



TERRAFIRMA

PUTTING HISTORIC LANDSCAPE PRESERVATION ON SOLID GROUND

“The best friend on Earth of man is the tree: when we use the tree respectfully and economically we have one of the greatest resources of the earth.” Frank Lloyd Wright

CARING FOR MATURE TREES IN HISTORIC LANDSCAPES

WHAT MAKES A TREE HISTORIC?

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SPECIAL CONSIDERATIONS



Littleleaf linden tree, Marshfield

CARING FOR MATURE TREES IN HISTORIC LANDSCAPES

Massachusetts is filled with historic landscapes - places that, through a combination of natural and human-made features, help tell the story of a historic event, activity or person, or reflect a community's historical development or traditions. Trees greatly enhance many historic landscapes, such as town commons, public parks and cemeteries; in many cases, it is nearly impossible to imagine these places without trees. Along with other vegetation, trees affect the scale, light, color palette and even the smell of a landscape - in short, how we experience and remember these important places. The protection and thoughtful treatment of trees is therefore a critical element of almost any historic landscape preservation effort.

This issue of Terra Firma focuses on the care of mature trees, with a special focus on the treatment of trees in historic landscapes. It provides information on identifying trees that are historically significant, providing basic care for mature trees and selecting an appropriate replacement when a tree must be removed. It is not a comprehensive guide to tree care and does not address all issues related to vegetation in historic landscapes. Resources that provide further guidance are noted throughout the text and on the back cover.



For general information on the identification and preservation of historic landscapes, see Issue No.1 of Terra Firma, available at www.mass.gov/dcr/stewardship/histland/histland.htm or (617) 626-1250.

H I S T O R I C T R E E S

Allée, North Andover



Council Oak, Dighton — after lightning strike



“Each generation takes the earth as trustees. We ought to bequeath to posterity

as many forests and orchards as we have exhausted and consumed.” J. Sterling Morton

WHAT MAKES A TREE HISTORIC?

Many people recognize trees as important natural resources - they clean our air, cool our city streets and protect our watersheds. But many trees are also significant as historic resources, either individually or by contributing to the overall character of a historic landscape. While a majestic oak may mark the site of an important event, an apple orchard may reflect regional agricultural traditions. Ornamental trees in a historic garden may tell us not only about the intent of the landscape designer but also about the aesthetics of a certain time period. Trees in less formal settings, dotting a town common, for example, may not have been planted according to an overall plan, but are no less important in establishing the character of the landscape.

The Commonwealth's rich collection of historic landscapes incorporates an equally important collection of historic trees.

- 1 Littleleaf linden tree, Marshfield** This massive linden tree on the Thomas-Webster Estate in Marshfield is historic not only in its size and placement within the estate, but for its association with Daniel Webster.
- 2 Allée, North Andover** Two rows of evenly planted trees, usually of the same species, create a walk known as an allée, a frequent feature of designed landscapes. This allée along the main drive into the Brooks School in North Andover is flanked by mature London plane trees.
- 3 Council Oak, Dighton (after lightning strike)** Located in present-day Dighton, the Council Oak (see cover) has been a significant meeting place for the Wampanoag Federation for centuries. By 2002 the tree died, having been severely damaged by lightning and a severe windstorm; today only a portion of the trunk survives.
- 4 Hopkinton Town Common** Town commons, like this one in Hopkinton (historic photo), are often dotted or edged with historic trees which are usually intentionally planted and contribute to a community's character.
- 5 Orchard, Pepperell** Orchards, like this example in Pepperell, may reveal the historic use of a property or the agricultural practices of a region. While no one tree may be individually significant, they collectively comprise a rural vernacular landscape.
- 6 American sycamore, Sunderland** This American sycamore in Sunderland is over 112 feet tall, has a circumference of nearly 25 feet, and was standing in 1789 – though it may be much older. It is the largest of its species in the state, and is a Massachusetts “champion tree”, a designation based on a tree's trunk circumference, height and crown spread.

Hopkinton Town Common



Orchard, Pepperell



American sycamore, Sunderland





TREE CARE WITH A PRESERVATION PERSPECTIVE

Historic trees, whether they are significant in their own right or as components of a significant landscape, may demand a level of care beyond that provided to other trees. Where the loss of a tree would have a negative impact on a historic landscape, preventive care such as fertilization, mulching, and disease control, is critical to ensure that the tree survives for as long as possible. Similarly, it may be wise to extend the life of a mature tree that has historic value through pruning, cabling or other methods, while in another context a tree in similar condition might be removed. In other words, historic trees should be treated not just from an arboricultural perspective, but also from a preservation perspective.

