, or part thereof, to fail – and a target of some value or importance. A target can be a vehicle, building, or a place where people gather such as a park bench, picnic table, street, or backyard. In addition, a tree may be determined a risk if it stands in an environment that might contribute to the potential for failure. Examples of this situation would be sites that are prone to high wind or wet soils. Another problem that must be considered when inspecting for risk trees are trees planted too close to traffic signals, roadway signs such as stop or speed limit warnings, and street lighting, since branches obscuring such signs or lights could lead to traffic accidents, personal danger, or injury.

Trees in urban and suburban areas can also create risks to pedestrian and vehicular traffic with low branches that block sidewalks or streets. The recommended minimum street clearance for vehicular thoroughfares is fourteen feet. This height allows vehicles, such as standard-sized tractor-trailers, fire trucks, trash and recycling trucks, to pass without damage to the tree or vehicle. Sidewalk clearance is recommended to be a minimum of ten feet. Nevertheless, one can walk or drive through many neighborhoods, both urban and rural, and find streets and sidewalks without the recommended clearances.

Trees can also present a hazard in community settings as a result of root growth. Planted too close to sidewalks and curbs, trees may grow roots that can interfere with the adjacent physical infrastructure. Tree roots searching for oxygen, water, and nutrients will upset or damage concrete sidewalk slabs quite easily. This is especially obvious when trees are planted in the utility strip or “tree belt,” where soil conditions are frequently poor and droughty. In search of better growing conditions, tree roots travel under the sidewalk to nearby residential lawns or to seams in the sidewalk. Over time, the roots grow in diameter and lift up the sidewalk, creating a trip hazard. Such a trip hazard has the potential to result in a large lawsuit if personal injury occurs.

Another risk tree situation that is often found in communities deals with utility lines, both above, and below ground. Utilities across the country spend over one million dollars per day clearing trees around power lines along roadways. In spite of this, power failures often occur as the result of tree-related impacts. In these instances, the trees present problems that are not necessarily the same type of risk as a tree’s structural failure, but are nonetheless threats to the safety of a community’s residents. In severe weather, even structurally sound trees may fail. From this brief introduction, it should be clear that every community needs to analyze its tree risk potential in a systematic way. Because of the natural variability of trees, the severity of their defects, and the different sites upon which they grow, evaluating trees for defects and risk potential can be a complex process. Inspecting trees for potential risk or liability is one of the most important components of any tree management system. Judging potential for tree risk, budgeting for their removal, and developing a timetable for action is critical to protect the safety of those who live, work, or relax near trees.



Trees can live a long time but they do eventually succumb and “die.” A tree can need to be removed before every last bit of living tissue is dead in it.

Rating and Establishing Priorities

A tree risk rating system is essential to ensure that appropriate and reasonably consistent criteria are used to evaluate the relative liability of a tree. Using a rating system allows managers to set priorities for risk tree management and enables the development of realistic fiscal budgets needed for their removal or remedy. Many rating systems are available for use, based on the specific land-use or landscape setting. For example, the identification of potential risk trees along a rural roadway is quite different than examining trees in an urban park setting. Methods and criteria for ranking potential risk trees are different in each setting, and the ability to accurately complete assessments in these locations varies in many ways. Various types and complexity of inspection can be considered based on the location and pattern of usage in a particular area. For example, trees growing in urban areas with lots of nearby structures, traffic, and pedestrians, need closer examination than those growing along a rural, less traveled roadway. Visual inspections are the general method that is used to examine trees for risk potential, and may range from a simple “windshield survey” to a complete inspection of the tree, including its crown, branches, and trunk.

It is essential that a community’s tree risk management program be systematic. This point cannot be overemphasized. In a court of law, a plaintiff must prove negligence on the defendant’s part in order to win a lawsuit. Negligence arises from: one, the responsibility to maintain safe trees in the community; two, a subsequent breach of that responsibility, such as when a risk tree is not removed; and three, damage or injury resulting from the breach of responsibility. For example, negligence may be proven if a risk tree failed and damaged a car.

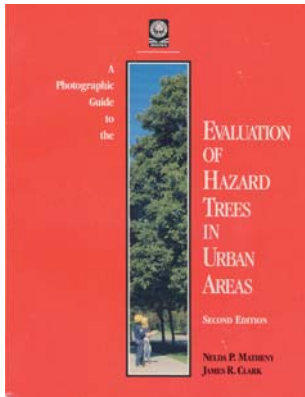
In most instances, it is impossible for a city or town to remove all the risk trees growing along its streets and in its parks – sufficient resources (people and money) simply are not available. A municipality, therefore, must abide by the “reasonable person standard.” The standard is used to judge if an action was reasonable and prudent. More simply, would a reasonable person, given the same situation, have behaved similarly? The best way for a community to follow the reasonable person standard is to develop a written, systematic procedure for locating and evaluating risk trees. Because it is often not feasible for a community with limited fiscal and personnel resources to remove every risk tree, hav-

ing a systematic procedure, in writing, is the best defense against negligence. The procedure should detail a rating system that ranks trees based on their risk of failure and potential to cause damage. The procedure should also provide a standard timeframe for inspecting, on some level, the community's trees.

It is reasonable for a community to annually inspect their street trees in high traffic areas in parks, conservation and recreational settings, and areas around public buildings. The extent of the inspection will vary, given available resources, but some form of inspection should occur annually. In some cases, this might be simply a windshield survey, where a qualified inspector drives each city street in the course of a year and looks for major and obvious defects in trees, while in other cases the inspection will be a more detailed, close-up inspection that will review the tree from a full 360° perspective. As long as the procedure is standardized, systematic, appropriate for the landscape type, traffic or usage intensity, and established in writing, a municipality can justify this inspection system given fiscal and personnel resources available within the community. If adequate funding is available, towns can undertake more complete and intensive surveys and then spend more inspection time on each tree, annually inspecting every street tree. One exception is trees in low priority areas, such as those not along public roadways. After undertaking an initial risk assessment inventory, the urban forester can identify areas of the community where target risk is so low that tree failure is extremely unlikely to cause damage. These areas can include secluded parkland, low-use trails, and wildlife habitat areas. If it is reasonable to do so, surveying high-risk areas, such as downtown business districts, should occur more frequently than in undeveloped nature areas and remote open space areas. This is a reasonable procedure, designed to reduce tree risk while addressing the fiscal realities of cost and staffing levels.



Tree roots can cause hazardous conditions, such as ? sidewalks.



Inspection Process

An evaluator must inspect each part of the tree, crown, stem, and roots, especially if root damage is suspected. Ideally, the tree should be viewed from all sides because a “windshield” survey (visual inspection from a vehicle) might miss something on the side of the tree facing away from the road. The inspector should inspect each tree in the same manner each time in order to achieve a systematic, repeatable pattern of assessment that will enable consistent comparisons to other trees and defects.

A qualified inspector, experienced in arboriculture and tree maintenance, should perform the risk tree assessments. Ideally, a Licensed Arborist or Certified Tree Warden should complete the inspection, or supervise field inspectors. Anyone performing risk tree assessment should continuously seek information and training to keep current of new methods and to maintain a high degree of skill. Municipalities that do not have qualified personnel on staff may contract with a consulting Licensed Arborist to do the inspections.

In the crown, the inspector looks for problems with the branches. These can come in the form of broken, hanging branches, cracks, significant decay or cavities, or dead branches. It is recommended that a threshold for defective branch size be established generally around two inches in diameter (conforming to the industry standard ANSI A300 pruning standard for crown cleaning). Smaller defective branches may be present, but do not present a serious risk. Weak branch crotches are also a common defect found in many trees. Depending on the size of the branches involved, the stress on the crotch can be severe. Weak crotches are a leading cause of branch and whole tree failure. They are found not only between the stem and a lateral branch, but also between leaders in a forked tree. Because tight, “V-shaped” crotches often have little sound wood holding the branches together, they are more likely to fail when subjected to wind stress or snow load.

Stem and branch defects are commonly associated with wounds that lead to decay and open cavities. Cankers and cracks, common in park settings, are less of a problem for street trees. Vehicular contact and vandalism are more likely causes of wounds on street trees. Again, when assessing the risk potential of a tree, certain decay thresholds need to be established, such as the thirty per-

cent strength loss limit for considering a tree a high risk. With decay, trees can be up to seventy percent hollow before they approach the thirty percent strength loss threshold. An experienced arborist has the skill to determine the safe decay limits on a case-by-case basis. As a tree defect, wood decay has received close scrutiny. Decay is common on tree trunks, branches, and roots. Anytime bark ruptures, the decay process can begin and decay in living trees is one of the most destructive forces affecting trees. In fact, many prominent scientists consider decay to be the most common hazardous defect of urban trees.

In the root zone, the inspector should look for cut roots, decay on the root crown, soil heaving or root plate lifting, and fruiting bodies in the soil indicative of root rot fungi. Trees that have lost up to one-half of their root systems should be considered a high risk. Sometimes root crown investigations are insufficient, and the inspector must excavate around the root crown to look more closely at the supporting roots. Trees without a root flare - they appear to go straight into the ground like a telephone pole - must be carefully evaluated below the ground, since root flare defects might have been hidden by the excess soil piled around them. Ultimately responsible for a tree's structural stability, the roots also provide water and dissolved minerals from the soil. Large, woody roots offer support and anchor the tree; tiny root hairs absorb nutrients and water found in the soil. Root damage or loss accounts for a large percentage of tree deaths and failures. Through a variety of injuries caused by construction, installations of irrigation systems, improper drainage, and soil compaction, roots can sustain exorbitant amounts of damage. Often, root injuries are covered with grass, fill, or concrete and this successfully hides the severity of the damage. This creates an especially dangerous situation since a casual tree examination can easily overlook damage to the root system. Symptoms of root damage are manifested in the crown by poor growth, thinning and yellowing of the foliage, as well as a general decline starting from the top of the tree. Other visible signs of root damage include bleeding wounds on the trunk; loose, peeling bark around the stem buttress; sunken areas around the lower stem; girdling roots and suckering above the root flare, and cracks extending into the stem from the soil line. Any time an inspector notices recent roadwork, landscaping, irrigation system installation, or paving near a tree, they should inspect the root system for potential damage.

A final flaw to look for is the presence of a lean or an off-balanced tree. Trees will lean as a result of various external forces. Competition for light, or in reaction to prevailing winds, some trees naturally



Bruce Spaman, Superintendent of Parks and Tree Warden for the Town of Greenwich, using a mallet to listen for the soundness of the tree to test for decay.

lean away from others. Leaning trees responding to natural forces have built up “reaction wood” and has distinctive anatomical and physical characteristics. It is formed typically in leaning or crooked stems and branches. Reaction wood tends, or attempts, to restore the branch or stem to its original position. When trees show signs of leaning, but have gradually straightened up over time, this is also usually reduces risk. These trees leaned due to a past impetus, but by straightening, they have regained an upright growth pattern, and, in most cases, will ultimately balance the crown. In scenarios where trees are unnaturally leaning, however, a risk situation often results. Poor soil conditions, mounding and cracking of the soil behind the leaning tree, and exposed roots protruding from the soil all manifest an unnatural lean, where the tree is in danger of completely falling over.

In addition to the structural defects listed above, the species of tree is an important element to consider when determining a tree’s hazard potential. Different species have different wood characteristics. Oaks generally have strong wood, which is less likely to fail than a tree with weak wood, such as willow. Because of this, similar defects on different tree species will not necessarily represent similar risk. Different species also have varying abilities to compartmentalize wounds. Certain species are prone to forming poor branch attachments, such as silver maple and American beech. Some are less likely to fail than others. The inspector must have extensive knowledge about local trees and their growth habits.

Assessment System

Given all the data an inspector would collect from the defects listed above, it is imperative that a rating system be used in order to develop a risk-management strategy for a community’s trees. This way, the inspector can assign numerical rating values to each defect and target. For example, a simple rating system would rank defects in terms of their likelihood to cause failure: a rating of one means low failure probability; a rating of three means high failure probability. Next, the inspector ranks the size of the defective part: a rating of one indicates a small defective part (between two and five inches diameter); a rating of three indicates a large defective part (greater than ten inches diameter). The inspector then evaluates the target from two perspectives – the likelihood of it being dam-

aged if a failure occurred and the amount of damage likely to be incurred from a failure. Lastly, the inspector would take into consideration the tree species. These variables would also be ranked one through three, with one indicating a low damage probability and small amount of damage and three indicating a high probability of damage and a large amount of damage occurring. When totaled, the numerical values would fall between three and twelve, lending an idea of the hazard priority of each tree.

Using a rating system similar to the sample outlined above, a community will have identified problem trees and have ranked them by a rating value. The tree manager could then start working on remedying the trees with the highest ranking, or risk, thereby reducing a municipality's potential liability. Assessment systems can be as detailed or simple as seems appropriate. Simple systems that account for fewer variables are less powerful for analysis and prediction, but would require less time and effort on the inspector's part. Currently, there are several forms for ranking trees being used by arborists. The International Society of Arboriculture has published a reference book on hazard trees, and the park agencies of California and Minnesota have been using a system designed for their parks for many years. The USDA Forest Service, Northeastern Area, has recently published a manual that outlines that agency's latest risk assessment protocol for trees in urban areas.

Corrective Action

Identifying hazard trees and then ignoring them undermines the original intent of performing the evaluation. Managers should establish hazard tree correction measures based on thresholds from the rating system. In other words, numerical or verbal ratings should correspond to a given remedial action to mitigate the problem. Corrective treatments, pruning, cabling, tree removal, moving the target, augmenting tree vigor, and excluding visitors from high risk sites are some of the options. Astute tree managers will explore all possible ramifications of any corrective action. Community opposition to removals will vary, so an urban forester must be willing to explore different options for hazard reduction. Corrective actions depend on what part of the tree is likely to fail, how likely it is to fail, and what special significance the tree might hold. Despite being a high risk, certain trees demand preservation efforts because of their historical, cultural, or physical significance.

Some communities are under the impression that if they don't know about a risk tree, then they are not responsible when it fails. Nothing could be further from the truth. In a 1994 court case in Connecticut, for example, Judge Anne C. Dranginis ruled that "all property owners – state and private, city and rural – have the legal obligation to inspect their road or street side trees for age, condition, or weakness that might make them a hazard to passersby." The key to a community's tree inspection and maintenance program, then, is to establish a systematic protocol for assessing the community's trees. The procedure should be formalized in writing and should contain methods for assigning values for tree defect severity, size of defective part, target value, and probability of defective part damaging a target. This is the most efficient way to manage hazard trees and reduce a community's exposure to liability from a tree failure.

Suggested Readings

Hayes, E. 2001. *Evaluating Tree Defects: A Field Guide, 2nd edition*. Rochester, Minnesota: SafeTrees.

This field guide provides an easy to use method for identifying high-risk trees in a community setting. The low cost, thirty-page publication is fully illustrated, simple to use and provides a foundation for determining the characteristics of risk trees. The guide also addresses various maintenance options for removing the risk from public trees and is designed to be used in the field.

Matheny, N. and J.R. Clark. 2002. *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd edition*. Savoy, Illinois: International Society of Arboriculture.

By providing a systematic rating approach, evaluations allow managers to identify hazard situations, rank their relative severity, and create a priority for work. Along with numerous illustrations, the book includes a sixteen-page section containing forty-three full-color

figures. The guide focuses on several important aspects: review of past and present site conditions; identification and assessment of structural defects in root, root crown, trunk, and crown; evaluation of likely and significant failure; assessment of the significance of the target; development of the hazard rating. The guide concentrates primarily on trees in urban areas. These environments are recognized as having unique combinations of tree species and site characteristics that place trees in proximity to a variety of targets, requiring a more systematic approach to evaluation and abatement.

Pokorny, J. 2003. *Urban Tree Risk Management: A Community Guide to Program Design and Implementation*. Washington, D.C.: USDA Forest Service.

This publication is a fully illustrated training manual that addressed the identification, management, and correction of risk trees in a community. The manual provides an extensive background on all issues related to addressing risk trees in cities and towns. The manual was designed to preserve public safety and improve the health of urban forests by providing information to assist communities in the design, adoption, and implementation of risk tree management programs. It also is a valuable aid that can be used to train field staff to detect, assess, and correct defects in urban trees.

Kousa Dogwood *Cornus kousa*

Sometimes referred to as Japanese strawberry tree or Korean dogwood, this is native to Japan, Korea and China. This is an excellent small specimen tree growing to 30 feet is appreciated both for its attractive horizontal branching and the large, white bracts around the flowers in June. Leaves are oval in shape, to 3 inches long and 2 inches across, taper-pointed, with a wavy margin, and untoothed. Foliage turns a beautiful scarlet in the fall and the red-brown bark often flakes off in large, multi-colored patches. The tree is quite resistant to the anthracnose fungus which plagues the native Flowering Dogwood.



WHY UTILITY COMPANIES TRIM ROADSIDE TREES

Connecticut utilities have one of the most heavily-wooded service territories in the United States. In fact, one study indicates that there are 185 trees along every mile of highway and road in the state. When a storm with high winds or heavy, wet snow comes through Connecticut, more than ninety percent of the outages are caused by trees and tree limbs. Tree trimming reduces both the number and duration of outages for utility customers.

Utilities invest substantial amounts of time and money every year on vegetation management programs, identifying tree trimming and initiatives on and around utility poles and lines for several reasons:

To maintain reliability for customers – thousands of outages are caused by trees every year.

To assure the safety of the public, utility employees and contractors, and other workers (phone, cable, etc.) who may be working nearby.

To assure visual and physical access to equipment - finding trouble sooner than later saves money and prevents additional problems.

To prevent equipment damage - replacing and repairing equipment is very time-consuming and expensive.

(Source: Connecticut Light & Power)



Every person planting, protecting, and cultivating elm trees not more than sixty feet apart, or maple, tulip, ash, basswood, oak, black walnut or hickory, not more than thirty feet apart, for three years, for the space of one-quarter of a mile or more along any public highway, shall be entitled to receive an annual bounty thereafter of one dollar for each quarter mile so planted and cultivated, to be paid out of the state treasury.

Chapter 102, Section 1

An Act in Relation to Shade Trees upon the Highway

Connecticut Public Acts, 1881



Glenn: Emergency planning is done for many reasons, such as fire, flood, transportation accidents, and terrorism.

Bob: Preparation to deal with storm damage to community trees should be added to this list for many reasons including applying for federal clean-up aid and restoration efforts.



Chapter 17

Emergency Planning

David V. Bloniarz

In the United States, it is not a question of whether a severe storm will affect a community, but when it will happen. Large-scale or regional storms that cause extensive tree damage can cripple communities, compromise public safety, and typically result in a state of emergency declared at the state or federal level. Additionally, smaller storm events, more local in nature, can also cause extensive damage to a community's street, park, and private tree population.

To fully address the potential for a natural disaster, proper planning and preparation can make the assessment, response, and recovery from a catastrophe less confusing, less costly, and safer. It is important that every community develop an "Emergency Operations Plan" that addresses response logistics, staffing, communication, safety, restoration, and reforestation. It is never too early to develop such a plan, since a natural disaster can strike at any time. In today's turbulent world, the disaster planning can help in situations that extend beyond just the trees, as was evidenced at the World Trade Center, where many trees were damaged, but salvageable, in the blocks surrounding the site.

In addition to the Emergency Operations Plan, other tools can play an invaluable role in response and recovery from a disaster. These include a Complete Street Tree Inventory, a Comprehensive Urban Forestry Master Plan, a Street Tree Master Planting Plan, and Staffing and Equipment Plans. Taking a proactive approach to community forest management, through the development of strategic planning documents and procedures, response and recovery from a severe disaster will be facilitated and achieved in a more cost effective and safer manner.

The development of an Emergency Operations Plan that includes an assessment procedure for determining the extent of damage to the trees in your community can help in placing an immediate estimate of clean-up costs immediately following a severe event. This estimate, sometimes referred to as a “Preliminary Damage Assessment,” is often used by emergency management agencies to gauge the level of response needed in a particular community. The initial estimate of costs related to storm-damage trees can vary widely between communities, even if the amount, or type, of damage to the communities is similar. A survey of fourteen western Massachusetts communities following a severe winter storm in April of 1997 reported initial estimates of tree damages ranging from \$1,000 to \$100,000 per community, for like amounts of damage. During a storm emergency, municipal officials often complete the initial damage assessment while involved in crisis management. Communications with emergency response personnel or quick visual surveys of impacted areas are common damage-assessment procedure, but in many cases these are poor indicators of what the storm’s true total cost will be. Municipalities trying to manage a crisis often overlook costly tree problems. Having a standardized “Storm Damage Assessment Procedure” in place before the storm strikes – and a qualified damage assessor assigned to complete the assessment – provides a level of preparedness that will allow municipal officials to concentrate on the emergency response activities. This Storm Damage Assessment Procedure will help to place an accurate assessment of the true cost of a storm’s clean up, as it relates to trees, in a timely and efficient manner.

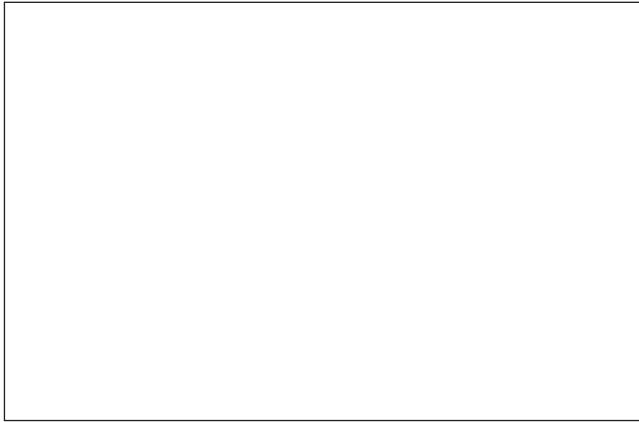
Planning for Your Community’s Response

Communities have differing needs and resources for disaster recovery. Depending on the size of each community, budget, and staff, communities will vary in their ability to plan for, and respond

to natural disasters. Anticipating the needs and costs associated with a disaster is often difficult and sometimes inaccurate. However, a community must consider the potential threat of such events and work on the development of an Emergency Operations Plan that will contain components of the plans and protocols identified above. It is the responsibility of every community to have an established Emergency Operations Plan in order to provide for the safety of its residents. Without such a plan, communities will place their population at risk for great inconvenience, injury, or even death.

Planning for a disaster should be taken very seriously, and it should be a mandatory component of every municipal tree management program. In the event that your community is not staffed with individuals who can develop such a plan, look toward other municipal departments for assistance, request help from your state's Emergency Management Office, work regionally with one or more nearby towns, request assistance from your utility providers, or contract the services to a qualified consultant. It is critical that an Emergency Operations Plan be developed, kept updated, and used during a disaster event.