Well-established trees may not appear to require much care. For example, while new plantings must be regularly watered, natural rainfall may be sufficient for mature trees. However, proper care will increase the health and extend the life of a mature tree. Some tasks may be performed by municipal staff or volunteers, while others are best left to a professional arborist - someone who is specially trained in the care of trees. Selecting an arborist who is certified can offer additional assurance that the job will be done well. Arborists who are certified by the International Society of Arboriculture (ISA) or who have passed the Massachusetts Certified Arborists (MCA) examination must demonstrate a minimum level of knowledge and complete ongoing training in order to maintain their certification.

Basic tree care practices include:

REGULAR INSPECTIONS will help you assess the vitality of your trees and identify any problems, such as dead limbs, signs of disease, detrimental insects or trunk decay.

MULCHING keeps the soil around the tree cool and moist, discourages the growth of weeds and eliminates the need to mow near a tree's base, which can cause damage. Organic mulch should be spread at a depth of 2"-4" and cover as much of the tree's root system as possible. Root systems can extend up to 2-3 times the diameter of a tree's branch spread; when mulching to that extent is not practical or desirable, apply mulch to as much of the area under the tree's drip line as possible. It is very important that mulch not cover any part of the tree trunk, as this can encourage disease and the development of girdling roots; it is best to maintain a mulch-free area for several inches around the tree base.

AERATION can address problems caused by compacted soil by increasing a tree's oxygen supply, root growth and water uptake. Aeration typically involves the drilling of holes in the ground throughout the tree's root zone, and should be performed by a certified arborist.

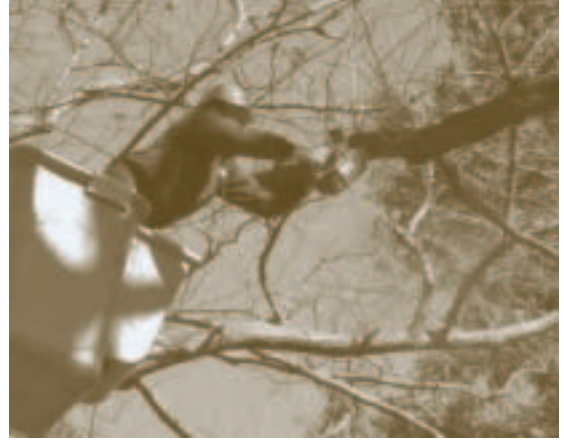
Aeration



Michael Davidsohn, LARP



Cabling



Pruning

INSECT AND DISEASE control methods vary considerably. Depending on the situation, treatment might involve application of insecticides or horticultural oils, or removal of an infected limb, among other solutions. A certified arborist can assist with identifying the nature of the problem and devising a treatment.

CABLING involves the installation of steel cables, attached to screws or bolts that are placed in the tree's limbs, to provide support or limit a tree's movement. Cabling can help prevent the large limbs of a mature tree from breaking during storms or heavy wind, thereby extending the life of a tree. Cabling is a specialized job that should be performed only by a certified arborist. In addition, follow-up inspections by a certified arborist are essential to assess the effectiveness of the cable system.

PRUNING may be necessary to remove dead or diseased limbs, to improve the overall tree structure or to influence the growth of the tree by increasing light and air penetration. Pruning involves the removal of foliage and therefore affects photosynthesis; consequently, over-pruning can limit the tree's ability to grow and can even result in the tree's death. Mature trees must be pruned carefully as they will not tolerate as aggressive a pruning as young trees and the job may require climbing and the use of special equipment. So that the health of the tree and safety of the public is maintained, only a certified arborist should prune mature trees. "Topping" - the removal of branches at the tree's crown to reduce overall height - is never recommended. Topping causes severe stress on the tree and can create hazards. If a tree's height must be reduced, consult an arborist for alternatives to topping.

GIRDLING ROOTS are tree roots that encircle the base of the tree trunk usually as a result of planting the tree too deeply or raising the grade, which may compromise the tree's vascular system and, ultimately, result in death. If detected early, girdling roots may be removed by a certified arborist, thereby extending the life of the tree.