Additionally, communication is a valuable component of disaster response. During the planning stage, many avenues of communication can be opened between the key players in a response scenario. Police, fire, public works, utilities, media outlets, community groups, and local emergency responders will normally be contacted, and included as components of the Emergency Operations Plan. Through initial communication with these agencies and individuals, a working relationship can be established that will lead to more effective implementation of response and recovery operations during an emergency situation. Additionally, coordination of the tree-related response and mitigation plan, with other recovery plans in your community, must be a key component of the planning stage. Elimination of duplication of services, equipment, and personnel can save time and money during an emergency and will be the only way that the response can be carried out in a timely, safe, and affordable manner.



Huurricane photo

One important consideration in planning for emergency response is the development of tree debris, chipping, and clean up plan. This includes the establishment of one or more storage and handling sites for tree-related debris such as parking lots and other open, easily accessible areas. These sites should be identified, and agreements about their use made with owners and managers before they are needed for clean up after a disaster.

Personnel and Training

Another component of disaster planning that should not be overlooked is training of personnel, including contractors, volunteers, and technical advisors. Proper training, disaster drills, and continuing education, even at an elementary level, can prove invaluable during a disaster event. Scheduled instruction, training seminars, and the distribution of training, educational, and resource materials can help in preparing your community for a serious event. Training should not be considered a “one-time” experience; it should be continual. State agencies, insurance carriers, and utility providers can often underwrite costs associated with this type of training. It is important that an ongoing training program be established in your community. Smaller communities may not have the staff or fiscal resources to establish such a formal training program. It may be best look to fire, police, and utility providers for assistance in the development and delivery of such instruction.

Keeping staff and crews up to date with changes and new techniques in urban forest management and response technology is critical to the effectiveness of a community’s response during an actual emergency. It is important to develop a core of managers, staff, and contractors that will be able to make immediate decisions during a crisis situation. Again, according to Burbank and Andresen, it is critical to “assign administrative responsibility to plan actions to assure that nothing is overlooked and that someone has the authority to accomplish the necessary tasks.”

Design and Planning

Disaster planning does not necessarily only include planning for the clean up and disposal of tree related debris from a storm event or disaster, but must include a more comprehensive approach to management of a community’s forest. This includes making appropriate choices at the planning



Connecticut tree wardens participate in a class on tree risk assessment and emergency planning.

and planting stages. Designing for sustainability and the use of appropriate tree species for specific landscape settings is important to ensure healthier trees that will be more able to survive storm events. Using good planning will help to ensure that trees that are appropriate for site conditions and location will be used. Planting the tree in the right place, choosing healthy nursery stock, proper planting technique and maintenance, and regular pruning can all help an urban forest survive a natural disaster. Having trees that are healthy, appropriate to the setting, strong wooded, and appropriately maintained will help reduce the amount of damage that occurs during a storm. Also, supplying trees with adequate water, protecting them during construction, and avoiding root damage and compaction can reduce the severity of impacts by many storm events.

Replanting your community should be the ultimate goal following clean-up after a storm event. Although it might not seem obvious during an emergency response, using discretion as to which trees can be saved, and which must be removed, will make a noticeable difference in the time needed for your urban forest to return to a functional level. Unnecessary removal of trees may occur if there are no established thresholds for what constitutes a salvageable or recoverable tree. Likewise, it is important that all hazardous trees are either removed or pruned appropriately, to ensure public safety and limit further damage from failure. Having a good team of experienced arborists available and contracted prior to a storm emergency will help to make an efficient transition from response to recovery, and replanting. The severity of the storm will dictate the response and recovery time needed to clean up debris and prepare areas for new plantings. Major storms require much more time for recovery operations than do minor, local events. However, after both types of events many years may be required for community trees to recover to pre-storm levels. While it takes years and generations to establish a healthy and sustainable urban forest, a severe storm or other catastrophic event can destroy the tree population in a matter of minutes or hours. In contrast, planning for replanting should be approached in a deliberate and thoughtful manner, with planting spread out over a number of years. Although residents may be anxious to quickly replant in their city or town, it is best to spread the tree planting effort over a number of years, since this will result in a diversely aged population, which will be healthier and more sustainable over time.

Communication and Public Response

One final consideration that should be addressed when planning for a disaster; you should be prepared to provide accurate and useful information to residents. It is important to provide guidance on proper tree care following the storm, pruning instructions, disposal sites, use of wood chips, avoiding “fly-by-night” tree care firms, and other related topics. Take advantage of media opportunities to educate the public on these and other issues that will help private individuals recover and green their own property.

Response to severe storm events varies in scope and duration depending on a variety of variables and scenarios. Planning for these events is not an easy task, but it is necessary. By developing sound response plans in advance, your community ultimately saves time, money, and possibly lives, as you initiate clean up, recovery, and greening efforts following a disaster. Emergency response plans should be updated on an annual basis and should be developed in a team approach including all appropriate municipal departments and agencies. A natural disaster is a tragic event any time it occurs, but proper and strategic planning can help ease the shock and reduce the feeling of hopelessness following such an event in your community. Take the time to plan; in the event of an emergency, you will be glad that you did.



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Suggested Readings

Bond, J. 2000. *Tree Emergency Manual for Public Officials*. Ithaca: Cornell Cooperative Extension.

This manual is designed to be a practical, short guide to managing disastrous tree damage resulting from catastrophic events. Its focus is on urban forests in the public realm where questions of safety and cost are critical. The target audience is public tree managers. Written in outline form, the manual is accompanied by a set of critical documents and standards called the *Tree Emergency Compendium*.

Burban, L. and J. Andresen. 1994. *Storms Over the Urban Forest: Planning, Responding, and Regreening, 2nd edition*. Newtown Square, Pennsylvania: USDA Forest Service, Northeastern Area State and Private Forestry.

This manual is a must for every community forester's bookshelf. Designed for use by municipal leaders, public works directors, urban forest managers, and urban forestry coordinators, it provides a ready reference of up-to-date procedures in planning and responding to natural disasters. Organized in an easy to use layout, this manual is one of the best compilations of materials related to disaster response.

Federal Emergency Management Agency. 2003. *State and Local Guide (SLG) 101: Guide for All-Hazard Emergency Operations Planning*. Washington, D.C.: Federal Emergency Management Agency.

This guide provides a strong background in establishing response plans and provides emergency managers and others with information on the Federal Emergency Management Agency's concept for developing risk-based, all-hazard emergency operations plans.



River Birch *Betula nigra*

This is a native to flood plains in the eastern United States from New Jersey south. Of ornamental interest year round with its peeling gray-brown to cinnamon to pinkish bark. It can grow to 70 feet relatively quickly, and is important as an ornamental in part because it is resistant to birch borer, though it is susceptible to leaf miner. Foliage in autumn turns yellow and quickly falls. 'Heritage' is a vigorous and often recommended cultivated variety. Not particularly drought tolerant and therefore not suitable for high-stressed urban sites.



Cities and towns in the lower Connecticut River valley lay right in the path of the Great Hurricane of 1938. With winds gusting to 180 miles per hour and soils saturated from four days of rain, trees didn't stand a chance. New Haven lost an estimated 13,500 trees with another 7,000 severely damaged. Hartford lost 10,000.

Republic of Shade: New England and the American Elm, Thomas J. Campanella

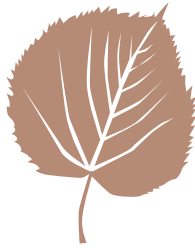


Glenn:

Tree law is a subject that creates a lot of apprehension among tree wardens, municipal officials and volunteers.

Bob:

Yes it does, and yet it is important to not avoid the subject. Learning a few fundamentals will help make it less intimidating, and perhaps even enjoyable.



Chapter 18

Tree Law

Robert M. Ricard

Tree law, like the law in general, is complicated and specialized. It is a discipline and profession that is filled with jargon and concepts that are difficult to understand. We are fascinated by the law, yet we fear becoming entangled with legal issues. In our modern daily life, it seems like almost everything we do has the potential to become a legal matter; “so sue them” is a common phrase in everyday speech. The United States has more attorneys than any other country in the world. In fact there are seven lawyers here for every one lawyer in Japan – the country with the second most lawyers in the world. Tree professionals and volunteers are often conscious of the threat of lawsuits and liability, as they should be.

It is, therefore, prudent to understand the law. No one will be able learn everything there is to know about tree law. They can, however, develop a basic understanding that is sufficient to perform public services well and with confidence. When in doubt, seek the advice of a qualified attorney. Public officials and employees should not hesitate to learn who the town attorney is and be comfort-

able in seeking their legal counsel. Community forestry professionals and volunteers in Connecticut need to understand four levels of law: state statutes, ordinances, regulations, and case law. This chapter is a brief overview of these.

Statutes

A statute can originate at either federal or state level, and is an act of Congress or the state legislature. Acts become law because the legislature determined that the issues they address warrant the strength that federal or state law carries. The existence of a state law is a signal that the people of that state, as represented by their elected officials, decided that the issue was of interest for the entire state, and was not just a local issue. State law has the power to either require something to happen, or to merely suggest that a task be performed (or prohibited). A state law is often referred to as statutory law.

In Connecticut, there are many state laws that pertain to forests and trees. Municipalities can be required by state law to do certain tasks, such as appoint a tree warden (Connecticut General Statutes Section 23-58). Other laws enable, but do not necessarily require a municipality to do something, such as establish a municipal forest (Connecticut General Statutes Section 7-131). A city or town usually cannot do something that it has not been empowered to do by the state, and this is why there are so many state laws.

The licensing of arborists (Connecticut General Statutes Section 23-61b) and forest practitioners (Connecticut General Statutes Section 23-65h) are examples of the state believing that citizens are best served by having baseline credentials for these professionals. The Connecticut state tree is white oak thanks to Connecticut General Statutes Section 3-110 and Arbor Day is the last Friday in April due to Connecticut General Statutes Section 10-29a.

Ordinances

An ordinance is simply a law passed by a municipality. If the people and elected officials believe that an issue is important enough, and if no state law exists that addresses the matter, an ordinance may be adopted (see Scope of municipal powers, Connecticut General Statutes Section 7-148). Local ordinances may be established by the people of a municipality provided that the ordinance (or



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a part of it) does not supercede state law. For example, a municipal shade tree ordinance cannot appoint a person to be responsible for the community's public trees since state law mandates that a town tree warden be appointed by the chief elected official to fill that role. A local ordinance must also be able to stand up to public scrutiny, including possibly being tested by lawsuits. Local ordinances that have an effect on private property rights are challenged most often.

Regulations

The development, implementation, and enforcement of regulations may be a component of a state law or local ordinance. The purpose of a regulation is to provide additional, more detailed guidelines about an aspect of a law or ordinance. State or local agencies and departments may develop rules and procedures based on regulations; sometimes a regulation may even require that an agency or department develop rules and procedures.

For example, Connecticut General Statutes Section 23-65j states that “The Commissioner of Environmental Protection may adopt regulations, in accordance with the provisions of chapter 54, governing the conduct of forest practices...” The statute includes language enabling the Connecticut Department of Environmental Protection to write, implement, and enforce regulations. The statute includes information for writing regulations including the purpose, or intent, of the law; background or history of the issue; the procedures through which the regulations will be developed (public hearings, public notices); who will enforce the law and the regulations; and whether or not the law or regulations will end after a specified period of time.

Case Law

Sometimes referred to as “judge-made law,” case law is a branch of jurisprudence in which principals and rules of law are developed, modified, and applied by courts rather than by federal or state legislatures or local authorities. It is based on common law, the ancient, unwritten law that originated in England and was inherited by the United States.

Decisions made by courts over the years serve as examples for cases that follow. Lawyers and judges use the outcome of previous decisions to argue their cases, to help reach new decisions. When

courts use certain cases over and over, the court-made “law” becomes a precedent, which serves as a guide for future court cases faced with similar situations. When a precedent is used repeatedly, a trend is established. Precedent can be overturned, however. If state law or local ordinances does not address a particular question of tree law (such as a question of a boundary tree and a dispute over its removal by one party), then case law will be used in a court’s decision. Case law always addresses issues of negligence, trespass, injuries, liabilities, and damages resulting from trees, public, or private.

Continuing Education and Legal Counsel

Tree law is a complicated and specialized subject. Any one, especially municipal employees and elected officials, should seek continuing education opportunities on tree law and related matters (e.g., tree risk assessment, tree safety) as much as they can. Also, seek legal counsel whenever there is a legal question that you cannot answer definitively. Doing these things will help you become a more competent community forestry professional or volunteer.

Suggested Readings

Carey, A., C. Donnelly, R.M. Ricard and C. Berger. 2001. *Connecticut General Statutes and Regulations of Interest to Arborists, Tree Wardens and Forest Practitioners*. Storrs: University of Connecticut Cooperative Extension System.

This is a complete collection of Connecticut state statutes pertaining to tree wardens, arborists, and forest practitioners. This is a good desk-top reference for all community forestry professionals and volunteers.



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Jordon, C. 1992. *Neighbor Law: Fences, Trees, Boundaries and Noise*. Berkeley: Nolo Press Self-Help Law.

This is an excellent book on case law and trees (private and public) and is required reading for community forestry professionals and volunteers. It is clear, concise, and thorough. Much of the book deals with matters unrelated to trees, but the tree section is the best on the topic.

Merullo, V.D. and M.J. Valentine. 1992. *Arboriculture and the Law*. Savoy, Illinois: International Society of Arboriculture.

This is the only available book devoted solely to trees and the law, and the senior author lectures widely on the topic. Much of the book is useful to people interested in, or needing to learn about, case law and trees. It is essential reading, although unfortunately it is not comprehensive.

MEASURING NOTABLE TREES

The Connecticut Botanical Society uses American Forests' tree measurement system, which produces a single number that we call AFA points. American Forests is responsible for National Register of Big Trees.

The formula simply adds together:

- *trunk circumference* at 4.5 feet above ground, in inches
- *tree height*, in feet
- one-quarter of the average *canopy spread*, in feet.

Circumference. With a tape measure, find the circumference (not diameter) at 4 feet 6 inches above ground level. If the tree is growing on a slope, measure the 4.5 feet up from the center of the slope, i.e. not the lowest or highest place where ground meets tree. If branches begin to swell the trunk at or below 4.5 feet, measure the smallest circumference below 4.5 feet. If the tree is multiple stemmed and forks above ground level, measure the smallest circumference below the place where the stems originate and also measure each stem at 4.5 feet. If it is multi-stemmed into the ground, measure each stem separately and note this condition on the datasheet. Convert feet and inches to inches for the calculation.

Height. We do not use estimates for trees which are contenders for largest of their kind. Most of the measurements for this project have been done with a clinometer (available from forestry supply companies) which we find accurate to one or two feet in 100. This device, which currently costs about \$100.00, is held in the hand and the treetop is sighted through it. A scale visible inside gives height in feet when the clinometer is exactly 100 feet from a point directly below the sighted branch (note this is not necessarily the base of the tree trunk). With a simple calculation it can be used at distances other than 100 feet. An estimate can sometimes be done by measuring the tree's shadow, measuring the shadow of an object of known height, and using the difference between the object's true height and shadow length as a correction factor to obtain the tree height. This is usually more accurate than guessing, but only works on sunny days

on open sites. There are various other optical and electronic instruments available for measuring heights. Use the height in feet for the calculation.

Average Spread. With two people, or by pinning down one end of the tape, measure the greatest branch spread from one end of the canopy in a straight line next to the trunk to the far edge. In the same way, measure a second spread in a line perpendicular (90 degrees) to the first line, regardless of canopy size above. The two spread measurements, in feet, are averaged and divided by 4 for the AFA points calculation.

Reporting Trees. Information about potentially notable trees in Connecticut can be sent to gddre@conncoll.edu or by mail to Notable Tree Committee, Connecticut College Arboretum, 270 Mohegan Ave. New London, CT 06320. Please include the name of the tree if at all possible, the circumference at 4.5 feet above ground, and the name, phone number and address of someone who will show us the tree if we decided it merits a complete measurement.



American Chestnut *Castanea dentata*

A native of eastern North America, Chestnut was once one of the most common species in the eastern North American landscape, and was one of most important timber trees. A blight caused by an introduced fungus that first appeared in New York City in 1904, rapidly removed these trees from our forests. The disease girdles trees so they rarely reach reproductive maturity or attain any appreciable size. The stumps and roots remain and sprouting is aggressive, assuring at least short term survival of the tree as an understory species in many forests. Research and development of resistant cultivars forms an important part of work of scientists at the Connecticut Agricultural Experiment Station.



The Connecticut Legislature passed laws in the 1927 Session placing the responsibility for the care of all state highway shade trees on the State Highway Commissioner, and authorizing him to plant trees and shrubs within highway bounds, as might be deemed feasible. Since that time the Department has carried on a carefully planned program of shade tree planting. Infinite care has been given to the selection of species and of planting location.

John L. Wright, Director of Roadside Development, Connecticut State Highway Department, *Proceedings of the Eastern Shade Tree Conference*, Bronx Park, New York, 1939

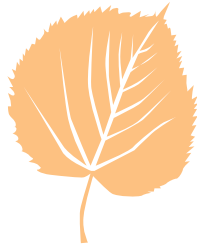


Bob:

Tree wardens began almost one-hundred years ago as tree conservationist, then evolved primarily into tree removers as a consequence of public safety needs.

Glenn:

In recent years it is great to see that many have achieved a balance between tree conservation and risk management.



Chapter 19

Tree Wardens: Historical Perspective, Roles and Responsibilities

Robert M. Ricard

A Connecticut municipal tree warden is arguably the most important human component of a city or town's community forestry program. That state law requires a tree warden to be appointed in each Connecticut municipality is widely known. But beyond this simple fact, there are many misconceptions about the position. A community in Connecticut cannot conduct an effective community forestry program without the participation, perhaps even the leadership, of a well-qualified, active tree warden. The purpose of this chapter is to provide an historical perspective of the position followed by a discussion of the roles and responsibilities of municipal tree wardens.

History and Perspective

In the late nineteenth century, population density was low and much of the Connecticut landscape, like most of New England, was either abandoned farmland or cut or burned over forests. Roads

were few and hosted mostly horse and wagon traffic. Trees were either planted to restore the land or were naturally regenerating. As a result, the forest trees (including those along roadsides) were young, small, and usually healthy and vigorous.

As industrialization in America escalated, and as population increased, both urban cities and rural villages grew and expanded. Private citizens and elected officials recognized the need to create and maintain green spaces, and cities and towns took steps to plant and maintain public shade trees. Municipal governments and volunteers established parks, spruced up town commons, and planted street trees. Few insects and disease then threatened forest trees. Pollution was still minimal.

The public's increased appreciation for the environment in both cities and in wild places, along with a desire to conserve it, resulted in the creation of many conservation organizations and agencies. To use Connecticut examples, Simsbury native Gifford Pinchot, who was also the first chief of the U.S. Forest Service, founded The Yale School of Forestry in 1900. In 1895, the Connecticut Forestry Association, now the Connecticut Forest and Park Association, was established. Much of the early mission of these organizations was tree planting, fire suppression, and forest regeneration. Street tree planting, along with rural forest conservation, was often written into early mission statements and went hand-in-hand with conservationist thinking: there was no dichotomy between "traditional" forestry and "urban" forestry.

This was the ecological and cultural situation when, in 1899, the Massachusetts state legislature passed the first tree warden state statute in the United States. Using this as a model, Connecticut and the other four New England states quickly followed suit. Thus, one-hundred years ago, thanks to a social climate that favored conservation, trees were deemed important enough to warrant passage of state legislation that required the stewardship of public trees by a tree warden in each town.

By the 1950s things had changed. Trees that were young and healthy in 1900 were older and beginning to show signs of stress. Urbanization and suburbanization were rampant. More cars, roads, people, pollution, power lines, insects, and disease began to take a toll on trees in community forests. As these factors caused trees to decay and decline, more public trees became a risk to public safety.

As a result of cultural and ecological changes through the twentieth century, the role of the tree warden changed as well. Whereas, the original intent of the tree warden laws was to position a tree conservationist in each city and town, the role gradually evolved into one of tree remover, primarily in response



to public safety issues brought on by old, mature, and decaying trees that threatened life, limb, and property. Removal of hazardous and potentially hazardous trees has become increasingly important as American society has become more litigious, with the threat of lawsuits constantly on the mind of municipal employees, managers, and elected officials.

Roles and Responsibilities in the 21st Century

What is the role of a tree warden in a Connecticut city or town today? Is a tree warden a conservationist or a public safety officer? The answer is that they should be both. Ideally, a tree warden should successfully and efficiently merge the original intent of the law with today's public safety needs, given current budget and personnel realities. They must help the municipality realize the essential benefits trees provide to the community while protecting, as best as reasonably possible, the public from high risk trees. It is important to recognize that all trees pose some risk, even the young, vigorous, healthy ones, and that assessing risk is a critical role of the tree warden. Risk can never be completely eliminated, but it can and should be prudently managed and reduced.

The tree warden must also provide for public participation in at least some municipal tree matters. Connecticut law requires the tree warden to post public trees if they are to be removed or pruned (unless deemed an immediate hazard to the public). Once posted, a person may within ten days request in writing that a public hearing be held. At such a meeting, anyone may present an argument in opposition to the pruning or removal of the posted tree. The tree warden makes the final decision, and the matter may then be appealed to superior court.

Many tree wardens in Connecticut cities and town have successfully and efficiently found the balance between conserving public trees and protecting the public from harm. It's not an easy task, and the job is often under appreciated. The successful tree warden seeks not only to increase his or her skills, education, understanding, and appreciation of tree care, but in working with the public as well. Hopefully, citizens and elected officials will also increase their understanding and appreciation of tree warden's role, and support the people in these essential positions.

Synopsis of the Connecticut Tree Warden Statutes

The tree warden laws are in Chapter 451, sections 23-58, 23-59, and 23-65 of the Connecticut General Statutes. Connecticut General Statutes Section 23-58 mandates the appointment of a town or borough tree warden. Within thirty days of their election, the chief elected official of each town and borough shall appoint a town or borough tree warden, except in cities that have an officer (i.e., city forester) with similar duties, to a one-year term and until their successors are appointed and have qualified. The tree warden may appoint any number of deputies as he deems expedient and, at any time, may remove them from office. Reasonable compensation for services rendered shall be provided to the tree warden and his deputies.

Once appointed, the tree warden is guided, in part, by Sections 23-59 and 23-65. The following is a summary of the powers and duties of Connecticut's tree wardens:

The tree warden shall:

1. Have the care and control of all trees and shrubs in whole or in part within the limits of any public road or grounds and within the limits of the tree warden's town, except those along highways or in public parks unless so requested by local park commissioners.
2. Care and control parts of trees and shrubs that extend or overhang the limits of any public road or grounds.
3. Expend all funds appropriate for the setting out, care, and maintenance of such trees and shrubs.
4. Enforce all provisions of law for the preservation of trees and shrubs and roadside beauty.
5. Remove, or cause to be removed, all illegally erected signs or advertisements placed upon poles, trees, or other objects within any public road or place under the tree warden's jurisdiction.
6. Post a suitable notice on any tree or shrub scheduled to be removed or pruned at least ten days prior to the removal or pruning unless condition of the tree or shrub constitutes an immediate public hazard.



7. Hold a public hearing at some suitable time and place after giving reasonable notice to all known interested parties, and post a notice if any person, firm, or corporation appeals in writing objecting to the removal or pruning of any tree or shrub that the tree warden has posted.
8. Render a decision granting or denying the application to stop the trees or shrubs removal or pruning and the other party aggrieved by the tree warden's decision may, within ten days, appeal to the superior court for the judicial district within which their town is located.

The tree warden may:

1. Prescribe regulations for the care and preservation of trees and shrubs as he deems expedient. If these regulations are approved by selectmen and posted in the town, these regulations shall have the force and effect of town ordinance.
2. Cause a tree or shrub that is under the tree warden's jurisdiction to be removed or pruned at the expense of the town if, in the tree warden's opinion, the tree is a threat to public safety.
3. Determine and approve in writing reasonable compensation for tree or shrub removal or pruning ordered removed or pruned by the tree warden.
4. Remove, with selectmen approval, any trees or other plants within the limits of public highways or grounds under the tree warden's jurisdiction, which are particularly obnoxious as hosts of insects of fungus pests.

Related court cases:

1. A tree warden is a public officer but if he does manual labor on trees at a separate charge, he is not acting as a public officer and if injured comes under the workman's compensation act.
2. The tree warden has exclusive control over trees within highway right-of-ways even though trees themselves stand on private grounds.

Suggested Readings

Jordon, C. 1992. *Neighbor Law: Fences, Trees, Boundaries and Noise*. Berkeley: Nolo Press Self-Help Law.

This is an excellent book on case law and trees (private and public) and is required reading for community forestry professionals and volunteers. It is clear, concise, and thorough. Much of the book deals with matters unrelated to trees, but the tree section is the best on the topic.

Merullo, V.D. and M.J. Valentine. 1992. *Arboriculture and the Law*. Savoy, Illinois: International Society of Arboriculture.

This is the only available book devoted solely to trees and the law, and the senior author lectures widely on the topic. Much of the book is useful to people interested in, or needing to learn about, case law and trees. It is essential reading, although unfortunately it is not comprehensive.

Carey, A., C. Donnelly, R.M. Ricard and C. Berger. 2001. *Connecticut General Statutes and Regulations of Interest to Arborists, Tree Wardens and Forest Practitioners*. Storrs: University of Connecticut Cooperative Extension System.

This is a complete transcript of all Connecticut state statutes pertaining to tree wardens, arborists and forest practitioners. This is a good desk-top reference for community forestry professionals and volunteers.

Ricard, R.M. 1996. "Tree Wardens and the Evolution of Urban Forestry in New England." Pp. 80-85. In *Proceedings of the Society of American Foresters National Convention, November 9-13, 1996, Albuquerque, New Mexico*. Bethesda: Society of American Foresters.

TREE WARDENS' ASSOCIATION OF CONNECTICUT, INC.

Tree wardens play a vital and essential role in community forestry and public safety. State law - Connecticut General Statutes Section 23-58 - mandates that every city and town appoint a tree warden. Connecticut General Statutes Section 23-59 and 65 further mandate that the tree warden has complete responsibility for the municipality's public trees. These laws do not, however, require any qualifications for the position.

In 1991 a needs assessment was conducted by the University of Connecticut Cooperative Extension System. It was discovered that most tree wardens did not have any tree care training or education, nor had they much contact with other tree wardens.

To help turn this situation around, the Tree Wardens' Association of Connecticut, Inc. was founded and incorporated in 1992. Almost a dozen tree wardens volunteered to serve on the first board of directors and to begin the difficult process of determining the group's purpose, mission, constitution, and future. The organization quickly incorporated with both the state of Connecticut and the Internal Revenue Service, gaining recognition as a charitable, Internal Revenue Code 501(c)(3).

Since these early steps the organization has grown to an annual membership of almost ninety tree wardens. Two workshops are held each year; one in the spring, the other in the fall. An annual dinner meeting is held to conduct the business of the organization, elect board members and officers, recognize people for outstanding achievement, and conduct an educational session.

One of the more significant achievements of the organization has been the Tree Wardens School and Certification Program begun in 1998. This is a six day educational program designed to instruct tree wardens, deputy tree wardens, and others in essential topics and their knowledge is tested. Participants must pass a test (seventy percent or greater) to be considered Certified Tree Warden. To maintain this Certification they must obtain a minimum of fifteen continuing education units by participating in relevant workshops, conferences and classes.

The board members also monitor pending state and local legislation and agency regulations that would affect tree wardens. Financial contributions have also been made to people and organizations that support tree wardens and community forestry.



New Haven has the oldest city Bureau exclusively devoted to Shade Tree care. Mr. George Cromie, in 1909 and 1910 drew up a plan for the systematic care and replacement of street trees, and served as Superintendent of the then formed Tree Bureau until 1930. So we are not faced with any tremendous theoretical problems in replacement of our trees or in caring for injured ones. Out of 31,000 street trees (about 20,000 of these being 8" or larger in diameter) we lost over 4,000 trees. We lost about 11,000 park trees as well.

Frederick Selden Eaton, City Forester, New Haven
Proceedings of the Eastern Shade Tree Conference, Bronx Park, New York, 1939



- Glenn:** Bob, it seems to me that more and more communities have passed community forestry ordinances in the past decade or so. Is this the case?
- Bob:** Yes, there are probably twice as many now than there were ten years ago. Many communities are finding that ordinances are a good way of handling land-use issues, including public tree conservation and management.



Chapter 20

Community Forestry Ordinances

Robert M. Ricard

Adopting a community forestry ordinance can be beneficial to cities and towns that have decided to establish a public tree management and conservation program and wish to include direct citizen involvement in the decision making process. A local forestry ordinance provides the legal authority to accomplish the objectives of community forestry – tree planting, tree risk assessment, public education, media relations, etc. It is not the only way to have a successful community forestry program, but ordinances have proven a successful method in many places, and are a good way to tailor the program to the special needs, priorities, and character of each town.

A community forestry ordinance is basically a legal framework within which local public tree management activities may be conducted. Unless it benefits the whole community, however, the ordinance is not likely to become law. Furthermore, it is essential to bear in mind that a community forestry ordinance in and of itself is no guarantee that a management program will be successful. It may help to establish standards and sets guidelines, but it works only to the extent that a community supports it. To be effective, it must also be administered well.

Connecticut state law requires the appointment of a municipal tree warden. This public official is the person in your municipality responsible for public trees. A community forestry ordinance cannot usurp the state legislated authority of the tree warden. It can, however, enhance the overall public tree management program in your community.

What Can a Community Forestry Ordinance Do?

Community forestry ordinances are as different as the communities that develop them, but there are a number of objectives that should be considered when constructing one. An effective community forestry ordinance can:

- Make your community's public tree management program more visible.
- Establish the program independent of changing public opinion, personnel and finances, and provide the structure for accomplishing objectives.
- Help a newly-established tree management program take root.
- Specify the qualifications a tree warden shall have.
- Direct special attention to the preservation and care of notable public trees.
- Provide the means to “sell” community forestry to the public.
- Be the means to regulate arboricultural practices such as planting, pruning, removal, and the selection of appropriate tree species.
- Advocate for the tree warden, other public employees, and community forestry.

Establish a Broad Base of Support

Trees don't involve themselves in the political process, but people whose lives and occupations are touched by them, do. For that reason, an effort to establish a community forestry ordinance can provoke controversy. The best way to minimize controversy is to involve representatives from as many different political interests as possible in order to establish a broad base of support for the community forestry ordinance.

The people in the front ranks of an effort to develop a plan to manage community trees are often, as one forester stated it, “strong-willed and uncompromising.” Compromise, however, is the only way to

Community forestry ordinances may include statements designed to develop community education programs about the benefits of public trees and the need to care for them.



establish an effective community forestry ordinance. The efforts of an unyielding and inflexible minority usually alienate the majority, and if a variety of interest groups are not enlisted in the cause of a community forestry ordinance from the start, success is unlikely. And, of course, the tree warden needs to be one of the principal people involved in - possibly even leading - the coalition building process.

A good place to begin is to list all the people and institutions in your community that would be affected by the standards and guidelines established by a community forestry ordinance. Then invite representatives of every conceivable political, commercial, educational, religious, and social

agency that might be touched by the ordinance to a preliminary discussion meeting. A typical list might include the Chamber of Commerce; realtors, developers, builders; local chapters of the Audubon Society or Sierra Club; service organizations such as Kiwanis, Elk, and Rotary Clubs; various city departments and commissions such as planning, zoning, parks, recreation, and conservation; garden and senior citizen clubs; Boy Scouts, Girl Scouts, and 4-H; churches, various welfare agencies, charitable causes, and so on.

After the first meeting, the next step is to form a working committee of seven to ten people who have the time, skills, and motivation to study the issues and communicate their findings effectively to the rest. The chairperson should be someone who is liked and respected by most members of the community, and

has proven to be an effective leader. Bear in mind that the task of the working committee is to hammer out a community forestry ordinance that will, as much as possible, satisfy the array of interests that are unique to your community.

Tailor Ordinance to Accomplish the Community's Specific Needs

You must create a community forestry ordinance that is appropriate for your community. Although there are many excellent examples to use as guides, there is no one “correct” model because communities differ in many ways. An ordinance designed for a big city on the Connecticut coast is unlikely to be appropriate for a village in the rural, northwestern part of the state. Differences in population density, commercial development, housing needs and conditions, and open space conservation plans will determine the parameters of what you can do in your community, as will local political and economic traditions.

The tone of the community forestry ordinance should reflect the unique character of your community, with its basic approach suited to your town's financial resources and its overall nature, culture and philosophy. For example, does your community prefer to regulate or to educate? Your ordinance will probably need to use both approaches: that is, regulate with respect to the use of licensed and insured arborists, and educate in others - the local City Beautification Committee might volunteer to promote to the public the benefits of tree care and management and advocate for increased funding of the community forestry program..

The first step in developing an ordinance is to study the problem in a manageable fashion. An experienced urban forester found that, in his community, it worked to break down several sample tree ordinances into easily understood components and assign topics to committee members on the basis of their familiarity with those topics. Committee members researched the topics, and then shaped them according to the community's requirements. It is also prudent to have legal counsel review a proposed community forestry ordinance.

Here is a sample of layout and content of a community forestry ordinance. Remember that some aspects may not be appropriate for your community's needs, abilities, and available resources.

Title: This should be succinct and reflect main goal of ordinance.

Purpose and Intent: Establishes what "public good" will be served by the ordinance. The statement of purpose is a pronouncement to the effect that the community forest benefits everyone, and that the

community will work to maintain those benefits. It can state that the ordinance will promote public health and safety by regulating tree management activities. A statement about the benefits of trees should be included.

Applicability (or Scope): This should state which trees this ordinance applies to and where they are located (e.g., public trees located within streets, rights-of-ways, parks, and public spaces of the municipality). Note that some towns have included language about trees on private property that may constitute a *hazard* or *threat* to public safety and specify how the town will act.

Definitions: In order to head off legal challenges, it is essential to define the legal and technical terms used in the ordinance, such as tree risk, pest-infested tree, public place, property line, tree lawn, planting strip, parking strip, right-of-way, public tree, etc.

Tree Warden: Reaffirms (restates) the roles and responsibilities of the tree warden as specified in Connecticut State Statutes Sec. 23-58, 23-59, 23-60, and 23-65. Can indicate that the position may or shall be a municipal employee specifically (e.g., city forester, director of public works, parks superintendent). This section should include any additional tree warden duties beyond those required by state law.

Authority of Community Forestry Committee: This section establishes the committee and defines its composition, and should cite in detail the Committee's responsibilities. A variety of names are possible – Shade Tree Commission, Urban Forest Commission, or Community Forestry Committee, are popular. This section should state that the powers and duties of the Committee should complement, augment, and support the powers and duties of the tree warden. It is essential to remember that in Connecticut no local ordinance can supercede or usurp the power of the municipal tree warden.

Permits: Establishes that no one will plant, prune, or remove trees in the public right-of-way without approval of the tree warden.

Responsibilities: This section lists the duties of the Community Forestry Committee. These may include:

- Establishing and enforcing standards with respect to tree planting, maintenance, and removal on public lands.
- Developing a master plan for managing the community's forest, including risk tree assessment.
- Establishing contracting procedures and minimum standards and qualifications for arborists and other temporary workers. These procedures should also be linked to a community forest master plan.
- Making recommendations to local government policy makers (e.g., Planning and Zoning Commission) with respect to tree retention, protection, and replacement on private property.
- Providing for the continuing education of the public about the benefits of the community forest.
- Identifying future projects that will improve the community forest, including the preservation of historic and otherwise notable trees and groves on public and private property.
- Encouraging funding for the community forestry management program.

Local tree ordinances can be written to require contractors to plant trees correctly.



Severability: In the event that a court of law invalidates a section of the tree ordinance, the severability clause protects the remainder of the community forestry ordinance.

Interference/Enforcement: An ordinance is effective only to the extent that it is enforced. There should be a statement to the effect that failure to comply with the ordinance is illegal and will subject the offender to prosecution. An appeal procedure must also be included.

Incident Procedure: Negligence is generally considered to be the "failure to exercise the care that a prudent person usually exercises," and it is the greatest threat to tree programs. The best defense against negligence is to establish a routine of tree management and care that works, including assessing public trees for risk - and this requires the use of professionals. At the very least the community must survey all municipally-owned trees frequently for hazards and develop a timeline and management plan for removing them. Even under the most scrupulous program of care, however, trees will fall and damage property. If a falling tree causes a fatality, injury, or property damage, lawsuits are inevitable. Written procedures for dealing with accidents should be established. Herbicide and pesticide use may also provoke legal proceedings, and community government must be prepared to respond to these challenges as well.

Abuse of Public Trees: Prohibits mutilation or other abuse of public trees beyond those detailed in the tree warden statute. State statutes do cover damages to trees to some extent.

Protection of Trees: States that public trees are to receive protection (and specify minimum standards) during construction or other activities that might harm them.

Budget: The Community Forest Committee must have the authority to allocate funds.

Penalties: Establishes penalties for failure to comply with the provisions of the ordinance.

Other items may be included into the community ordinance as needed. It would be wise to look at samples of ordinance from other communities. Also seek legal counsel.

Avoid Pitfalls that Threaten the Ordinance in the Planning Stage

Bear in mind that a local community forestry ordinance that is the fruit of compromise is better than no ordinance at all. To that end, it is critical that the chairperson facilitate the process by providing a positive work environment. Here are a few suggestions that may help your working committee to avoid problems. Disagreement is inevitable, but adherence to a few simple guidelines may facilitate compromise:

1. It is essential that meeting times be convenient and regular and that meeting places be “neutral territory.” Timing is critical: lunch meetings for the core committee may work well, and late-afternoon meetings or meetings held just after work also tend to be efficient. Maintaining momentum is important: avoid calling unimportant meetings during the summer when many people vacation or during holiday periods.
2. The chairperson must be positive, open-minded, encourage the airing of ideas from all parties, work to maintain interest, and be sensitive to the positions and level of involvement of each committee member.
3. A third party, such as a state urban forester or someone from a town that has an existing community forestry ordinance, should review the details of the final product.

It is essential that the title of your community forestry ordinance reflect the tone of your community's overall philosophical approach. First impressions are critical: one title may alienate; another will be just right. For example, a tree warden who worked long hours chairing a community forestry ordinance committee realized that their original title, “Tree Protection Ordinance,” would have cost the support of homebuilders worried that “protection” might mean extra expense for them. Since the committee had been careful to create an ordinance that emphasized planning and education, not inspections and permits, it moved rapidly to change the title to “Tree Management Ordinance,” a word substitution that included protection, but did not seem as threatening. Finally, keep in mind that the right ordinance for any community is the one that makes its people want to plant and care for trees and forests.

Suggested Readings

Grey, G.W. 1993. *A Handbook for Tree Board Members*. Nebraska City, Nebraska: The National Arbor Day Foundation.

This is oriented to Midwestern communities. However, it is a useful book mostly because of its discussion of the reasons for having a community forestry ordinance. Do not use the examples of ordinances in the book for Connecticut communities.

D'Errico, M.V. 2000. "Tree Ordinances." Pp. 43-59. In *Handbook of Urban and Community Forestry in the Northeast*. Kuser, J.E., ed. New York: Kluwer Academic/Plenum Publishers.

This is a very thorough discussion of community forestry ordinances with a great deal of information about the benefits of a community adopting one. There is also a good outline of what an ordinance might contain.

Phillips, L.E. 1993. *Urban Trees: A Guide for Selection, Maintenance, and Master Planning*. New York: McGraw-Hill, Inc.

Phillips has several decades of experience as a municipal arborist in Massachusetts; a state with a tree warden statute similar to Connecticut's state law. His discussion, therefore, takes this into consideration, something Connecticut municipalities would need to do. This book contains a good outline of what an ordinance may contain.

TOWN FORESTS

If your community had a town forest, you would be only minutes from quiet woodland paths. Connecticut's forested landscape is increasingly fragmented into smaller and smaller parcels, but we still need woodlands for rest, recreation, and wood products. Our towns can have forests that meet all of these needs, and, when well managed, they are a very valuable long-term resource.

Located within the limits of a town, suburb, or city, a town forest is distinct from a park. A town forest is generally a contiguous tract of municipally owned land that is dominated by trees, often of various ages and species. It may be connected to other forest "islands" by conservation "corridors." It usually contains a diverse wildlife population, and has woody and herbaceous vegetation forming the understory. It is a multiple-use forest managed to provide people with recreational opportunities such as hiking, birding, photography, and cross-country skiing; to protect watersheds and wildlife; to educate users about nature and the forest environment; and it may be periodically harvested for timber and fuelwood. A town forest is a part of the larger urban and community forest ecosystem.

As everyone knows, there is often far more profit in developing a piece of land than in keeping it in forest. But in some other countries, for example Switzerland and Germany, most forested land has been kept as forest for a very long time. Why? Because they recognize that there are very real benefits. In the United States, the first town forest was established in New Hampshire in 1711. Europeans, in contrast, have been managing and protecting their town forests since the Middle Ages. Intensively managed European town woodlands are diverse and contain a wide range of species and trees of differing ages. They are also accessible to the majority of the population. For instance, from the center of Zurich, citizens are no more than thirty minutes away from scenic woodland paths.

Town forests also provide many environmental benefits. These forests protect public water supplies and provide habitat for a wide range of birds and animals. For instance, nearly twenty percent of the water used in Zurich is from town forest ground water. They are a source of pride; there are few instances of vandalism because the citizens who enjoy them regard the forests as their own. Town forests are used for recreational activities like hiking and cross-country skiing. They provide special areas in which children can play and where joggers can run through physical fitness courses called "parcours." In some town forests,

timber sales pay for virtually all recreational activities. In others, like Zurich, the population is so large that timber sales help to defray the costs, but cannot foot the entire bill.

Town Forests in Connecticut

Town forests have been around since colonial days. However, and appropriately, an increasing number of Connecticut towns have used professional consultants to establish sound forest management practices on town-owned forest land. Until recently, however, Connecticut's town forests have been overlooked and underappreciated. By 1984, ninety towns in Connecticut owned a total of over 29,000 acres of forestland. The size of these town forests ranges from the five-acre "vest-pocket" forest in Scotland and the fifty-five-acre educational forest in Westbrook, to a 2,400-acre forest in Meriden.

Municipalities may have been slow to develop town forests for any of a number of reasons. For instance, municipal officials and citizens may not know how to acquire forest land, establish a town forest legally, obtain the advice of professional foresters, or have chosen to leave their forest in a unmanaged state. In addition, municipal officials and citizens may not be aware of the potential for a forest to simultaneously provide recreation, aesthetics, education, and even wood products. Some officials may fear increased forest use because they believe it would increase maintenance costs. Officials might not understand that more use can also lead to financial support from appreciative users. A lack of basic knowledge about forest inventories and cover types can be reversed since information and technical assistance for managing a town forest is now readily available.

In contrast to Europeans, who have a tradition of town forests, in the United States, we have a history of developing the forested lands around our cities and towns into commercial, industrial, and residential sites. Given the long-term economic and social benefits of town forests, and particularly the opportunities for recreation that is vital to the well-being of core city residents, there is clearly a need to plan for areas where managing a town forest is a viable alternative.

How to Establish a Town Forest

According to Connecticut General Statutes Chapter 97, Sec. 7-131 (a), "the legislative body of any town, city, or borough may vote to establish a municipal forest for the purpose of raising timber, protecting

water supplies, providing opportunities for outdoor recreation, or employment of relief labor. For such forest, such town, city, or borough may appropriate money and purchase land, accept land or money by gift or bequest and allocate any land to which it holds title and which is suitable for the production of timber.”

Once the benefits of a town forest are understood, and with the help of officials (e.g., forest commission, conservation commission), identifying and setting aside woodlands for a town forest is required. To do so, you will need to educate the public about the economic and social benefits of a town forest through public meetings and media contacts. It is important to also solicit the cooperation of a wide range of people in your community, including local officials, environmentalists, and influential business and professional leaders. Cultivate the support of citizens by establishing the town forest in the name of a worthy group or cause (e.g., name it the Vietnam Veterans Memorial Town Forest or dedicate it to the community’s children).

Management Planning for a Town Forest

If you want your town forest to provide a full range of ecological, social, and economic benefits, you need to create and implement a forest management plan. To do this, professional assistance will be required. You will need to seek advice from a service forester with the Connecticut Department of Environmental Protection, Division of Forestry. This forester will help acquire the basic information concerning the property. Then the services of a Connecticut licensed Forest Practitioner will need to be retained. This private consulting forester will first discuss land management possibilities, perform a forest resource inventory, write a forest management plan, help your community implement the plan, and protect the interests of the landowner (the town citizens), the community and the forest. And lastly, learn as much as possible about your town forest specifically and forestry in general.

Suggested Readings

Beattie, M., C.H. Thompson and L. Levine. 1996. *Working with Your Woodland: A Landowner’s Guide, 2nd edition*. Hanover: University Press of New England.

This book is a practical and popular guide to managing private and public woodlands. Once a town forest is established in your community, this is the best book to use as a reference for managing the resource.

McCullough, R. 1995. *The Landscape of Community: A History of Communal Forests in New England*. Hanover: University Press of New England.

Although the intended audience for this book is a general, popular one, it is largely of academic interest. The author argues that there is great value – both economic and spiritual - to the public in using municipal forest lands for many reasons, including timber.

McCullough, R. 1998. "Town Forests: The Massachusetts Plan." Pp. 292–318. In *Stepping Back to Look Forward: A History of the Massachusetts Forest*. C.H.W. Foster, ed. Petersham, Massachusetts: Harvard Forest.

Understanding the past is a great tool for moving forward. McCullough, like the author of *The Landscape of Community*, presents a strong case for the creation and the management of community forests. The town forest movement in Massachusetts has a long and distinguished history.

Milne, G.M. 1995. *Connecticut Woodlands: A Century's Story of the Connecticut Forest and Park Association*. Middletown: The Connecticut Forest and Park Association.

This is essential reading for any Connecticut citizen with a deep interest in Connecticut's forest, past and future. The book contains a wealth of information on the people and institutions that have helped shape the state's forests.



I have tried various devices to get our youth initiated in arboriculture. In 1876 an effort was made to promote “Centennial Tree-Planting” by offering prizes, which proved successful far beyond my expectation. Many youth in Connecticut whose first experience as little arborists was prompted by those prizes, have become so interested in this pleasant work that they have continued it each subsequent spring.

Birdsey Grant Northrup, Secretary, State Board of Education
Shade Trees Along the Highways
Report to the Connecticut Board of Education, 1881





PART FIVE

Social Dimensions of Community Forestry

Forestry is not just about trees; it's a social activity too. People involved with community forestry already know about the importance of public trees and landscapes, but what about others. How do you reach elected officials, the general public, municipal employees and anyone else? By the effective application of communication skills, fundraising abilities, volunteer management and political advocacy, people will become allies and supporters.



Glenn: It doesn't matter how important public trees are if people don't know it. And I bet people often overlook marketing as an integral part of a sustainable community forestry program.

Bob: The good news is that there are a few really basic components to a successful approach that everyone can understand and apply to their programs.



Chapter 21

Marketing the Community Forest

Stephen H. Broderick and C. Benjamin Tyson

Those of us involved with community forestry are often “get-our-hands-dirty” type people. We love green spaces and growing things, and marketing may not seem like the most enjoyable activity. But consider this: if you really want a successful community forestry program, an understanding of some basic marketing principles just might be the most important tool available.

What is Marketing?

To some people, the very word marketing invokes negative images of fly-by-night snake oil dealers at carnivals, or junk-mail brochures selling to-good-to-be-true investment opportunities. In reality, marketing is a process, designed to promote specific actions and involving several sequenced steps, that allow a good cause or product to sell itself. Most historians, for example, believe that marketing played a key role in the success of the American Revolution. The Boston Tea Party, used skillfully in posters, slogans, songs and sermons, became the catalytic symbol that helped win the hearts and minds of the colonists.



What's all this got to do with community forestry? Simply this: to the many folks out there whose support you will need, the whole notion of community forestry is a concept that needs to be marketed. Why is it important? How will it benefit them, and their community? Why is it worth the investment? Unless you reach the right people with an understandable message that answers these questions convincingly, your program may never get off the ground. And that is marketing.

The promotion of a concept like urban and community forestry, as opposed to a product like dish detergent or pickup trucks, falls under the heading of social marketing. C.R. Andreasen defines social marketing as “the adaptation of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behavior of a target audience in order to increase the physical, social, or psychological well being of an individual and of the society of which they are a part.” Basic social marketing principles can be used effectively in any size organization, from the National Wildlife Federation to the Friends of My Town Park. You don't need a huge budget to be successful at it, but you can certainly waste a huge budget if you don't go about it in an organized, systematic fashion.

In this chapter, we offer a basic approach to developing a community forestry marketing campaign:

- How to recognize those situations where a marketing campaign is required, and
- How to develop a simple marketing plan by asking, and answering, the right questions in the right order.

Why? Making the Case

“Why community forestry” is question number one. Beginning a community forestry program is an attempt to effect social change. Why is this necessary? Why is it more important than other potential uses of community resources? You who are at the forefront of the effort must clearly understand, and be ready to articulate, the environmental and social problems the effort will address. And you must use that knowledge to set both your program and outreach goals.

What? Getting Everyone on the Same Page

Question number two: Exactly what are you promoting? Many community forestry organizations have specific and familiar operational goals, such as “X number of trees planted,” or “Y number of trees pruned.” But is the number of healthy trees on the street really our ultimate goal? Or are the real goals something more fundamental: things like mitigating air and noise pollution, saving energy through shading and wind-breaking, increasing property values, and/or improved health and quality of life for our citizens?

To illustrate this point, suppose you find yourself speaking to your municipal Finance Board Chairman about why your town should invest in community forestry. You could emphasize the fact that your bare, tree-less streets are really looking ugly, and how much prettier and pleasant they’d be with trees on them. Or, as an alternative, you could explain how large, healthy trees lining town streets have been shown to increase adjacent property values by twenty percent, and how these increased values have in some cases translated into an improved bonding status for the community. You might go on to mention that a few well placed trees around public buildings can reduce air-conditioning and heating costs by twenty percent or more, and how good planting plans in shopping districts attract more folks downtown. In parting, you could leave him/her with your name, contact information, and a brief, attractive fact sheet that highlights these points.

If you chose this latter approach, you would have implemented your own mini-marketing plan. You distinguished between what social marketing specialists call “core goals” (e.g., increased property values, energy conservation, increased economic activity) and “secondary goals” (e.g., completed street tree inventory, number of trees planted, etc). You tailored your message to the specific audience in question by emphasizing benefits that mattered to her. And your fact sheet reduced existing barriers to further contact and further sharing of your message.

The key point here is simple: you are unlikely to ever get very far with secondary goals like tree planting unless you first succeed in articulating the true social benefits, or core goals, inherent in community forestry. People simply must know that there are real economic and environmental benefits to a well-managed community forest. If you fail in this crucial first step, you run the risk of having your program placed in the deadliest of all budget categories: “Nice, but not necessary.”

Who? The Art of Targeting

Once you have the “why’s” and “what’s” of community forestry well in hand you’re ready for question number three: To Whom? Now you’re getting into what social marketers call “targeting”, and it’s among the most crucial aspects of successful marketing.

In their book *Public Relations and Communications for Natural Resource Managers*, James Fazio and Douglas Gilbert state “There is no such thing as the general public.” The truth is we are all members of lots of publics, but none of them are general. Instead, from a marketing perspective publics are formed around issues, and consist of people who think more or less alike about those issues. Your community forestry organization, for example, consists of people who all think similarly about the importance of community forestry. But start discussing gun control or abortion rights at one of your meetings and you’ll probably find the group sorts out quite quickly into two or more “publics” with respect to those issues.

The idea behind target marketing is to divide your community into groups whose members will think about and respond similarly to community forestry messages. Then you can design messages specifically for each (like you did for your Finance Board Chairman), dramatically increasing the likelihood of a favorable response. Examples of community forestry target audiences might include:

- Community decision-makers and political leaders, including budget managers.
- Community merchants and business people.
- Environmentally active citizens.
- Retirees.
- Individual neighborhood residents.

No doubt you can think of others. To each of these groups, the prospect of a community forestry program represents different benefits and potential problems, and raises different questions. It means something different to all of them, including nothing at all to some. One of the biggest benefits to targeting is that it forces us to think and learn something about our key audiences, rather than



taking the easy way out and grouping them all into one big, amorphous mass called the “general public,” about which we can’t help but make erroneous assumptions.

The more narrowly you define an audience segment, the more targeted your communication strategy can be. But fewer and fewer people are reached as the focus narrows. The challenge is to pick a group large enough so there will be a significant impact, but with a narrow enough focus so you get results - a balance between efficiency and effectiveness.

Choosing your Targets

If your organization is like most, there are only so many dollars, people, and other resources to go around. You just can’t expect to reach every important audience out there at the same time. As with so many things in life, you have to establish priorities.

Often, social marketers do this by picking their best prospects first. These are the groups whose basic values and beliefs are consistent with yours, and who can be made into converts for the cause with the least amount of effort. Environmentally active citizens might well be an example; people who, once recruited, can help develop the program and reach your other audiences.

One very significant difference between commercial and social marketing is that, much of the time, commercial campaigns only deal with best prospects. A toothpaste commercial, for example, rarely attempts to teach people why they should brush their teeth. Instead, it tries to convince those who already do why one particular brand is better than the rest. Social marketers, on the other hand, are not so lucky. We nearly always have to deal with some folks who, for whatever reason, are not at all predisposed to our message. They may be convinced that community forestry is a waste of money, or that it will somehow cause more work for them. Or they may just have some other hang-up

Business in a community are a key audience for a community forestry marketing strategy.



we'll never be able to fathom. The real difficulty, of course, comes when such folks are “Gatekeepers” occupying key budget or political positions. This can leave us in tricky political waters with little or no navigational experience.

Avoidance is easy, but usually disastrous in such situations, and half-hearted efforts like mailed brochures will rarely do the trick. What's most often required is the courage and maturity to meet face-to-face, calmly and professionally, with your “why's” and “what's” once again firmly in hand. Such meetings have at least demilitarized many a formidable opponent over the years, and sometimes even result in valuable converts.

How? Sending Messages that Work

So far, we've discussed the importance of understanding, and articulating, our core goals: the true societal benefits of a community forestry program. We've thought about how those translate to secondary program goals, so we know just what it is we're promoting. And we've thought about exactly who we're promoting it to. If you make it this far, you've already done far better than most. Now the final question becomes how? What message are we sending to our target audience (message design), and how are we sending it (media mix)?

When deciding what you want to say to a target audience, it helps to ask yourself a few simple questions. First, what do you want from this group? A general awareness of why community forestry is important? Financial support? Political support? Or roll-up-your-sleeves action and hands-on involvement? The essence of your message will differ depending on the answer. With some audiences you'll want more than one of these results. Such cases can require several phases to guide the audience, over time, from awareness to knowledge to action.

Second, how can the message be placed into a context that they can relate to? If you're looking for citizen participation in a downtown neighborhood planting project, for example, you might not want to begin by discussing global warming and the importance of public trees for sequestering carbon. Something about higher property values, the beauty of tree-lined streets and the sense of community and neighborhood pride this project will create might be a better choice.

Third, what will it cost audience members to do what you ask? Different requests involve different types of costs. There are financial costs (please contribute to our municipal tree budget), time costs (please help us out with the restoration of the town green) and psychological costs (please cold-call your neighbors and garner support for tree maintenance). If the costs are perceived as too high, they can keep people from acting. With a little thought you can sometimes lessen the perceived costs of a message's request without substantially lessening the impact.

Finally, is your message as clear as possible? In the words of Steven Mansfield, communication scientist, "Any message that can be misunderstood probably will be." The communications science literature abounds with examples of expensive campaigns that failed because of misunderstood messages. Avoiding this pitfall primarily involves spending as much time listening as you do talking, and not turning your positive missionary fervor into an arrogant presumption that you know everything. Pre-testing your message with a few members of the target audience, for example, rarely fails to be enlightening.

Putting it All Together

Now that we've run through the basic steps of a targeted outreach campaign, let's illustrate this approach with a couple examples. First, we'll go back to our best prospects - those folks in town who are currently, or potentially, active in an environmental cause. These are people who already know that environmental quality is important. They share your basic values, and are instinctively sympathetic to your cause. These are your potential troops and allies. Your goal for them is behavior change. You want them to get active with your organization, and to feel the same sense of importance that you do about community forestry.

Because you're designing your message with these goals in mind, it must be both convincing and motivational, conveying if possible, a clear sense of urgency. You might start, for example, with some hard-hitting facts about the threats inherent in the current situation and the magnitude of the problem: that four trees die for every one planted, the resultant deterioration of community neighborhoods and environments, etc. You could clearly detail the wonderful benefits just waiting to be realized through citizen action, and what a huge difference each individual can make. You could end

by emphasizing why now is an important time to act, and suggest a reasonably low-cost action to take: join the organization, come to next Tuesday’s meeting, or make a call. Something they are confident they can accomplish, that brings them face-to-face with your members and allows them to be infected with your enthusiasm.

How do you get this message to them? This isn’t an easy question to answer because, at the moment, you have no idea who or where your best prospects are. There’s someone out there who recently moved to your community after being active in organizations elsewhere. There are others out there who recently retired and suddenly have more time to spend on social causes. And there are folks out there who have been sitting on the sofa, watching the Discovery Channel® and thinking about volunteering for the environment, but who just don’t know where to go or who to call. In short, your best prospects could be just about anyone, living just about anywhere in town.

Such a situation calls for multiple outreach channels, or media, to provide the best opportunity for reaching lots of people. The hometown newspaper, community newsletter, and/or community access television channel are good tools for “sweeping” the audience with periodic stories about your purpose, accomplishments, upcoming events, and need for recruits (always with specific information on how to contact you). So-called human interest stories, detailing how your efforts made a difference in someone’s life, can be especially effective. Getting this done, of course, requires not only having such stories to tell, but taking the time to educate and to develop personal relationships with your key local reporters and other media people.

Beyond that, investigate existing communication channels through where local environmentalists interact. Is there a local garden club? Sports club? Audubon or Trout Unlimited chapter? You may be able to get a local member list, or have a few minutes to speak at a meeting. Ultimately, you may want to consider creating your own outreach vehicle (e.g., a quarterly newsletter that’s regularly avail-

Linking trees to multiple community values, such as recreation and aesthetics, is important to a community forestry marketing plan.



able at the local hardware store, garden supply store or other places where outdoor type folks are found).

Another valuable target audience can be community merchants and business people. These are people who can be very helpful in several ways: direct financial support, influence with the community's political leadership, and increasing your program's visibility by incorporating it into their own business promotions in some way. While your goal for this audience is also action, it's a different type of action: the type that flows from a conviction that helping you will benefit them.

A well-designed message for this group might start by describing (ideally with illustrations) how community forestry can make the local shopping district more attractive to consumers and bring more folks downtown. It could continue with some facts about how much consumers in general care about environmental issues. Public interest surveys, for example, consistently show that the majority of American consumers care about environmental quality and the environmental impacts of the products they buy. And since you are working hard to improve the local environment, associating themselves with you can be good for business. (McDonald's Corporation once paid \$10 million for the right to place the Global ReLeaf® logo on their take-out bags, and MCI Corporation in the past has offered customers the option of sending a percentage of their bill to The Nature Conservancy or the National Audubon Society.) Might there be a local parallel you could suggest to merchants? If by effectively publicizing their contributions and otherwise promoting their business, you can bring even a few more customers into the store, you just might begin to find more business partners up and down the street.

The best media mix for this audience is far more straightforward. There can be no substitute for face-to-face, one-on-one conversations. Becoming a familiar face at Rotary or Chamber of Commerce events, coupled with individual visits to their place of business, is the most likely formula for stimulating action. And the benefits of each successful contact make the extra effort worthwhile. An attractive brochure, a brief CD-ROM, or video production about your group can be important information pieces to leave with people. But they are unlikely to do the job on their own. A friendly local face is your competitive edge over the crowd of state and national environmental causes competing for their support.

Two final points about marketing: first, credibility is essential, hard earned, and easily squandered. Be certain that your organization is operating on a sound scientific basis, and that whatever messages you send out are correct and consistent. Contradictory information sows doubt about your entire effort. Similarly, poor advice about what tree to plant or how to care for it destroys credibility: immediately with those who know better, and eventually, when the tree dies, with everybody else.

Second, do your best to be sure that response systems are in place before you begin your marketing effort. If you motivate someone to take action, make it clear what action that should be, and that those who do act encounter friendly assistance, not blind alleys or roadblocks. Don't publicize a phone number unless the person at the other end of the phone responds quickly and knows what the caller is talking about. And don't ask for a contribution from a local merchant unless you're prepared to do something productive and visible with the resources he/she provides.

Whether we realize it or not, marketing is something every community forestry organization gets involved with eventually. Too often, however, we only get involved when it becomes obvious we can no longer avoid it (e.g., the week before the Board of Finance considers the budget). If, instead, we build even a small effort at pro-active marketing into our regular organizational agenda, the long-term payoff can be enormous.

Suggested Readings

Andreasen, A. R. 1995. *Marketing Social Change: Changing Behavior to Promote Health, Social Development, and the Environment*. San Francisco: Jossey-Bass Publishers.

A useful text that thoroughly explains the core ideas supporting social marketing approaches to behavior change. It provides a clear understanding of target audience decision-making, methods for increasing the usefulness of research, and ways to conduct multi-stakeholder social marketing programs.

Beamish, R. 1995. *Getting the Word Out in the Fight to Save the Earth*. Baltimore: John Hopkins University Press.

Beamish is a true voice of experience, having been director of communications for both the National Audubon Society and the New York Adirondack Park Agency. A great basic manual for laypersons with particular focus on recruiting members and keeping them engaged, and using print media and the written word effectively. Beamish concludes with a brief but well done primer on fundraising.

Fazio, J.R. and D.L. Gilbert. 1986. *Public Relations and Communications for Natural Resource Managers, 2nd edition*. Dubuque: Kendall/Hunt Publishing Co.

A two-part manual that begins with outreach planning tools and techniques, and ends with public presentation and communication skills. Both sections are good although the latter is understandably out-of-date in terms of available media technology.

Jacobson, S.K. 1999. *Communication Skills for Conservation Professionals*. Seattle: Island Press.

This is an excellent, comprehensive manual for conservationists with a particular slant towards using mass media to reach large audiences. It is liberally seasoned with real life examples of conservation organizations successfully employing marketing and communications science.

Tyson, C. B. 2003. *Strategic Environmental Communication: Communicating Strategies for Influencing Environmental Behaviors*. North Chelmsford, Massachusetts: Erudition Books.

Tyson has written an applied and theoretically grounded, reference that explains how to conduct audience research, develop theory driven communication strategies, and manage, monitor, and evaluate campaign progress. A detailed case study of a long-term watershed-based forest stewardship project in Connecticut is presented.



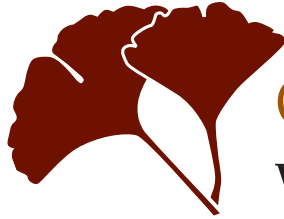
In working, shading, and beautifying our highways, we have been too negligent and selfish, and have not kept pace in this progressive age in which we live. I am glad to know, however, that of late some are awakening to these long-neglected improvements, and that our State is offering inducements for towns to take hold of this humane and Christian work of road improvement.

Edwin Hoyt, New Canaan
Forest and Ornamental Trees and Shrubs
Report to the Connecticut Board of Agriculture, 1897



Bob:

Developing good relationships with the media – professionals who can tell your story – is essential to maintain and increase public support for a community forestry program.



Chapter 22

Working with the Media

John C. Lepper

From time to time, we may be totally at odds with the news media and how they cover an event, and thus, may even feel antagonistic. However, communicating your message to the public means more than just publicity. It can help recruit volunteers, raise funds, bolster membership, improve your organizations image, or reward hard working volunteers; we have to work with them to get our message out.

One of the first things you need to do is develop a media list. Be sure to include the appropriate reporters or editors of local daily newspapers (town reporters or stringers), local weekly newspapers, local television station, community access cable station, and local radio station. Get to know these people and establish good relationships with them. Become known as a person who can be relied upon for solid information and good story leads. Integrity is your most valuable asset. Honesty is a necessity when dealing with the media. If asked for information you do not have, be frank, but offer to get the information for them, or refer them to someone who does have the answer. In the long



run, frankness and honesty are more effective than shading facts, ignoring situations, or giving erroneous impressions.

Treat all media equally when sending out a news release; do not play favorites. But in answering a special request, honor that request as exclusive. Do not offer the same information to other media before the requesting medium has used it or has had reasonable time to use it.

Read, watch, listen, and notice things. Keep your mind and eyes open for possible news and feature stories at all times. If you see or hear of news in the making and have no time to do the story yourself, tip off the media so they can develop the story themselves. Anything you can do to assist the news media increases their desire to cooperate with you.

Remember, the media is a commercial enterprise in business to make a profit. Competition for media time and space is intense, so do everything you can to make the editor's job as easy as possible. Be sure your story is newsworthy. Be sure you know about your specific program and/or event. Your job is to get the news to the media, and most important, deliver it while it is still newsworthy.

Judging What is News Worthy

There are several factors involved in making a news release newsworthy:

- **Timeliness** - get it to the media while it is still news. Know the media deadlines. You can find these out in your initial visit with your media contact person. Get your news in ahead of the deadline. If you miss the deadline, your story is dead.
- **Interest** - To be newsworthy, a news release must be of interest to a substantial number of the media's readers or listeners. It must contain information that others would want to know.
- **Accuracy** - It is essential that a news release be accurate and factual. There is no place in a news release for suppositions, the writer's opinion, or the writer's prejudices.

Trees and the media can be powerful allies in presenting a positive message to the public about community forestry.

Honesty and integrity are critical in developing an effective and long-term relationship with the local press.



News releases are one of the fundamental tools of public relations, and all too often, the bane of editor's across the country. The reason is simple, most releases are written incorrectly. About eight out of ten publicity releases which reach an editor's desk end up in the waste basket.

Your aim should be to write releases as simply and clearly as you can, making it easy both in style and in arrangement of pertinent facts, for the person who must rewrite it to do so accurately.

News releases should be written to interest editors and their readers and listeners, not you and your organization. Write to express, not to impress. Present your ideas simply and directly. The writer who makes the best impression is the one who can express complex ideas simply.

Some media people will supply you with guides or style books to follow in preparing copy for them.

Targeting Your Audience

Think of your audience and not the story. Before you start to write, decide what audience you want to reach. Do you need public support for an issue? Are you trying to attract people to a special event?

Some subject areas that provide opportunities for publicity are: after a storm, after a casualty, planting time, raking leaves, treatment for insects, Arbor Day, Tree City USA or Connecticut ReLeaf awards, bloom time, and fall colors. The media loves controversy. Be there with a reasonable view on trees.

Suppose you have been assigned to handle the public relations for an event. A good campaign requires thought and planning. Things you should do or think about: who is invited to the event (officials or "VIP's"), know agenda for the event, what the event is about, why event is being held, obtain biographies and copies of speeches from key participants (these are needed for media kits).

Preferred time of day for an event, is 10:00 a.m. or 2:00 p.m. This allows reporters and camera crews to get information back to those who plan the day's placement of news. While 10:00 a.m. and 2:00 p.m. are optimum times, this does not preclude other times of day.

In planning for coverage of the event, be sure you have taken care of supplies to have on hand including media kits, bad weather/rain date plans should also be part of your planning.

There are four ways of getting your message to the media. They are:

- Media Advisory
- News Release
- Fact Sheet
- Backgrounder

The Media Advisory is a tool used to alert the media to your event. It is basically a “who, what, when, and where” document outlining the particulars of your event. Media advisories should be sent out a week before the event is to take place. A media advisory should entice editors and reporters to the event. Do not tell them your whole story, rather give them significant details, like who the “VIP’s” will be and when they will be there, human interest slants, and other teasing bits of information.

To be newsworthy, a news release must be of interest to a substantial number of the media’s readers or listeners. It must contain information others would want to know. A good news release must contain five important points – who, what, when, where, and why, and, if possible, how. It is important to get all these points in the first sentence or two whether you are writing for newspaper or broadcasting. These first sentences are called “the lead.” A good lead captures the attention of a reader or listener and makes him/her want to know more about your activity.

Now go into the details of your story. Each succeeding paragraph should be of declining importance. If an editor has to cut your story he/she can do so from bottom to top without cutting the important facts.

Use short words. Write short sentences, and short paragraphs. Two sentences make a good paragraph in a news release. Write to express not to impress.

The best way to get the most from a news release is to select media based on who can make use of it. Work with editors rather than using them as targets for your release. Mark copies in red that





contain local interest for editors. Avoid words and phrases such as spectacular, interesting, best, etc. They are subjective and everyone may not agree. Let facts speak for themselves. Be objective. You do not make news with adjectives and modifiers. You make news with facts. Always give exact dates in a story. Always spell out numbers one through ten. Do not try to use advertising in your publicity. Never send a story to more than one editor at the same newspaper or broadcast facility.

The Fact Sheet is an outline rather than a complete story and is included in the media kit. Backgrounders are in depth information on a subject and are also included as part of a media kit. Both backgrounders and fact sheets provide more detailed information that may lead to follow up stories.

To get your release to where it needs to go, you have four choices: hand delivery, regular mail, e-mail, or FAX.

There are advantages and disadvantages to all four:

HAND DELIVER

Advantages

arrives on time

can be personalized

can include photos

Disadvantages

time to reproduce copy and stuff

envelopes

time to deliver

REGULAR MAIL

Advantages

delivery most always certain

can be personalized

Disadvantages

can arrive late

time to reproduce copy and stuff and

mail envelopes

E-MAIL	
Advantages	Disadvantages
fast	attachments can contain viruses and worms
cheap	impersonal
can include photos	formatting problems between computers
	wind up in stack with other E-mails
FAX	
easy to send to many people	can jam on either end
arrives fast	needs to be retype
drelatively inexpensive	print quality may be poor
	impersonal



Check with your media contacts to determine which method they prefer you to use. Many editors do not want releases sent by E-mail.

From time to time, you may be asked to do live interviews with a reporter. Here are some points to keep in mind for those occasions. Help reporters meet deadlines; but do not do an interview unprepared. If you cannot meet a deadline, tell the reporter you can not, and why you can not. Be sincere. Tell the truth even if it hurts. Even “little white lies” destroy your credibility. State your conclusions first then explain. In this age of sound bites, this will help ensure that your important points are not edited out. Stay “on the record.” Off record comments may be used against you in some manner. Do not respond to a “fact” if you do not know it to be a fact. Begin your answer with, “I do not know that to be a fact.” Do not answer “what if” questions. If a reporter begins a question with “What if...,” respond with “I would rather stick to what is.” Do not let the interviewer rush you. If presented a series of questions, say “Can I take those one at a time” or “Let me respond to your first question.”

Slow down the pace and think about your answer. Do not let the reporter interrupt you. Do not get angry even if the reporter is belligerent. The offensive question will probably be edited out leaving only your angry answer. Do not be afraid to say, "I don't know." Instead refer the reporter to someone who does know, or find the answer and get back to them. Be sure to follow through. One final thought to keep in mind; you probably know more about the subject than the reporter. Educate the reporter.

Photographs pose special problems and opportunities. Most newspapers prefer to use their own photos and will often send a photographer to a news event or interview in connection with a story. Some will print a good picture that has been sent to them.

What makes a good photograph? It must have news value, tell a story, have human interest, and good composition. Be sure contrast is good and subjects are in sharp focus. Try not to have more than four faces in the photo. Make sure all faces are recognizable. Group people close together. In addition to creating more photo interest, it gives the editor more space to crop and enables photo to be more usable. Get in close for pictures. Fill up the frame with what you want in the picture. The bigger your subject in the picture the better it will reproduce. Be sure your subjects are doing something, never just looking at the camera, and the more candid the better. The unusual photo is what gets reader attentions. The more important you can make a photo appear to an editor, the better its chances of being used.

Be mindful of background for photos. Make sure plants, poles, or other objects are not sticking out of people's heads. Check to make sure buttons are buttoned, zippers are zipped, and hands are not in places that could look embarrassing or unflattering.

All photos should have captions identifying the photo, place, date, event, and the people in it. Type information on lower half of sheet of paper, attach top of sheet to back of photo with tape, and



SHARON

THE LAKEVILLE JOURNAL
 & THE MILLINGTON NEWS, Thursday, November 16, 1995 A3

Tree Project Branches Out Across Green

By MARGIEN EPHROUTH
Staff Reporter

SHARON - It's about one million tall trees, and almost, even delicate. But long before the 700-year life expectancy, the English oak planted on the Green was half that tall.

"The trees also were quite tall, and we'll never know," said Peter Petros, an instructor of the Sharon Green Preservation Association which raised \$4,000 to purchase 10 plants, including one in the heart of town. The entire effort is by the Mr. Petros's observations on the English oak. The oak accompanying the project will ever be in competition. These grow slowly.

"But this is the start," Petros said. The idea is to purchase planted around town which developing "why" are private property to be moved to the Green.

This English oak was planted with an eye toward filling the gap when the somewhat-dwindling Main Street mansards to disperse, as all else seems to, Petros said.

A little to the south, the second of four new tree stands, Kentucky red-fir trees. This tree, which has nothing to do with nuclear energy Kentucky would grow up in heron for a individual here, and grows to 75 feet. It is not only lovely but adaptable.

But probably among the most adaptable ones in history is the third tree planted, a pinkie oak. 150 million years old, Asian, common to Eastern China, and today with limited success reaching to 80 feet. It is disease and

pest resistant. And is beautiful, Petros said.

And finally, near the southern end of the Green stands a new American-made oak, a tree with beautiful red foliage in the fall.

The association has been funding about 10 plants to obtain the fast-growing specimens, it had options and a single white oak.

Now it is up to the newly appointed Tree Warden Scott Monroe to see that the necessary along and to grade and land the old street, an estimated 200 trees on the green alone. With a \$7,500 annual budget, none of which goes for salary, the operation is seriously underfunded, Mr. Monroe said.

And the need for care is great after new severe drought in 1993 and 1995.

"One way to do this, Mr. Monroe said, is to avoid liquid food right into the trunk. That's the fastest way.

Another method is pumping liquid fertilizer under pressure into the root area. This is much more effective and far less damaging than the old method of pouring liquid with a hose and pouring in dry fertilizer.

"I still wonder why it is given fertilizer in the nursery but that would be another topic," Monroe said for the number of trees involved, pouring fertilizer into each around the trees is the best way here.

But that is going to require more time taking and more grass watering.

"People like the trees but people take them for granted. We have a

On Sharon Green

Peter Petros of the Sharon Green Preservation Association walks the Green past an English Oak planted by the preservation group.



1996 FAIRFIELD MINUTEMAN

A day to root for trees

ReLeaf Festival celebrates arboreal splendors of Fairfield

BY MELISSA TOOTHILL

"Without trees, we 'wood' not have a home." This statement graced one colorful poster displayed at the ReLeaf Festival on Sherman Green last week. The illustration, one of scores drawn by elementary school students from across the state, depicted trees and the animals that live in them. The posters were featured among many exhibits at the state's third annual celebration of trees, which Fairfield hosted this year.

"The goal of the festival is to accentuate the value of trees" and to teach maintenance and planting techniques, said Connecticut ReLeaf Chairman Richard Bauerfeld. Approximately 400 students from three Fairfield and two Bridgeport elementary schools attended the event. It's ideal for children, Bauerfeld said, because they are "still young and still in that learning stage."

Stefan Novotny, a fifth-grader at Fairfield's Dwight School, showed his eagerness to learn at a Bridgeport Hydraulic Co. display. He interacted intently with a model depicting a cross-section of earth. The item is designed to show how



Photos by Craig Skinner

'Beary' good news

First Selectman Paul Audley and Smokey the Bear applaud during award ceremonies at the ReLeaf Festival on Sherman Green last week. Fairfield was presented with its eighth Tree City award during the event.



groundwater flows and discharges. "It also

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??

??

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fold caption over face of photo. Do not write on front or back of photos. Do not use paper clips or staples on photos.

In Summary

Working with the media is an essential task for communicating urban forestry messages to the public. Remember these points to make your work easier and more effective. First, establish your media contacts and work with them. Make their job easy. Write releases correctly, simply, and clear. Write to interest editors, their readers and listeners. Think of your audience and not the story.

Think of what triggers opportunities for publicity and good stories (i.e., planting time, bloom time, Arbor Day, fall colors, raking leaves, weather related events). Remember, when developing a story for television, it is a visual medium. There has to be a visual interest to make the story – think action, color, and audio. Above all, be credible, straightforward, and honest in dealing with the media. Following these simple rules will make your work with the media more effective and enjoyable.

Some terms you should be familiar with when dealing with the media:

ADVERTISING	The lifeblood of the media. Newspapers have space to sell, the broadcast media time to sell. The media cannot survive without advertising dollars. Never try to camouflage advertising as news.
CAPTION	Identification of the person or persons appearing in a photograph. Sometimes called a “cutline.”
COMMUNICATION	The art of communicating, transmission, or exchange of information by the printed or spoken words.
COPY	The text of a news release that is to be printed or broadcast. Any material that is to be set in type or broadcast is usually referred to as “copy.”
CUT	In the printed media, any illustration, whether photograph or drawing, is referred to as a “cut.”
DEADLINE	Final moment when a news release must be in the hands of an editor or news director to be printed in a certain edition or aired on a certain broadcast.
MEDIA	Plural of medium. Used to designate all forms of mass communication—newspapers, magazines, radio, television, etc.
PUBLICITY	Information that concerns a person, group, event, or product disseminated through the communication media to attract public notice.
PUBLIC RELATIONS	A program of action to earn public understanding and acceptance. Advertising and publicity are tools of public relations.

Suggested Readings

Fazio, J.R. and D.L. Gilbert. 1986. *Public Relations and Communications for Natural Resource Managers*, 2nd edition. Dubuque: Kendall/Hunt Publishing Company.

A two-part manual that begins with outreach planning tools and techniques, and ends with public presentation and communication skills. Both sections are good although the latter is understandably out-of-date in terms of available media technology.

National Tree Trust. 1993. *Volunteer Media Handbook*. Washington, D.C.: The National Tree Trust.

This handy little manual may be impossible to find now although it is well worth the effort to track a copy down. It contains all that is needed in developing media materials and for handling the media prior to and at tree planting events.

Ricard, R.M. and S.H. Broderick. 1996. *Effective Communications for Natural Resource Volunteers and Professionals*. Storrs: University of Connecticut Cooperative Extension.

This is a simple, yet thorough booklet covering many facets of communications and media. It contains a detailed outline of how to develop a media strategy and then how to execute that strategy.

American Basswood *Tilia Americana*

Also known as American Linden, this native tree grows from Maine to Minnesota, south to Tennessee. It is a large tree to 80 feet that requires plenty of room to develop and, therefore, should be limited to planting as a specimen. Some cultivated varieties may be suitable for street plantings. The dark green 4 to 8 inch long leaves are broadly ovate, come to an abrupt point, are coarsely serrate and turn yellow in autumn. Branches droop so they should be pruned, preferably at a young age, when growing near pedestrian and vehicular traffic.



TREE COLLECTIONS IN CONNECTICUT

The following list of places with collections of trees is offered as a resource for those working to improve their tree identification skills. All locations are open to the public and have some form of interpretive material, usually tree labels, brochures, or both. It is undoubtedly incomplete, and contact information, especially web site, is subject to change.

Bartlett Arboretum

151 Brookdale Road,
Stamford, CT 06903
(203) 332-6971
www.bartlettarboretum.org

Bushnell Park

Between Asylum and Capital Avenues in
downtown Hartford
Bushnell Park Foundation
(860) 232-6710
<http://www.bushnellpark.org>

Cedar Hill Cemetery

453 Fairfield Avenue,
Hartford, CT 06114
(860) 956-3311
<http://cedarhillcemetery.org>

Connecticut College Arboretum

Office: 103 Olin Building,
270 Mohegan Avenue,
New London, CT 06320
(860) 439-5020
<http://arboretum.conncoll.edu>

Cotton Hollow Tree Trail

Sawmill Road, Glastonbury
Parks & Recreation Department
(860) 652-7679

Dinosaur State Park

400 West St.,
Rocky Hill, CT 06067.
(860) 257-7601
www.dinosaurstatepark.org

Elizabeth Park

Corner Asylum and Prospect Avenues at
the Hartford/W. Hartford town line.
<http://elizabethpark.org>

Highstead Arboretum

P.O. Box 1097,
Redding, CT 06875.
(203) 938-8809
<http://highsteadarboretum.org>

Holy Apostle College and Seminary

33 Prospect Hill Road,
Cromwell, CT 06416
(860) 632-3010
[http://www.holyapostles.edu/
General%20Info/Trees.htm](http://www.holyapostles.edu/General%20Info/Trees.htm)

Institute of Living

200 Retreat Avenue,
Hartford CT 06106
(800) 673-2411
<http://instituteofliving.org>

**Lockwood Farm, Connecticut Agricultural
Experiment Station**

890 Evergreen Avenue,
Hamden, CT 06518
[http://www.caes.state.ct.us/
Departments/lockwood.htm](http://www.caes.state.ct.us/Departments/lockwood.htm)

Montgomery Pinetum

Bible Street opposite Clover Place,
Greenwich (Cos Cob)
[http://www.greenwichct.org/
ParksAndRec/prFacilitiesIndex.asp](http://www.greenwichct.org/ParksAndRec/prFacilitiesIndex.asp)

Palmer Arboretum

Rt. 169, behind Historical Society Building
(Palmer Memorial Hall). Woodstock

University of Connecticut Campus

Rt. 195, Storrs
Visit this web site for campus
woody plant tours:
<http://www.hort.uconn.edu/plants/>

Wadsworth "Arboretum"

Along Long Lane,
from Wadsworth Street,
Middletown

Wadsworth Mansion

421 Wadsworth St.,
Middletown, CT 06457
(860) 347-1064
<http://www.wadsworthmansion.com>

White Memorial and Conservation Center

80 Whitehall Road,
Litchfield, CT 06759
(860) 567-0857
<http://www.whitememorialcc.org/>



Glenn: Bob, there never seems to be enough money for municipal tree programs and people are always searching for ways to fund their efforts.

Bob: I agree, Glenn. My experience is that the most successful programs have a diversity of funding sources, in addition to tax dollars.



Chapter 23

Fundraising for Community Forestry Programs

Robert M. Ricard

Like most municipal improvement activities, urban and community forestry requires funding. In certain situations, volunteer tree activists and businesses can provide in-kind services and goods. In many other instances, goods and services simply must be purchased.

American author Gertrude Stein once said that “Money is always there, but the pockets change.” To be successful, urban and community forestry programs must heed this wisdom and develop diverse, and adaptable, fund raising strategies. With a plan in place, public officials, citizen tree activists, potential donors, and funding agencies will be able to understand your program goals, objectives, and financial needs and will be more willing to enter into working financial partnerships.

This chapter will focus on raising funds from sources other than from local, state, and federal government.

Where Do Contributions Come From?

It is critically important to realize that revenue need not come from the public sector only. Individuals, business and family, and/or corporate foundations can help finance the urban and community forest and often will provide the greatest funding opportunities. In the United States, individuals constitute eighty-two percent of total giving, whereas corporations and private foundations make up eleven percent of the total.

You are more likely to get donations if you have a specific, well-planned project. For instance, sometimes grants are given to get a project started. The city of Middletown provides an excellent example of the way in which “seed money” works. In 1989 the city received a two-year grant to initiate a model urban forest project. In the two grant years, an ordinance was passed, a tree inventory was developed, and urban forest commission was created, community support was obtained and trees were planted. To enhance these efforts, funding was also received from city government. Most importantly though, at the end of the life of the seed money, the Middletown Urban Forest Commission recognized the need to diversify funding sources and has successfully obtained volunteer assistance, individual contributions, private foundation grants, and partnerships with local businesses.

Similarly, citizen organizations in Hartford and Stamford developed diversified fundraising strategies for tree planting and associated projects, such as youth job training. In these cities, community forest projects have been funded with foundation grants, individual donations, and local business contributions. They have relied on community spirit and activism to raise funds.

The following are examples of traditional, non-government funding sources:

- Private and corporate foundations
- Corporate giving through partnerships and sponsorships
- Special events (e.g., dinner, auctions, golf tournaments)
- Individual donors
- Civic groups (e.g., Lions Club, Rotary)
- Unions/professional organizations
- Direct mail (e.g., an annual appeal)
- Interest from permanent endowments
- Local business giving, including in-kind services

It is important to remember that for a community forestry project to remain viable, fund raising must be based on multiple sources of revenue, so when one source dries up, others are available.

Who Should Fund Raise?

Anyone can raise money for a good cause, and you are probably more experienced than you think. Most of us have raised money at some point in our lives, be it a bake sale, church supper, or paper drive. Fundraising requires dedication, imagination, information, and a plan.

Ask any fundraiser, seasoned professional or beginner, what is the most intimidating aspect of fundraising and, invariably, they say the fear of rejection. This is natural - no one likes to be rejected. Know that your request for funding might be rejected, but learn from each encounter and move on to the next prospective donor.

No one person possesses all the required skills, so fund raising should be a group activity. Chances of success are greater if people in your group are skilled in the following areas:

- Accounting
- Banking
- Computers
- Corporate relations/corporate culture
- Library research
- Marketing
- Media relations
- Public speaking
- Sales
- Technical writing

Be Informed; Be Prepared

Your chances of success increase if you do your homework. Learn as much as possible about the person, foundation, or business you are approaching. Learn what they like to fund. Know their

assets and whether or not they have formal procedures for fund requests.

Put yourself in the prospective donor's shoes. Ask yourself, "Why should I give to your urban or community forestry project?" Most people give for one or more of the following reasons:

- Peer pressure
- Save taxes
- Help save the planet
- Achieve popularity
- Gain public recognition
- Increase property value
- Promote business

Appeal to them accordingly. No person, government, or business is going to donate to an organization that cannot demonstrate fiscal responsibility. Prepare a project budget to present to prospective donors. If possible, have a financial statement showing the last three years of activity. For a nonprofit organization, an annual report will suffice.

You will also need to demonstrate that your organization is capable of completing project objectives. Unfortunately, this can be a "Catch-22" for new organizations. Be prepared to supply any of the following to prospective donors: resumes of project coordinators, list of board members and past donors, references, letters of recommendation, testimonies, and proof of your organizations tax exempt status, if applicable.

Many cooperatives and foundations provide guidelines for fund requests. Ask for them, and then provide only what they request.

Put Your Best Face Forward

Many urban and community forestry organizations, both public and private, overlook marketing as a key component of fundraising. Even if you only do one fund raising event, the image your





group projects is lasting. It is easier to “sell” your project or organization if, through year-round marketing, you make yourself known.

Use the media to your advantage. See that your community forestry organization is in the news. Routinely contact reporters, journalists, and freelance writers to inform them of your activities. Invite representatives from government, businesses, and civic associations to your urban and community forestry events, and publicize them.

The best marketing “tool” is a positive attitude. Stay upbeat, even when financial times are tough. People like to be associated with winners. They are more likely to give if they perceive your organization to be successful and result-oriented.

Thank the Donor and Publicize the Gift

Acknowledge the donor; thank them. Before doing so, however, ask how they wish this to be done. For foundations, corporations, and local business, publicity will usually be very important, but individual donors sometimes prefer anonymity.

When you have completed the project, send a report to the donor. People enjoy and appreciate receiving pictures, quotes from participants, letters from kids, news clips, and materials that are the product of their gifts, some may even require it. Send thank you letters that include a report on the disbursement of funds.

Put It All Together

Fundraising is an activity that takes years to perfect. Schools and universities often have whole departments of professional fundraisers to acquire necessary revenue to finance their missions. Be creative. Workshops, especially on grant writing skills, are offered by nonprofit and for-profit development groups. Public libraries will be able to provide some references as well.

Trees in the urban and community forest are living, lasting memorials to peoples’ generosity, care, and devotion. To quote Bryce Nelson, “People who will not sustain trees will soon live in a world which cannot sustain people.” But remember, the fact that tree planting/tree care is worthwhile will

not guarantee success. Planning, dedication, research, skill, and hard work will help ensure that the forests along our streets, in our parks, and around our schools and municipal buildings will be planted and maintained in perpetuity.

Suggested Readings

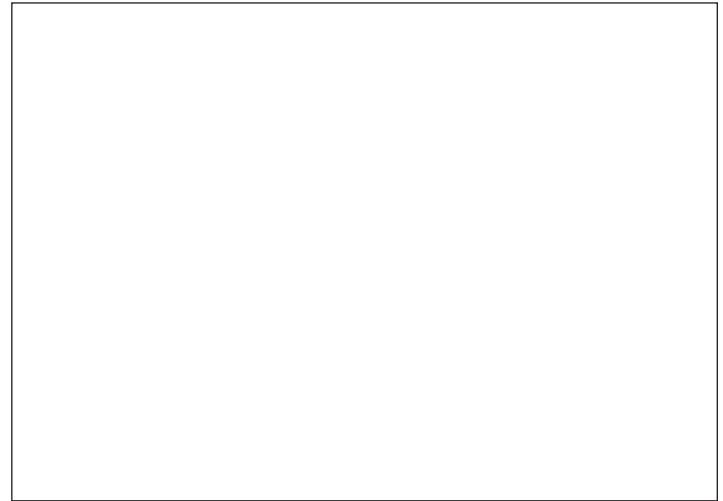
Flanagan, J. 1982. *Grass Roots Fund Raising Book*. Washington, D.C.: The Youth Project.

This is simply the best book to read on fundraising. It is regarded as a classic. This is the book to own and read before moving on to more advanced books.

Gurin, M.G. 1981. *What Volunteers Should Know for Successful Fund Raising*. New York: Stein and Day.

Gurin provides a book that is organized well and easy to follow. It is particularly good at helping people develop and define organizational goals and objectives and then based on these, develop fundraising goals, objectives, and strategies.

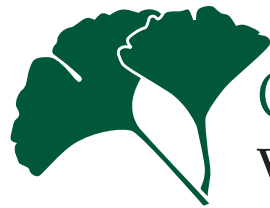
Steckel, R. 1989. *Filthy Rich and Other Nonprofit Fantasies*. New York: Ten Speed Press. This is an advanced book targeting larger, well-established nonprofit organizations. It is, if anything, fun to read.



Donor recognition events are an important part of successful fund raising.



- Glenn:** Volunteerism and public participation is a strong tradition in Connecticut communities.
- Bob:** However, Glenn, professionals and municipal officials sometimes are skeptical that volunteers can do positive things.
- Glenn:** But you and I both have seen the amazing contributions volunteers make to their communities.



Chapter 24

Volunteers in Community Forestry: Principles and Practices

Colleen Murphy-Dunning and Robert M. Ricard

Since urban ecosystems are particularly dominated by the presence of the human species and the built environment, it is critical to recognize that city residents are stakeholders with whom we can engage in the stewardship of our urban environment. Although our public agencies have the mandate to manage public lands, ecosystems are not defined by private or public boundaries. Engaging volunteers to work in partnership with natural resource professionals contributes to more effective management that can transcend such property divisions and recognize the valuable contributions our citizenry can play in the urban environmental movement.

The role of citizens in natural resource management is not a new notion. Social or participatory forestry has long been practiced in rural areas of developing countries. Principles drawn from

social forestry include the idea that local communities have superior knowledge and understanding of their local conditions. It also acknowledges that local communities have a right to manage their local resources and respects them as capable individuals. Often these initiatives have addressed local natural resource needs through agroforestry practices or community wood lots. For example, forestry extension educators might engage local populations in producing their own fuel wood, which ultimately reduces pressure on local forest areas. Adapting these outreach strategies to the urban context is a more recent development.

Another legacy that urban community forestry efforts build upon is the urban renewal strategies in the United State over the last half century. Community development corporations and other organizations recognized the interrelated aspects of neighborhood renewal, and attempted an integrated approach in areas such as affordable housing, education and training, job opportunities, and child-care. Similarly, in urban ecosystem management, there is now a greater understanding of the interconnectedness of biophysical and social features including the “human drivers” (culture, norms, and behaviors) that connect to environmental impacts like non-point source pollution, invasive species, and erosion. Capturing the lessons learned in the urban renewal and social forestry movements and adapting and enhancing the techniques and practices to the management of urban ecosystems, or results in more effective citizen participation.

Effective and enduring citizen participation in urban natural resource management is not just free, volunteer labor although city agencies strapped for resources may be tempted to view volunteer labor simply as a means to augment reduced budgets. It is certainly true that citizens providing in-kind labor can reduce planting or maintenance costs, but such a limited approach will be likely short-lived. John Kretzmann and John McKnight emphasize in *Building Communities From The Inside Out* that all communities have assets – human capital - to address neighborhood concerns. Partnering with residents of our urban neighborhoods to manage urban natural resources requires faith in their capacity, ability, understanding of local concerns, and right to participate. Engaging and empowering people to participate at all levels will lead to greater investment, ownership, and sustained involvement.

Community-based groups participate more effectively if they are involved in all phases of urban ecosystem management, from inventorying, mapping, planning, and decision-making to plant-



Kids and adults can work well together to achieve community benefits.

ing and maintenance. Engaging in all phases allows community groups to direct their volunteer investment to efforts that are relevant to their neighborhood and address needs that are important to them. Recruiting and retaining volunteers on this basis is more likely to be a long-term investment with greater outcomes, as compared to recruiting volunteers for one-time events such as Arbor Day or Earth Day.

“Citizen Foresters” will not replace the need for arborists, tree wardens, urban foresters, and other natural resource professionals. Partnerships among professional groups, civic organizations, and the private and public sectors are needed to address the complex environmental issues that confront us in the urban environment. Community-based ecosystem management is effective, but still requires the commitment and resources of the social networks that such partnerships establish. Working cooperatively, we can move more effectively toward a healthy, sustainable, urban ecosystem.

How Can My Tree Group Attract Able Volunteers?

Volunteers affiliate with organizations that produce results. So, to attract good volunteers, a tree group must be very good at what it does. An example of such an organization is the Peace Corps; it is very good at what it does and is famous for its appeal to volunteers. A tree group can have an appeal as compelling as the Peace Corps by creating what experts call a “commitment culture,” that is, it can distinguish itself by its clear sense of mission and its actions and, thereby, attract and retain suitable volunteers. To attract able volunteers, consider the following general guidelines:

- Communicate the mission simply and clearly.
- Develop creative and challenging ways to translate group ideals into effective, visible action.
- Develop rewarding and creative positions that empower volunteers: use their talents in appropriate and meaningful ways that encourage personal growth, self-expression, and the exercise of leadership and managerial skills.

- Create a positive image. Be perceived as an organization that contributes to society in a meaningful way.
- Always keep in mind that the best way to recruit volunteers is by word of mouth. Satisfied members bring in new members.
- Be inclusive. Tree-planting initiatives will not succeed unless the whole community is involved.
- Include children. 4-H stresses that “kid energy” is a powerful ingredient in alchemy of community action.

How Can Volunteers be Put to Best Use?

Tree groups which at their core consist of dedicated volunteers are able to accomplish tasks on many levels and attain their objectives because volunteers are motivated, flexible, creative, and often very well connected to influential people. When a particular task needs to be done, define it carefully and ask a suitable person or institution to volunteer to do it. For example, if a tree group has developed an ordinance, a lawyer should be recruited or hired to examine it. If a nonprofit organization's tax return is complicated, an accountant should be asked to prepare it. Stamford Tree Foundation, a city-based nonprofit organization started in 1989, has attained virtually all of its objectives through the efforts of volunteers. Here are several additional suggestions:

- Never hesitate to ask. The worst that can happen is that someone may say no.
- Provide training. For example, Milford Trees, Inc., a highly visible and effective tree group in Connecticut, developed a special program to train people to conduct tree inventories. Even “tree skills” that appear to be simple (e.g., inventorying trees) require workshops or several training sessions and working with a professional.
- Use volunteers to train volunteers. In any organization, there will be seasoned veterans who can assume the task of training others to be effective in their area of expertise, be technical, financial, legal, or practical.

How Can My Group Keep Good Volunteers?

Every effort should be made to match the qualifications of volunteers to the specific needs of your group, and, whenever possible, this should be done by personal interview. This makes it more likely that volunteers will be fulfilled by their work.

- Create direct-contact positions and situations. People want to know that they are serving the community. Direct contact with the people being served is the surest way to satisfy the volunteer's need to feel worthwhile.
- Take whatever practical steps are necessary to facilitate volunteer efforts. Offer child care, provide short-term tasks, and refine tasks that can be performed at home.
- Record the efforts of volunteers in order to provide them with references useful in the marketplace.
- Appeal to retired people who are rich in skills and often have more time than others. Make a special effort to design an appeal thoughtfully to attract the variety of "audiences" that constitute the specific community.
- Be sure that all people feel at home in the organization. It is foolhardy not to welcome everyone in the community into a tree group, since trees will not thrive unless the people living with them care for them. By promoting urban forestry in the nontraditional sectors of America, a broader support base for the movement can be developed.
- Give volunteers a choice of activities. The Wethersfield Shade Tree Commission, for example, provides a broad range of involvement opportunities to appeal to just about anybody.
- Express appreciation. Tell volunteers, "We couldn't have planted all those maples without you." Host a celebration for volunteers every year. Write letters of appreciation. Say thank you!

Working with Professionals

In certain situations, it is essential that a professional work on or supervise projects or tasks conducted by volunteers. For example, when performing a street tree inventory, it is prudent to have the municipal tree warden assess trees for hazardous condition and earmark trees for removal or pruning. The tree warden that can effectively use volunteer support and labor can accomplish more than the tree warden who shuns the efforts of volunteers. Conversely, the volunteer group that passes up professional assistance may fail in its mission.

Suggested Readings

Brudney, J. L. 1990. *Fostering Volunteer Programs in the Public Sector*. San Francisco: Jossey-Bass Publishers.

There are quite a large number of publications available on how to recruit and manage volunteers. Most of these deal with human services oriented organizations. Brudney's book deals effectively with volunteers issues that are in the public realm; precisely where community forestry professionals and volunteers interact. There is a section that nicely explains the cost-benefits of using volunteers, as well as the pitfalls. This book is highly recommended for municipal officials, especially tree wardens, who may not be convinced of the utility of volunteer service.

Dale, D. 1978. *How to Make Citizen Involvement Work*. Amherst: University of Massachusetts Citizen Involvement Training Project.



Kids and adults can work well together
to achieve community benefits.

This book may be old but it is not dated. It contains many of the principles that remain standards for motivating community activists. Check lists follow discussions of principles providing an easy means to develop a strategy for volunteer involvement of community forestry programs.

Kretzmann, J.P. and J.L. McKnight. 1993. *Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets*. Chicago: ACTA Publications.

Although this book does not deal with issues in Connecticut specifically, it is a rather advanced book on why community-based initiatives are important and explains how to go about increasing community activism. This is a good book to read to move your community forestry program towards significant public participation.

Lipkis, A. and K. Lipkis. 1990. *The Simple Act of Planting a Tree: A Citizen Foresters Guide to Healing Your Neighborhood, Your City, and Your World*. Los Angeles: Jeremy P. Thatcher, Inc.

Andy and Katie Lipkis are a husband and wife team nationally known for the great success that their organization - TreePeople - has had for almost two decades in reforesting Los Angeles. Their success is based almost completely on volunteer involvement, and they share their insights and stories in this fun-to-read book.

Sommer, R. 1996. "The Value of Resident Participation in Tree Planting." *Arborist News* 5(6): 43-47.

In this brief but well-written journal article, Sommer attempts to convince professionals in the tree care industry that properly trained and supervised tree planting volunteers can be effective and provide the community with tremendous services.

THE MESKWAKA TREE PROJECT

The Meskwaka Tree Project is an educational program designed to help people increase the social, environmental, and economic benefits produced by Connecticut's urban and community forests. This can only be achieved by improving the quality of community tree programs through the training and support of community tree volunteers.

The program was created and developed in 1992 as part of the Urban and Community Forestry Program of the University of Connecticut Cooperative Extensions System. The Connecticut College Arboretum is a cosponsor providing the training site and significant resources for the educational event. The USDA Forest Service, State and Private Forestry, provides financial support and the Connecticut Department of Environmental Protection, Division of Forestry, provides additional technical assistance.

The high point of the program is Meskwaka Weekend. Held at Connecticut College for three days and two nights usually in June, community forestry experts present the latest information to participants in an informal, yet stimulating and challenging, environment. Up to twenty-five people are accepted into the program by agreeing to go back to their communities to either initiate new community forestry efforts, or by assisting in enhancing existing programs. As of 2003, more than 200 people have become Meskwaka Cooperators and they have written and moved through the legislative process local community forestry ordinances, conducted tree walks, written informational brochures, and created nonprofit organizations, to name just a few accomplishments.



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POSITION ANNOUNCEMENT: MESKWAKA TREE PROJECT

Title: Meskwaka Tree Project Cooperator

Duration: One year - longer if willing

Duties: To provide leadership, guidance, direction, and/or assistance in developing and/or enhancing a community tree program in your town, city, or neighborhood.

This can be accomplished by: (1) successfully completing a Meskwaka Tree Project Educational Seminar (“Meskwaka Weekend”); (2) assisting in developing a new or enhancing an existing community tree program or project; (3) being responsible for the overall management of your communities tree program or some specific aspect (i.e., tree planting, volunteer management, fundraising, government affairs) of your community tree program; and (4) being part of the growing statewide network of Meskwaka Tree Project Cooperators who are actively promoting urban and community forestry throughout the state.

Qualifications: A firmly held belief that an individual can contribute to improving our environment by “thinking globally and acting locally.” A willingness to dedicate personal time and effort to increasing the quantity and quality of your community’s trees. You should have good communication skills, a fondness for working with people, experience with community groups or commissions, and a willingness to provide an occasional report on your community tree activities. Urban and community forestry experience is not essential.

A sense of humor is a must.

Compensation: Largely commensurate with the ability to derive satisfaction from the knowledge that one is *making a difference in their community* and their world through urban and community forestry activity. Free participation in a “Meskwaka Weekend” educational seminar and all follow-up training sessions, reunion meetings, and other activities. Free set of curriculum/reference materials, updates of these materials, and a periodic Meskwaka Tree Project Newsletter. Opportunity to develop close working relationships with a variety of urban and community forestry volunteers and professionals, and to develop new friends who share common goals and interests.

Start date: Usually in June.



As early as 1798, a Connecticut newspaper advocated for state laws encouraging shade tree planting. “Would it not be a regulation well deserving the attention of the General Court to require every town to plant the sides of the public roads of forest trees.”

Republic of Shade: New England and the American Elm,
Thomas J. Campanella



Bob: Now that we recognize the value of volunteers in community forestry, how can people become involved?

Glenn: One of the great things is that there are many different opportunities. Service can be as simple and temporary as helping to plant trees on a Saturday morning, to serving as the finance committee chair of the town's Community Forestry Commission.



Chapter 25

Committees, Commissions and Nonprofits

Adam R. Moore

One of the blessings of living in Connecticut is that trees grow so well here. To grow a tree, one can merely stop mowing the lawn. Our soils sprout trees, the climate favors trees, and the state is situated at the northern edge of the range of many southern trees (e.g., sweetgum, tulip poplar), and southern edge of the range of many northern trees (e.g., tamarack, black spruce, white birch). This gives Connecticut a great diversity of trees, a diversity that is exhibited on roadsides and parks in every city and town across the state.

Nearly equal to the number and diversity of Connecticut trees is the number and diversity of the committees, commissions, and nonprofit organizations that in some way are involved with the management of, or at least care about, public trees.

People who are concerned about public trees should know this. The interested volunteer and professional may find themselves involved with committees, commissions, or nonprofit organizations by volunteering their time, testifying in opposition to the organizations' policies, raising money, giving

money to them, or sitting on the board of directors. These organizations may have influence and power, and the community forestry volunteer and professional should have some practical knowledge of who they are and what they do.

Committees, commissions, and nonprofit organizations describe different types of organizations where citizens gather together for some specific purpose. The first two, committees and commissions, are public organizations, branches of government, usually local government. The third – nonprofit organization – refers to those legally constituted, nongovernmental entities, incorporated under state law as charitable or not-for-profit corporations that have been established to serve some public purpose and are tax exempt according to the Internal Revenue Service. The mission of nonprofit organizations may vary; they might be charitable, professional, or philanthropic. They usually are granted tax-exempt status because the government recognizes that their contributions to society are important enough to wave taxing them the same as for-profit corporations. In fact, most of these organizations would exist without this exemption.

The Nonprofit Organization

The mission and purpose of nonprofit organizations can be virtually anything as long as it is recognized as a nonstock corporation that provides a legitimate public service. Missions can include providing child welfare services, work to reduce domestic violence, provide medical assistance to AIDS victims, create and maintain homeless shelters, etc. They do not include religious organizations.

Another common mission of nonprofit organizations is conservation and may include educational or professional associations. (One that is not such a group, but is rather an industry association, is the Connecticut Outdoor Advertising Association. This group takes an interest in public trees as they affect outdoor advertising, such as billboards, and can be relied upon to voice its opinion on public policy matters before legislative committees.)

There are a wide variety of private, nonprofit organizations that are classified by the state of Connecticut, somewhat confusingly, as public charities, and by the Internal Revenue Service as 501(c)(3) tax-exempt organizations. These organizations often have a dues-paying membership, a board of directors, active volunteers, and in some cases paid staff. They have bylaws and a certificate of incorporation on file with the Connecticut Secretary of State. They may engage in advocacy at the



federal, state, or local levels (within the limits established for nonprofit organizations by the Internal Revenue Service), produce publications, they might conduct research and education programs, they can award scholarships, and the like. They are forbidden from engaging in elections or campaigns.

Nonprofit organizations are funded via a number of revenue sources. Some are fortunate enough to enjoy an endowment. The boards of endowed organizations adopt a “spending policy” that allows a certain, conservative percentage of the endowment, such as four percent to be annually spent on the operation of the organization. Nonprofit organizations seek to build their endowments through wise investment decisions, prudent management, capital campaigns, and accepting bequests and donations. Nonprofit organizations are funded by their members through dues and annual giving campaigns. Securing advertising and corporate sponsorship of events also helps to provide funds for nonprofits. Many nonprofit organizations apply for and receive grants from foundations, corporations, or state or federal government. In some cases, sales of merchandise, such as books, t-shirts, hats, etc., can be a source of funding. The management of nonprofit organizations assets and programs can generate revenue – a nonprofit organization can sell timber from a property that it owns, lease farmland, rent out a meeting room, and charge for services. Some nonprofit organizations hold fundraising events, such as walk-a-thons, auctions, testimonial dinners, and charity balls to provide an additional source of revenue.

Nonprofit Organizations and Community Forestry

In Connecticut, nonprofit organizations that pertain to community forestry include the Connecticut Forest and Park Association, Connecticut Tree Protective Association, the Connecticut Botanical Society, and the Federated Garden Clubs of Connecticut. There are also national organizations concerned with public trees that have members and programs in or affecting Connecticut. Among these are American Forests and National Arbor Day Foundation. With certain organizations, it is a particular committee that focuses on the subject of public trees. In the Connecticut Botanical Society, for instance, it is its Notable Trees Committee.

One Connecticut nonprofit organization that deals specifically with public trees, and has a board with representatives from many different organizations, educational institutions, and govern-

ment agencies, is the Connecticut Urban Forest Council, Inc. For Connecticut to receive federal funding for the various urban forestry programs conducted by the Connecticut Department of Environmental Protection, the state must have an urban forest council. The purpose of the Council is to advise community forestry educators and professionals with the Connecticut Department of Environmental Protection and the University of Connecticut Cooperative Extension System, and to provide an opportunity for those with an interest in public trees to communicate, plan strategies, share ideas, and express concerns. The Council also prepares and hosts a very well-attended annual state-wide conference on community forestry featuring speakers recognized both state-wide and nationally.

Professional Organizations

Some nonprofit organizations are nation-wide professional organizations including some whose members are engaged in the care of public trees. These nonprofits include the Society of American Foresters, the International Society of Arboriculture, and the American Society of Landscape Architects. Most of these organizations have Connecticut chapters, with dues-paying members and elected board leadership.

There are Connecticut professional groups as well. For instance, a recently organized (incorporated in 1992) Tree Wardens' Association of Connecticut has helped to establish a forum for volunteer and professional tree wardens across Connecticut. By creating a voluntary certification program, this organization of volunteers has helped ensure that basic yet critical knowledge is taught to and understood by Connecticut tree wardens. The Connecticut Tree Protective Association was established in 1922 with a primary mission of representing all aspects of the tree care community.

These organizations often have publications that deal with public trees in some degree. They may also host conferences and other educational programs that provide continuing education credits to participants.



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There are a host of local conservation charities that are interested in public trees, sometimes in association with an interest in a particular local park or park system. The Knox Parks Foundation in Hartford and the Rockfall Foundation in Middletown are two good examples. Many Connecticut communities have a local garden club that engages in local service projects related to public trees or public parks. Virtually every community has a service organization that, while public trees are only tangentially related to their missions, will occasionally undertake projects that affect public trees.

Committees and Commissions

Committees and Commissions are organizations, or components of larger bodies, that are in the public sector, primarily in local government. Each municipality has a number of town boards filled by elected or appointed representatives; some of them have paid staff doing the work of the commission as well. Each committee or commission performs the functions assigned to it by the Connecticut General Statutes and by the town or city ordinance or charter. These organizations include conservation commissions, inland wetland and watercourses commissions, planning and zoning commissions (in some towns planning and zoning are functions handled by two separate commissions), park and recreation commission, and shade tree or community forest commissions.

There are also regional planning agencies that can incorporate public trees into the town plans of conservation and development, and, in certain cases, special commissions with special regulatory powers. Some towns have historic district commissions that strictly regulate what can occur in a certain historic area. In some cases, certain towns have banded together and yielded some authority to a regional regulatory agency, such as the Gateway Commission (servicing towns in the lower Connecticut river valley), that has the power to approve or deny certain actions within its zone of jurisdiction. These organizations are funded by taxes, generally local property taxes, and occasionally by fees or fines imposed by the town.

Suggested Readings

Cubbage, F.W., J. O’Laughlin and C.S. Bullock III. 1993. *Forest Resource Policy*. New York: John Wiley and Sons, Inc.

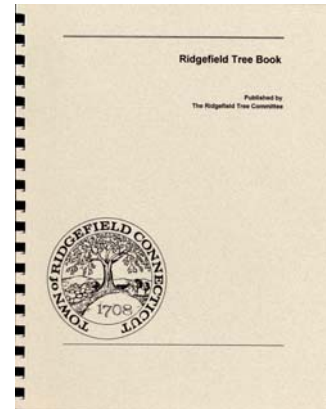
This book contains more information than you need to know, but the book contains the best treatment of the role of nonprofit organizations in natural resource conservation. *Forest Resource Policy* is used as an undergraduate text on natural resource policy and is considered a classic. Nonprofit organizations are covered in the chapters on Interest Groups and Environmentalism, Conservation, Ethics, and Professionalism.

Drucker, P.F. 1990. *Managing the Nonprofit Organization*. New York: HarperCollins Publishers.

Peter Drucker is considered to be the “guru” of innovative, nonprofit management, and is a prolific writer with decades of publishing. This book is as simple a treatment of nonprofit organizations as you can get. It is well-worth reading especially in helping organizations define their mission and to develop long-term goals and objectives.

Wolf, T. 1987. *The Nonprofit Organization: An Operating Manual*. New York: Prentice Hall Press.

This is considered a classic book on nonprofit management from the viewpoint of staff members. It includes chapters on board, staff, planning, financial management, and budget management. This is a very easy book to read and a good place to start learning about nonprofit organizations.



ELM WATCH

Elms, icons of community pride (the Big Elm, Elm City, and Elm Street) throughout Connecticut and the rest of New England, graced parks, churches, roadways and streets with their cathedral-like canopy. They complemented the architecture of our communities, bringing the contact and comfort of nature into urban areas.

Half a century ago, Dutch elm disease initiated a great local ecological change of dramatic proportions - the near elimination of American elm from the land.

Elm Watch emerged in 1999 ready to take advantage of new technologies to protect remaining American elms and to begin restoration work with new, resistant elm hybrids. Elm Watch is a volunteer organization linking people to elms, the gateway tree to the appreciation of the larger community forest. The mission of the organization is to "...protect, preserve and restore the American elm in our communities... to encourage elm stewardship and promote awareness of the community forest through advocacy, education, and direct action."

Elm watch:

- Developed an Adopt-an-Elm program that links individuals, businesses, municipalities, and organizations to historic and notable American elms. Adopters fund the cost of macro-injecting those elms with Arbortect, the fungicide that protects elms from Dutch elm disease for three growing seasons.
- Works to restore proven disease resistant elms to the landscape relying on American elm cultivars that have survived the rigorous test of the National Arboretum.
- Organizes sanitation efforts among municipalities, tree wardens, individual property owners, academic institutions, and citizen organizations.

(Source: Elm Watch)



Throughout America there are cities famous for their shade trees. The magnificent Elms of New Haven and Oberlin, the tree-lined thoroughfares of Brooklyn, East Orange, Springfield, Mass., Detroit, Indianapolis and Los Angeles – compare them with city streets which lack the glory of the trees.

Charles Lathrop Pack

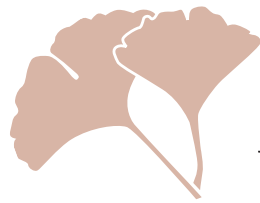
Trees As Good Citizens 1922

Frederick Selden Eaton, City Forester,
New Haven Proceedings of the Eastern Shade Tree Conference,
Bronx Park, New York, 1939



Bob: Glenn, I believe that it was Tip O’Neill who said that “All politics is local.”

Glenn: You’re right – and local politics means developing one-to-one relationships with your elected officials. And they need to know how much you care about community forestry programs.



Chapter 26

Working with your Government

Charles R. Augur

Come to Me With Solutions!

A wise and grizzled veteran of town politics once told me that he used to advise residents in his town not to come to him with problems, but to come to him with solutions. I believe that this is sage advice to residents of any community who wish to start a municipal tree-planting program. My advice is to not be shy with local municipal officials. Most municipal officials are sensitive to public opinions, or they should be. They will listen to you because they need your vote and the votes of your neighbors and friends. And I don’t see how a politician can lose by promoting tree planting.

Learn About the Budget Making Process

It is absolutely imperative that municipal tree lobbyists learn about the structure of the municipal government and, specifically, how the budgets are adopted in your city or town. Learn about the structure of your local government, at least enough to know every step of the budget making process,

and especially the schedule for adopting a municipal budget in your city or town. Remember that the fiscal year in Connecticut runs from July 1st to June 30th. Some municipalities begin the budget process as early as September. Most small towns probably begin in January and adopt a final budget in May. It does not hurt to start your efforts well before the budget process even begins, in order to plant the right seeds as early as possible.

First, learn who assembles the initial budget draft. Most municipalities have a town meeting form of government with a strong first selectperson who drafts the proposed budget, and a board of finance that tinkers (or decimates) it before they send it to the voters for final approval. Some places have adopted a town council form of government, with a town manager who drafts the first proposed budget and submits it to the town council, which might be the legislative body of the municipality. In large cities, a finance person on a mayor's staff or even the mayor himself may be responsible. The important point is to get there first and get your project into a budget line item at the very beginning.

Every city and town is slightly different from the next. That is the beauty of Connecticut's municipal governments. Learn enough about yours so that you can navigate through the entire budget process and keep up the pressure throughout. Even an appointed official such as a town manger or a public works foreman will, or should be, receptive to the requests of the average citizen. Ultimately, even a municipal employee or an appointed official must answer to a town council, board of alderman, or some elected body which will make that person accountable.

Some cities or towns have a tree commission, or perhaps the conservation commission has jurisdiction over trees, and they are responsible for developing their own budget requests. These are then passed on as part of the initial draft town budget. In this case, you must start with the appropriate commission or board and ensure that its members support your efforts.

Tactics: Bring Bodies and Keep Up the Pressure

Some Connecticut residents have complained that their city or town has a tree commission





that refuses to plant trees, or that their mayor is stubbornly ignoring their requests. If, during any part of the budget making process, it appears that you are being ignored, then bring allies with you to budget or policy meetings with the mayor, town manager, selectman, or appropriate board or commission. Packing a room full of people who are all demanding the same thing has a tremendous psychological effect on groups or individuals who had hitherto ignored or opposed you. In general, if you have difficulties in obtaining the appropriations that you know your town needs, or you want to advocate adoption of a certain policy which you know will be beneficial to the town, bring allies to the important meetings. When a meeting room is stacked with like-minded allies on a particular issue, it is amazing to see various boards and commissions do a complete reversal on an issue and change their opinion rapidly.

I also advise you to bring large numbers of tree planting enthusiasts with you during each and every step of the budget process. This is the most effective way to keep up the political pressure throughout the budget process. If you ask for money for tree planting early in the budget process, yet do not keep lobbying and pressuring to retain it in each and every draft of the budget, it is easy for a board of finance, a town council, or even the annual town budget meeting to cut your project. Once your tree planting line item reads zero or disappears from the budget document, it is very difficult to induce the budget makers to put it back in. So be persistent throughout the entire budget cycle.

Find Me the Money: Show Me the Money

The best selling point to a municipal budget making entity is to find, obtain, or even identify grant sources for your municipality. My town was able to obtain two grants for tree planting. With this additional revenue, the board of selectmen and the board of finance were happy to appropriate additional funds for trees. The grants did not cover all of the costs of the projects, the town had to provide a twenty-five percent match. However, the town was able to use the work done by our highway department and volunteer organizations as “in-kind” contributions, and the value of this work far exceeded twenty-five percent of the projects’ cost. One of the tree planting grants was from our public electric utility. The second was an “America the Beautiful” grant for municipal tree planting. This is a federal program that is administered by the Connecticut Department of Environmental Protection and is still available to municipalities as of this writing.

Remember also that not all roadways are municipally owned. Many are State of Connecticut highways, and permission must be obtained from the Connecticut Department of Transportation to plant trees within the state road's right-of-way. Furthermore, permission from the public utility companies may be required before trees are planted under or near electric utility or telephone wires. The utility companies have lists of preferred varieties of smaller trees for planting underneath or near their lines. (Be certain that these lists do not include species invasive in Connecticut.) The companies want to protect their equipment from branches which may grow into the wires, and the tree lovers can avoid the heartache of planting and nurturing a tree into maturity only to have it butchered by the utilities pruning program.

Selected Readings

Mathews, D. 1994. *Politics for People: Finding a Responsible Voice*. Urbana: University of Illinois.

This is a pretty standard book on how to work with local government from a citizen's point of view. It is not a community organizing book per se, but it does address the issues of community advocacy and community networking. Academic in orientation, this book is highly readable and filled with trustworthy information.

O'Neil, T., and G. Hymel. 1994. *All Politics is Local and Other Rules of the Game*. New York: Random House.

No matter what your political persuasion, almost everyone would find this book entertaining. It also successfully manages to communicate several key points. Written by the late Tip O'Neil, his insights come from more than half-a-century of political "wheeling-and-dealing." The primary point of the book is that to get government to respond, you have to get into the game.







PART SIX

Moving Forward

Previous chapters highlighted the components of community forestry and also emphasized the importance of process and planning. Now these ideas can be synthesized into a comprehensive community forestry program. To do this requires knowledge of community needs and desires, as well as what programs and activities already exist.



Glenn: Bob, I know that setting goals and objectives is critical for developing a sustainable community forestry program. But it seems to me that it can be a daunting task.

Bob: Well it is, Glenn, and all too often it doesn't happen. The process is still necessary much like financial planning for a person's retirement. It may be painful and challenging, but you'll never regret doing it.



Chapter 27

Developing A Community Forestry Program

Robert M. Ricard

How does a group of people - or an individual - start a community forestry program? Or how does a person get involved with an existing one? What should be done first and who should be involved or at least consulted? Where should program efforts be focused first in order to set the foundation for additional programs? What are the needs of the community? What is ideal and what is realistic?

This chapter is designed to answer these and other pertinent questions. It outlines how people can work together to establish a local community forestry program. Interested people should not be afraid to tackle this - you don't need to be a politician, community planner, or forester. However, motivation and commitment is required. Ordinary people in cities and small towns across the state are changing the very face of their communities by working to conserve public trees and are improving ecosystem health as well.

Some people believe that local government should be responsible for the community

forest but, like any truly effective undertaking, community forestry should begin at a grassroots level. Most officials encourage resident's efforts to maintain local resources if their efforts are well organized and are designed to enhance the community. Even in an era of tight budgets, starting and sustaining community forestry programs is not beyond the means of any community, no matter how small. The simple procedures outlined here may be used to guide efforts to develop a community forestry program according to a town's particular needs.

Setting Goals and Objectives

Imagine that the main thoroughfare into a community is devoid of trees, or that it is dominated by one species such as Norway maple (an over-planted and invasive tree) or Bradford pear (an over-planted tree). A group of likeminded residents have noticed this and developed a vision in which the main thoroughfare is planted in part with white oak, sugar maple, and larch, and they have determined that a variety of species, no more than ten percent of any single species, be planted throughout the town. These are ideas, and all community forestry programs begin with ideas. Because these are good ideas, and because the people in this group assumes everyone loves trees, they might think making them a reality will be easy. But the fact that almost everybody loves trees unfortunately doesn't mean that everybody will support a community forestry program. In any community, large or small, different groups have different agendas. To establish a community forestry program, goals and objectives must benefit the whole community and these must be clearly demonstrated. In what specific ways will the program affect the community? What, specifically, will be accomplished by inaugurating a new program? Who stands to reap the greatest benefit? Will most residents support it? These questions need to be considered carefully.

The first step in initiating a successful program is to establish the need for it. Once the need has been identified, a successful launching requires the commitment of the community. To secure that commitment, it is essential that goals and objectives be clearly established before ideas are presented to local government and the community at large.

A goal is the end to be achieved. It is the destination, purpose, or vision. An example of such a vision might be: a tree-lined main thoroughfare, a variety of species planted throughout

the community, the hiring of a community forester, the creation of a greenway or a park, and so forth. Objectives are the activities to be done, or the efforts, needed to reach the goal. Goals can be as simple or as grand as the imagination permits, but they must be realistic and need to be clearly established from the start.

To decide on goals and objectives, first take stock of the situation. Consider where the community is now and think carefully about where it will be tomorrow, after the community forestry program has been implemented. The care that is taken to work out these details will determine whether the program will succeed. For example, if the community is to profit from the economic, environmental, and aesthetic benefits the community forest provides tomorrow, the program must include the means for its proper care today.

Once goals are agreed upon, the next step is to decide how best to get there; i.e., consider objectives, the specific methods used to reach the goals. As objectives are developed, continually ask, “If this particular step is taken, what may result?” To attain these ends, goals and objectives need to be set that can be precisely evaluated. This requires that current conditions and envisioned outcomes be accurately described. To illustrate, imagine that ninety percent of the trees in a community are Norway maple, an undesirable but not unusual situation in Connecticut. The goal is to plant trees so that no one species predominates; specifically, so that no species constitutes more than ten percent of the total tree population. This is an easily evaluated goal.

- A good statement of goals and objectives will clearly:
- Describe the specific end to be achieved.
- Indicate *when* the goal is to be achieved.
- Specify how to get to the goal (these are the objectives).
- Describe how and when to evaluate and measure it.

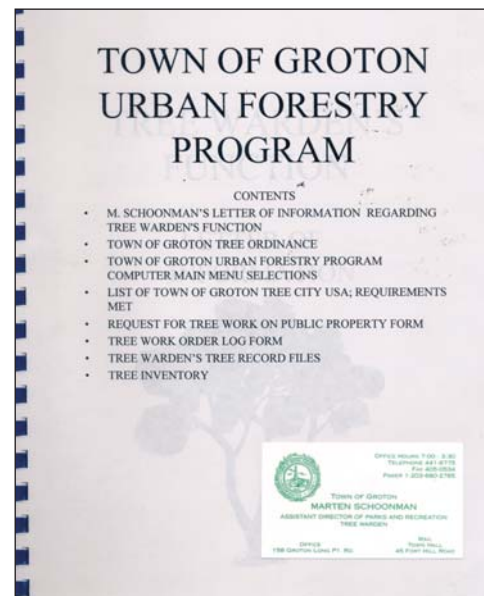
An effective goals and objectives statement should contain a clear description of the current situation. Consider the following imaginary “this-is-the-way-things-are” statement:

“Entry to the town is unattractive because Main Street is almost bare of trees and Norway maple makes up nearly ninety percent of the street tree population. Community forest “management” consists of removing dead and hazard trees and this work is being done by inexperienced, untrained crews that are not supervised by a knowledgeable, well-trained person. The town does not have a tree ordinance or a shade tree committee. The tree warden is not certified. The town has no master plan; it is growing fast and haphazardly. Few residents are aware that a healthy, managed community forest would benefit everybody in a wide variety of ways....”

Consider the following imaginary “this-is-the-way-things-*should* be” statement. Which elements are measurable goals and which are not?

“The chief elected official will appoint a well-qualified and experienced, certified tree warden. A Community Forestry Committee will be established to help administer specific aspects of the program. The committee will meet bimonthly. Committee members and the tree warden will be required to attend periodic training programs conducted by community forestry educators and organizations. The committee will oversee the creation of a community forestry ordinance. The committee will develop a planning process that will result in a community forest master plan in order to apply ecological principles of natural resource management to the community.”

With an important exception, most of the elements in this statement are specific and measurable. The exception is the statement that the master plan will be created “in order to apply ecological principles of natural resource management to the community.” “Planning” and “ecological principles” are terms loaded with meaning. To measure their effects requires the skill



of sophisticated scientists. However, the need for planning and a master plan are fundamental to the establishment of any community forestry program. Virtually by definition, no program can be successful without planning and sensitivity to the community's ecosystem as a whole. But developing specific goals and objectives will result in more effective outcomes.

Identify Key People

It is critical to decide whose involvement is essential to the success of a community forestry program and solicit their help. Without the support of the influential people in any community, a program is unlikely to get off the ground. Involving key people will give the program the official sanction it needs. Do not proceed without taking this step.

Who are the political and social leaders in the community? The tree warden, of course, must be included. Identify the people who wield power: they control money, resources, and other people's jobs. Invite the chief elected official to sit down and ask him or her to help identify the people needed to support the program. Bear in mind also that key people will vary according to the goals of the program. For example, if the objective is to prevent lawnmower damage to trees in parks and school grounds, then specific town agency managers and possibly park and education commission will need to be included. If the program is an effort to promote downtown business through beautification, then it is important to involve local business leaders.

It is essential to involve local politicians as soon as possible. Enlist the support of the mayor, the council, and selectmen while the program is in its formative stages. When their ideas and their input are solicited early on, important people are more likely to support the effort.

It is equally important that key people hear about the program directly from the founders, rather than from local gossips or the newspaper. When a significant change is afoot, community leaders need to be informed so that if they wish, they can take an active role in it before everybody in town knows about it. Certain people may choose not to involve themselves in the program, but if the effort has demonstrated its worth and possibilities, then it is not likely that they will try to block the project. Influential people who oppose a program, no matter how worthwhile

it is, are a real obstacle. It is essential to make your local leaders look good. They are sure to return the favor.

Put People to Work Effectively: Committee Development

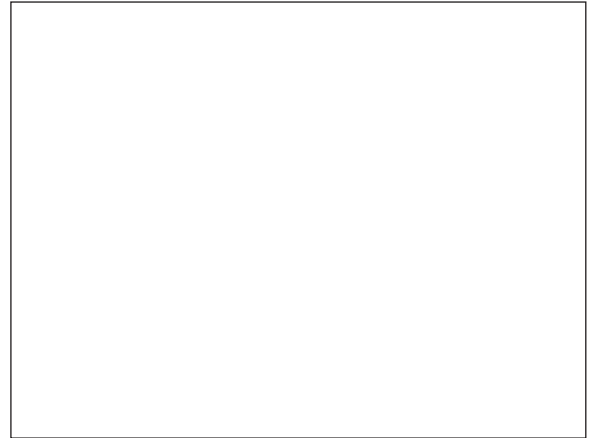
Once key people have contributed their ideas to the program, or have indicated their willingness to support it, the creation of a committee is appropriate. A committee (or several committees) will undertake the nuts-and-bolts work essential to informing the whole community about the community forestry program and making it a reality.

Any effort to involve the entire community through general meetings is likely to be a disaster. Too many people (whatever number that is) can turn the process into a cumbersome, frustrating, and fruitless exercise. Because of their small size, committees are more easily convened, more efficient, and more effective. Meetings can be conducted informally, which encourages discussion, and members are able to make more significant contributions than they would in a much larger group.

Prior to asking individuals to serve on a committee, decide on its purpose. If the committee is to be responsible for implementing the goals of the program, this must be clearly communicated to committee members at the first meeting. Use the goals and objectives statement to do this.

A critical first decision is to decide what authority the committee will have. The committee should either be granted authority to make policy, or to advise the local governmental entities that policy. In either case, the committee needs to develop an understanding with government officials about who has final authority on program-related issues.

Two or three years are effective terms for committees that oversee community forestry programs. The key is to balance the desire for program consistency with people's personal needs. Procedures must be established for replacing members.



Some other questions the committee will need to address:

- The program is likely to require money - where will it come from?
- What other resources are needed for the committee to do its work?
- How are members selected?
- What is expected from members?

Once a community forestry committee is established - and positions are filled with skilled, interested members - it can proceed to assess the existing community forestry program. Also, a written statement detailing the roles and responsibilities of members is often useful. The committee can then decide where to direct community forestry efforts in the most efficient and productive direction. These are tough, but essential, topics - ones that many people would rather avoid. But the result will be profound, and the community can only benefit.

Suggested Readings

Elmendorf, W.F. 2000. "Community Planning and the Natural Environment." Pp. 61-74. In *Handbook of Urban and Community Forestry in the Northeast*. Kuser, J.E., ed. New York: Kluwer Academic/Plenum Publishers: New York.

Neville, L.R. 2000. "Managing Urban Ecosystems: A Look to the Future of Urban Forestry." Pp. 411-423. In *Handbook of Urban and Community Forestry in the Northeast*. Kuser, J.E., ed. New York: Kluwer Academic/Plenum Publishers.

Strom, S. 2000. "Urban and Community Forestry: Planning and Design." Pp. 77-94. In *Handbook of Urban and Community Forestry in the Northeast*. Kuser, J.E., ed. New York: Kluwer Academic/Plenum Publishers.

Together these three chapters in this scholarly book are excellent references about how to develop and implement a successful community forestry program. Elmendorf's piece looks at the community forest as a whole and covers working with traditional governmental entities, such as planning agencies. Strom develops the theme further with greater technical design considerations. Neville rounds out the topic by arguing for the need to develop a greater vision for the future, and not just doing "reactive" management.

Grey, G.W. 1996. *The Urban Forest: Comprehensive Management*. New York: John Wiley and Sons, Inc.

Phillips, L.E. 1993. *Urban Trees: A Guide for Selection, Maintenance, and Master Planning*. New York: McGraw-Hill, Inc.

Both authors explain the community planning process well. Grey does a good job explaining organizational structures (how to go about doing it) while Phillips strength are the real-life, concrete examples. This is not an easy topic, and community forestry advocates are advised to read these texts before proceeding with organizing efforts.

Shagbark Hickory *Carya ovata*

Native to eastern North America, this tree is easily distinguished by its showy bark that peels away in long strips.. Common in forests, it is suitable for shade and highway plantings and as a specimen tree. Leaves are alternate, odd pinnately compound; leaflets have serrate edges, are 4 to 7 inches long, and turn a showy, burnt-yellow in fall. The large nuts can be a nuisance, including damaging cars when they fall. It grows best in a sunny location in well-drained soil.



EFFECTIVE MEETING MANAGEMENT

After a long day at work, do you show up at a meeting that is scheduled to end at 9:00 p.m. but ends at 10:00 p.m.? Do your associates trickle in after the meeting starts? Do they leave several times to do other work? Do you try to make a point but the chair seems to listen to only the person at the end of the table? Did you spend the first ten minutes of the meeting reading minutes from the last meeting? Do you know why you are even at the meeting?

No one can afford to waste time attending meetings that take too long to accomplish little or nothing. Whether the group is a committee, commission, or the board of a nonprofit organization, it will accomplish more - and with greater joy - if meetings are run properly and effectively. Effective meeting management does require knowledge and skill on the part of the leader. It also requires preparation, clear directions, and follow-up. And most importantly, it requires that everyone in the group abide by the rules of meeting management.

It is worthwhile to spend at least a brief amount of group time deciding how meetings will be run and then sticking with the procedure. Parliamentary Procedure is a well established and widely accepted method that has stood the test-of-time and the courts and can be learned by any one and any group. Some people mistakenly think of Parliamentary Procedure as difficult to learn and to formal. In fact, only a small portion of procedures are used during most organizations meetings so learning is simple and straight forward. Also, some people regard Parliamentary Procedure as overly authoritarian where in fact its creation, development, and methodology is the epitome of the democratic process. It is quite deliberately designed to give everyone a fair opportunity to be heard in a meeting will moving the meeting along in a timely fashion. The majority opinion rules on a question but the rights of the minority are protected.

There is no need to hold meetings for the sake of meetings. It is important to remember that the meeting process is only important for running an effective meeting; it is not why a meeting is held in and of itself. Accomplishing the goals and objectives, and, ultimately, the mission of the group, is why a meeting is held and why a group exists at all.

Suggested Readings

Frank, M.O. 1989. *How to Run a Meeting in Half the Time*. New York: Pocket Books.

A small and easy to digest book on how to run and participate in meetings, with emphasis on the latter. It is small and simple enough to be read in one evening yet is comprehensive as well.

Ricard, R.M. 1996. *Effective Meetings for Natural Resource Volunteers and Professionals*. Storrs: University of Connecticut Cooperative Extension System.

This publication is designed specifically for natural resource volunteers and professionals, including people involved with community forestry. It is a good guide on how to run a meeting effectively and uses examples from people and organizations involved in community forestry. It describes how meetings should be arranged, run, and concluded. It further discusses the essentials of Parliamentary Procedure.



Bob: Performing a community assessment is easy and fun, especially with a group of dedicated community forestry people.

Glenn: And, of course, it can quickly help pin-point the strengths and weaknesses in a program so that you can redirect limited resources where they are most needed.



Chapter 28

Assessing Your Community

Robert M. Ricard

Most communities react to public tree issues as they arise - often to negative events such as “surprise” tree removals - rather than conducting tree programs based on long-term planning, progressive advancements in program development and implementation. For example, even though it is prudent, reasonable and desirable to assess public trees for risk and then take action to mitigate tree risk, the reality is that such projects are rarely implemented until after an event raises public and political awareness of its importance. This is simply courting disaster.

True progress will not be made without comprehensive, long-term planning; the community will always be just reacting to events. Progress cannot occur without first understanding what resources – human and ecological – exist in the community. In order to understand how all elements interact, an assessment is necessary.

This chapter describes a very simple way to assess your municipality’s strengths and weaknesses regarding the protection and management of public trees. It is based on more than a

decade of outreach and technical support, and on a vision of what an exemplary Connecticut community forestry program should be like. Although this idealized program can never actually be attained, visualizing a program with very high standards is useful in helping community forestry professionals and volunteers develop goals and objectives.

An Exercise in Assessing Your Community Forestry Program

The purpose of conducting an assessment is to acquire baseline information that tells professionals and volunteers what has already been successfully accomplished, and what else needs to happen in order to have a sustainable community forestry program. This one is designed uniquely for this state, its communities, heritage, government, people, ecology, and future needs. It mirrors the Connecticut ReLeaf program developed by the Connecticut Urban Forest Council, Inc. In fact, performing the assessment presented here will help your community qualify for Connecticut ReLeaf Community designation, if desired. This is not a contest, it is an exercise to determine whether a community is strong and where additional effort may be needed.

Six major, general criteria can be used to serve as critical indicators of exemplary and sustainable community forestry programs in Connecticut cities, towns, villages, and neighborhoods:

1. Community Involvement: Public Activities and Events
2. Municipal Employee Training and Development
3. Inter-Agency Cooperation
4. Budget and Capital Resources
5. Planning and Management
6. Citizen Education and Training

In the following sections, the criteria are described and examples are provided to help determine into which category certain events and programs best fit. A chart is also included to help record what community forestry activities and efforts currently occur in your town.



1. Community Involvement: Public Activities and Events

Citizens must understand and recognize the benefits and importance of a healthy forest if long-term sustainability is to be achieved. Public participation is essential. Examples include public involvement in tree planting, street tree inventories, educational campaigns, newspaper articles, and stewardship activities (e.g., pruning, watering, and park clean-ups). What programs and activities illustrate your community program and activities?



2. Municipal Employee Training and Development

A community depends on the people who are trained, skilled, experienced, and knowledgeable in the many aspects of community forestry. Necessary skills may include tree risk assessment, tree planting and maintenance, emergency planning, and organizational management. Professional training of municipal employees who are active contributors to community forestry efforts is essential. What programs and training have been provided in the community? What measures are in place to ensure that proficiency and adequate skill levels are maintained? For example, are your maintenance people properly trained in tree care and maintenance? Are your field crews regularly given the opportunity to participate in workshops and in training sessions that will help develop their proficiency in tree management and maintenance? Is your tree warden certified? Do volunteers attend conferences such as those given by the Connecticut Urban Forest Council, Inc.?

3. Inter-Agency Cooperation

Various companies, agencies, departments, committees, and commissions in a community often have responsibility for specific aspects of a community's public trees. Examples include state and local highway departments, utility companies, public works departments, shade tree

commissions, conservation commissions, planning and zoning commissions, and citizen organizations. Some or all may be working in isolation. Communication and cooperation between (and within) departments and commissions is critical for long-term sustainability of community forestry programs, which tend to span a variety of disciplines and jurisdictions. What mechanism does your town have for interagency information exchange or for communicating with citizens groups and the general public?

4. Financial Resources

A statewide survey conducted in 1991 by the University of Connecticut revealed that most cities and towns do not provide adequate funds for their community forestry programs. In fact, most funds are expended only for tree removal. Sufficient funding for tree replacement, pruning, and other management tasks, as well as routine tree removal, is essential for long-term forest sustainability. Financing from a mixture of both public and private sources is best, but somehow a community should demonstrate a commitment to community forestry through an annual, predictable revenue stream. This means public (municipal) funding is essential, and that some specific projects, new tree purchases for example, might be from private funds. Does your community have an annual budget for public tree maintenance beyond tree removal? What items does the budget cover? Is it sufficient for community needs? Is there a private fund-raising strategy in place?

5. Planning and Management

Planning and management tools, such as inventories, emergency storm plans, master plans, and planting plans, are critical for sustaining long-term, high quality programs. What planning and management tools are used in your town? For example, is there a regularly updated tree inventory? How is it managed (i.e., computerized data management, geographical information system) and who performs the work? How was the inventory information acquired (e.g., trained staff, volunteers, consultants)?



6. Volunteer Training and Education

The public has a right – and, arguably, an obligation – to participate in community forestry activities. In fact, public participation is guaranteed by state law in the tree warden statutes. Also, much social science research demonstrates that when the public gets involved, there is greater support by elected officials.

It is, however, critical that volunteers direct their efforts in constructive ways, and education and training can help accomplish this. What training do volunteers in your community forestry program receive? What educational events do they attend? Is training required for participation? Is it rewarded?



European Beech *Fagus sylvatica*

A native of Europe, this is a popular, widely cultivated species with a stout trunk and dense, rounded crown of spreading branches extending almost to the ground. The beautiful smooth gray bark is easily damaged especially and is also the target of people who carve into it. There are many cultivars that can often be found as large specimen trees on estate, park, and school grounds. Leaves are alternate, simple, entire, with an undulating margin, oval shape, and 3 to 5 inches long, turning a rich russet and bronze in the fall. Not suitable for most street plantings but is one of the most beautiful specimen trees and can grow to 100 feet in height.

ASSESSMENT WORKSHEET

1. Community Involvement: Public Activities and Events

- Project Learning Tree trained teachers
- Public participation in tree inventory
- Public participation in tree ordinance development
- Arbor Day Celebration citywide
- Arbor Day Celebration per school/street
- Connecticut ReLeaf Celebration
- Notable Trees recognition
- EnviroThon
- Other efforts

2. Municipal Employee Training and Development

- Certified Tree Warden
- Certified Deputy Tree Warden(s)
- Tree Warden and/or Deputy(s) required CEU's
- Licensed arborist or other professional licenses
- Road crews/park maintainers trained in tree care
- Other efforts

3. Inter-Agency Cooperation

- Communication mechanisms with Connecticut DOT
- Communication mechanisms with utilities
- Communication mechanisms between municipal agencies
- Communication mechanisms with citizens and citizen organizations
- Other efforts

4. Financial Resources

- Municipal dollars allocated to tree planting
- Municipal dollars allocated to tree removal
- Municipal dollars allocated to tree care/maintenance
- External grant dollars received
- Private dollars received
- Other efforts

5. Planning and Management

- Tree Inventory
- Tree Ordinance
- Emergency Management Plan
- Long-Term Management Plan
- Tree Board/Community Forestry/Conservation
- Commission Plan-of-Action
- Incorporating Tree Retention/Replacement into Planning and Zoning Regulations
- Other efforts

6. Volunteer Education and Training

- Meskwaka Tree Project
- Connecticut Urban Forest Conference
- Connecticut Tree Protective Association workshops
- Other efforts



CONNECTICUT ReLEAF: AN OPPORTUNITY TO SHOW-CASE YOUR COMMUNITY

Connecticut ReLeaf is a program that acknowledges and rewards quality urban and community forestry efforts. The program seeks to recognize effective and exemplary urban and community forestry as practiced by cities, towns, neighborhoods and institutions.

Sponsored by the Connecticut Urban Forest Council, Inc., a state-wide organization composed of representatives from Connecticut environmental groups, state agencies, universities, research institutions, corporations, professional communities, and citizen groups, the principal purposes of Connecticut ReLeaf are to:

- Reward cities, towns, neighborhoods, and institutions for their good work in sustainable urban and community forestry.

- Provide peer-to-peer examples for other Connecticut cities, towns, neighborhoods, and institutions to emulate.

- Encourage others to increase and improve urban and community forestry efforts.

Connecticut ReLeaf fosters long-term and sustainable urban and community forestry programs throughout Connecticut and relies on standards that are exemplary for the long-term care and maintenance for their trees. It is designed uniquely for the state, its communities, heritage, government, people, ecology, and future needs.

To qualify, a community must demonstrate that it meets criteria for at least five of the six assessment criteria. Contact the Connecticut Urban Forest Council, Inc., for more information.

(Source: Connecticut ReLeaf application material)



Many years ago, when pastor of a church in Rockville, he (Rev. Horace Winslow) planned for that place two parks, securing sites, raising money, grading, and setting out a number of trees; so Rockville, with her now beautiful pleasure-grounds, in the heart of the city and full of fine shade trees, owes them in large measure to his efforts.

Miss Mary Winslow writing (in 1903) about her father, Rev. Horace Winslow, Simsbury, and first president of the Connecticut Forestry Association





Appendix I

AN INTRODUCTION TO THE ANSI300 STANDARD

Branch Size, A minimum or maximum diameter size to be removed should be specified in all pruning operations. This establishes how much pruning is to be done.

Pruning Objectives, These should be established prior to beginning any pruning operation. The A300 provides two basic objectives.

Hazard reduction pruning (HRP), is recommended when the primary objective is to reduce the danger to a specific target caused by visibly defined hazards in the tree. For example, HRP may be the primary objective if a tree had dead branches over a park bench.

Maintenance Pruning (MP), is used when the primary objective is to maintain or improve tree health and structure, and includes hazard reduction pruning. An example might be to perform a MP operation on a tree in a front yard.

Pruning Types, HRP and MP should consist of one or more of the following pruning types.

Crown cleaning is the selective removal of one or more of the following: dead, dying, diseased or weak branches and suckers/watersprouts.

Crown thinning is the selective removal of branches to increase light penetration, air movement, and to reduce weight.

Crown raising is the removal of the lower branches to provide clearance.

Crown reduction decreases the height and or spread of a tree. Consideration should be given to the ability of a species to sustain this type of pruning.

Vista pruning is the selective pruning of a crown to allow a view from a predetermined point.

Crown restoration pruning should improve the structure, form and appearance of trees that have been severely damaged.



Appendix II

SAMPLE COMMUNITY FORESTRY ORDINANCE FOR CONNECTICUT CITIES AND TOWNS

I. SHORT TITLE

The short title of this Chapter shall be Community Forestry Ordinance for the City of _____, _____ County, Connecticut.

II. PURPOSE

It is the purpose of this ordinance to promote and protect the public health, safety, and general welfare by providing for the regulation of the planting, maintenance, and removal of trees, shrubs, and other plants within, or owned, by the City _____.

III. DEFINITIONS

The following definitions shall apply in the interpretation and enforcement of this Chapter:

City Owned Property

Any and all property owned by the City of _____ including, for the purposes of this chapter, such limbs, roots or parts of trees and shrubs as extend or overhang the limits of any municipal road or grounds.

Boulevard Effect

Arrangement of trees along a street for aesthetic, scale, or climate control purposes. For

purposes of this regulation a “boulevard effect” is created when there are three or more trees within a 150 foot stretch of street frontage on the same side of the street.

Property Line

Outer edge of a street or highway right-of-way boundary.

Property Owner

The owner of record or contract purchaser of any parcel of land.

Shrubs

A woody plant, branched from the base, generally less than fifteen (15) feet tall when mature.

Trees

A woody plant usually with one main trunk, reaching a height of at least fifteen (15) feet when mature.

Community Forestry Plan

A management plan and resulting annual work plan prepared by the Tree and the Community Forestry Commission. The City’s Department of Development and Enforcement is assigned the responsibility to assist the Tree Warden and the Community Forestry Commission. For those areas that are incorporated in the City’s park system or is part of the streetscape (Boulevard Effect), the Director of Parks shall assist in development and maintenance of the plan. For all watershed properties, exclusive of those under control of the Parks Department, the Public Works Department shall assist in the development and maintenance of the plan.



IV. MUNICIPAL TREE WARDEN

In accordance with Section 23-58 of the Connecticut General Statutes, a Tree Warden shall be initially appointed by the City Manager for a term of one (1) year, thereafter for a term of three (3) years. The Tree Warden shall have a working knowledge of community forestry practices either through formal education and/or directly related experience. The Tree Warden shall be either a Certified Tree Warden or a licensed arborist within one year following appointment.

A. Duties of Tree Warden:

1. Enforcement of all provisions of law for the preservation of trees and shrubs and of roadside beauty.
2. He/she shall remove or cause to be removed all illegally erected signs or advertisements placed upon trees within any public road.
3. For trees or shrubs that must be removed and are located within the City's right-of-way, or owned by the City, he/she shall post notice of removal at least ten days prior to the removal. Following such posting, he/she shall hold a public hearing regarding the removal, if any person, firm or corporation objects to removal and presents a request for a hearing to the Tree Warden in writing. Such public hearing shall be held at the next regularly scheduled meeting of the Community Forestry Commission.
4. Issue permits for removal of any trees within City right-of-way in accordance with the Community Forestry Plan and Arboricultural Specifications and Standards.
5. The City's Department of Development and Enforcement is assigned the responsibility of assisting the Tree Warden in his/her duties.

V. COMMUNITY FORESTRY MANAGEMENT PLAN

The Tree Warden and the Community Forestry Commission shall develop, and each subsequent year, update the Community Forestry Plan. This plan shall describe the community forestry activities to be undertaken by the City, the reasons for those activities, the possible funding source(s), the alternatives available to the City to fund or accomplish the activity, the projected date of completion, and the consequences if the activity is not completed. Activities may include but are not limited to municipal tree inventory, planting, tree removal, beautification projects, and educational projects.

The Community Forestry Plan shall include a management plan for all city-owned forested areas and a Master Street Tree Plan. The Master Street Tree Plan shall consist of city-wide, street by street written evaluation of the tree species best suited to a particular planting site in regard to growing habits, shape, form, health, disease and pest resistance, conflicts with wires, lights, pavement, traffic, pedestrians, sidewalks, environmental pollution, sewers, and space availability. It shall also include recommendations for maintenance and replacement of existing trees as well as recommendations for the type of street trees to be planted in new residential, commercial or industrial subdivisions.

VI. PERMITS AND APPLICATIONS

A. Scope of Requirements:

1. No person may perform any of the following acts without first obtaining a permit from the Tree Warden;



2. Plant on City-owned property, or treat, prune, remove, or otherwise disturb any tree, shrub, or forested area located on City-owned property, except that this provision shall not be construed to prohibit owners of property adjacent to City-owned property from watering or properly mulching without a permit any tree, shrub, or forested areas located on such City-owned property;
3. Trim, prune, or remove any tree, shrub, or portions thereof if such tree, shrub or portions thereof reasonably may be expected to fall on City-owned property thereby having potential to cause damage to persons property;
4. Place on City-owned property, either above or below ground level, a container for trees, shrubs, or forested areas;
5. Damage, cut, tap for maple syrup, carve, or transplant any tree, shrub, or other plant located on City-owned property;
6. Attach any rope, wire, nail, sign, poster, or any other man-made object to any tree or shrub located on City-owned property;
7. Cause damage to the root-zone of any City-owned tree by digging a tunnel or trench, moving or storage of construction vehicles, materials, or equipment or changing of the grade within the drip line.

B. The Community Forestry Commission shall review all permit applications, and make recommendations to the Tree Warden. The Tree Warden makes the final determination for the permit application. An application shall be acted upon by the Community Forestry Commission within forty-five (45) days, or the next regularly scheduled meeting, or receipt

of such application. A permit may be issued without Community Forestry Commission review, if, in the opinion of the Tree Warden there exists a dangerous or life-threatening condition.

VII. VIOLATION

The violation of any provisions of this chapter shall result in a fine and penalty of at least one hundred dollars (\$100.00) in addition to any costs of curing or abating said violation such as tree replacement and removal costs. If the violation is of a continuing nature, each day shall constitute a separate offense.

VIII. APPEAL

Any person aggrieved of a final decision of the Tree Warden may, within ten (10) days, appeal therefrom to the superior court.



Tuliptree *Tuliptree Liriodendron tulipifera*

This native to the eastern United States is a large tree, often growing tall and straight to 90 feet. It has large, distinctive lobed leaves that turn golden yellow in the fall. The common name refers to the yellow to pale green, fragrant flowers, which resemble tulips. The tree requires ample growing space and is best suited as a specimen. It is one of the softer hardwoods and is susceptible to ice and storm damage

Appendix III

WHERE TO GO FOR HELP

Urban and Community Forestry Program Assistance

Connecticut Department of Environmental Protection
Division of Forestry
79 Elm Street
Hartford, CT 06106-5127
(860) 424-3178
chris.donnelly@po.state.ct.us

University of Connecticut
Cooperative Extension System
1800 Asylum Avenue
West Hartford, CT 06117-2600
(860) 570-9257
robert.ricard@uconn.edu

Universities, Cooperative Extension, and Research Stations

University of Connecticut
College of Agriculture and Natural Resources

Agricultural Experiment Station
W.B. Young Building

1376 Storrs Road, U-4010
Storrs, CT 06269-4010
(860) 486-2917

Publications Resource Center
W.B. Young Building
1376 Storrs Road, U-35
Storrs, CT 06269-4010
(860) 486-3334

College of Agriculture and Natural Resources
W.B. Young Building
1376 Storrs Road, U-4066

Storrs, CT 06269-4066
(860) 486-5113

Department of Plant Science
W.B. Young Building
1376 Storrs Road, U-4067
Storrs, CT 06269-4067
(860) 486-0682

Department of Natural Resources
Management and Engineering
W.B. Young Building
1376 Storrs Road, U-4087
Storrs, CT 06269-4087
(860) 486-2840

Soil Nutrient Analysis Lab
6 Sherman Place, Unit 5102
Storrs, CT 06269-5102
(860) 486-4274

**University of Connecticut Cooperative
Extension System**

State Administrative Office
1376 Storrs Road
Storrs, CT 06269-4134
(860) 486-1987

Home and Garden Education Center
Rm. 4, Ratcliffe Hicks Building
1380 Storrs Road
Storrs, CT 06269-4115
(877) 486-6271 (toll free)

County Offices

Fairfield County Extension Center
67 Stony Hill Road
Bethel, CT 06801-3056
(203) 207-8440

Hartford County Extension Center
University of Connecticut
1800 Asylum Avenue
West Hartford, CT 06117-2600
(860) 570-9010

Litchfield County Extension Center
843 University Drive
Torrington, CT 06790-2635
(860) 626-6240

Middlesex County Extension Center
1066 Saybrook Road, Box 70
Haddam, CT 06438-0070
(860) 345-4511

New Haven County Extension Center
305 Skiff Street
New Haven, CT 06473-4451
(203) 407-3161

New London County Extension Center
562 New London Turnpike
Norwich, CT 06360-6599
(860) 887-1608

Tolland County Extension Center
24 Hyde Avenue
Vernon, CT 06066-4599
(860) 875-3331

Windham County Extension Center
139 Wolf Den Road
Brooklyn, CT 06234-1729
(860) 774-9600

Connecticut Agricultural Experiment Station

P.O. Box 1106
123 Huntington Street
New Haven, CT 06504
(203) 974-8500
(877) 855-2237
(toll free outside New Haven area)

Valley Laboratory
P.O. Box 248
Cook Hill Road
Windsor, CT 06095
(860) 683-4977

The following are specific departments with telephone numbers:

Department of Forestry and Horticulture
(203) 974-8605

Department of Soil and Water
(203) 974-8607

Department of Plant Pathology and Ecology
(203) 974-8606

Department of Entomology
(203) 974-8604

For inquiries about plants call
(203) 974-8601

For inquiries regarding insects call
(203) 974-8600

State Agencies

Connecticut Department of Environmental
Protection
79 Elm Street
Hartford, CT 06106

The following are specific Divisions with telephone numbers:

Division of Forestry
(860) 424-3630

Division of Wildlife
(860) 424-3011
Arborist License Administration and
Enforcement (860) 424-3369

Connecticut Department of Transportation
Bureau of Highways
2800 Berlin Turnpike
Newington, CT 06111
(860) 594-2612

Arboreta

Bartlett Arboretum
151 Brookdale Road
Stamford, CT 06903-4199
(203) 322-6971

Connecticut College Arboretum
Connecticut College
270 Mohegan Avenue
New London, CT 06320-4196
(860) 439-2144

Associated In-state and Regional Organizations and Agencies

Connecticut Forest and Park Association
16 Meriden Road
Rockfall, CT 06481-2961
(860) 346-2372

Connecticut Nursery and Landscape
Association
P.O. Box 414
Botsford, CT 06404
(203) 445-0110

Connecticut Chapter of the American Society
of Landscape Architects
87 Willow Street
New Haven, CT 06511
(800) 878-1474 (toll free)

Connecticut Recreation and Parks Association
1800 Silas Deane Highway, Suite 153
Rocky Hill, CT 06067
(860) 721-0384



Connecticut Tree Protective Association
58 Old Post Road
P.O. Box 356
Northford, CT 06472
(203) 484-2512

Connecticut Urban Forest Council
c/o Yale School of Forestry and Environmental
Studies
Urban Resources Initiative
205 Prospect Street
New Haven, CT 06511
(203) 432-6570

Elm Watch
P.O. Box 655
Great Barrington, MA 01230
(413) 266-1062

Northeast Center for Urban and Community
Forestry
USDA Forest Service, State and Private Forestry
University of Massachusetts
Holdsworth Natural Resource Center
Amherst, MA 01003
(413) 545-3755
Tree Wardens' Association of Connecticut
c/o University of Connecticut

Cooperative Extension System
1800 Asylum Avenue
West Hartford, CT 06117-2600
(860) 570-9257

Associated National Organizations

American Forests
P.O. Box 2000
Washington, D.C. 20005
(202) 955-4500

International Society of Arboriculture
P.O. Box 3129
Champaign, IL 61826-3129
(217) 355-9411

National Arbor Day Foundation
101 Arbor Avenue
Nebraska City, NE 68410
(402) 474-5655

Society of American Foresters
5400 Grosvenor Lane
Bethesda, MD 20814-2198
(301) 897-8720

Tree Care Industry Association
3 Perimeter Road, Unit 1
Manchester, NH 03103
(800) 733-5380 (toll free)
(603) 314-5386

**Other Important Toll-Free
Telephone Numbers**

National Pesticide Information Center
(800) 858-7378

Call Before You Dig
(800) 922-4455



No town can fail of beauty, though its walks were gutters, and its house hovels, if venerable trees make magnificent colonnades along its streets. Of all trees, no other unites, in the same degree, majesty and beauty, grace and grandeur, as the American Elm.” The Elms of New England! They are as much a part of her beauty as the columns of the Parthenon were the glory of its architecture.

Norwood; or Village Life in New England
Henry Ward Beecher, 1876