The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes defines nationally-accepted preservation principles and includes recommendations about the treatment of trees in historic landscapes. To purchase, go to <http://bookstore.gpo.gov/> or call (866) 512-1800. View an excerpt at www.cr.nps.gov/hps/hli/introguid.htm.

For more information on mature tree care, consult the brochures produced by the International Society of Arboriculture (ISA), available for download at www.treesaregood.com/treecare/treecareinfo.asp or for order at (888) 472-8733.

For tips on how to select an arborist in your area, consult the ISA at www.treesaregood.com/treecare/hire_arborist.asp or (888) 472-8733 or the Massachusetts Arborists Association (MAA) at www.massarbor.org/arborists/index.htm or (508) 653-3320.



Mount Wollaston Cemetery, Quincy

The lack of leaves on the upper branches of this tree indicates that the limbs have died, and may be a sign of poor tree health. Dead limbs have the potential to fall and cause damage – in this case to cemetery visitors and grave markers.

HAZARDOUS TREES: BALANCING PRESERVATION WITH PUBLIC SAFETY

A tree is considered hazardous if it has a defect, such as a decaying trunk, dead limbs or a damaged root system that may cause it to break apart or fall, or if there are targets such as people, buildings, or landscape features that could be harmed if the tree were to fail. Hazardous trees represent a genuine risk to public safety and must be taken very seriously. Regular inspections and maintenance can help identify and prevent problems before they cause harm, thereby reducing liability concerns. Some trees should be watched especially carefully; large, aging trees pose a greater threat than small, young trees and certain species have inherently weaker wood, making them particularly susceptible to stress.

Sometimes, the only way to address a tree hazard is to remove the tree. But some hazards can be rectified through less aggressive means. Removing large, dead branches and cabling weak crotches may adequately reduce the risk of falling limbs. Installing a lightning protection system may prevent a large tree from being struck and killed. A certified arborist should be consulted to help identify tree hazards and determine the best course of action. When dealing with a historic tree - one that is significant in its own right or as part of a historic landscape - it is important to explore all options for addressing hazards before taking the most radical course. When total removal is the most appropriate action, consider carefully what type of tree to plant in its place (see discussion on replacement on page 8).



For more on hazardous trees, consult the ISA's brochure, "Recognizing Tree Hazards" at www.treesaregood.com/treecare/hazards.asp or (888) 472-8733 or the DCR's Homeowner's Guide to Hazardous Trees, available at (413) 256-1601.

Memorial Drive, Cambridge

Although a tree may appear healthy in the upper branches, the trunk is oftentimes weak. This tree trunk along Memorial Drive was originally scarred by cars, and subsequent rot and insect infestation created a major hazard along a busy urban parkway. This tree has since been removed.





PLANNING FOR THE FUTURE: TREE REMOVAL AND REPLACEMENT

Trees are organic - they grow, mature and ultimately decline. With proper care and maintenance, a tree's death can be delayed, but should nonetheless be planned for as an eventuality. It is especially important to plan an appropriate approach to the removal and replacement of trees that have historic value. Removal techniques should be designed to have minimal impact on other historic features, and decisions about replacement trees should be made from a landscape preservation perspective.

MINIMIZING IMPACTS

Removing a mature tree can be dangerous and should only be undertaken by a professional. In addition, removal can involve substantial excavation, as tree roots may extend 2-3 times the diameter of the branch spread. In a historic landscape, it is generally best not to attempt to remove a tree's root system but, rather, to cut the trunk to grade and either allow it to decay over time, or perform limited grinding that does not extend beyond the diameter of the trunk. This prevents the disturbance of other landscape features that may be in the vicinity of the tree - such as additional vegetation, turf, walkways or fences. It also lessens the risk of disturbing archaeological remains located below ground as many historic landscapes are considered "archaeologically sensitive" sites; that is, they have the potential to contain prehistoric or historic artifacts that, if disturbed, could lose much of their historic value. The removal of trees in burial grounds, in particular, must be approached very carefully (see discussion page on 10).

Planting a tree, which requires digging a hole as much as three times the diameter of the root ball, also has the potential to disturb other landscape features and archaeological artifacts. Locating the new tree in the same location as or next to a previous planting (interplanting) may minimize the impact, since the soil in that area has already been disturbed. In any landscape that is potentially archaeologically sensitive, consult with the archaeological staff at the Massachusetts Historical Commission (MHC) for guidance prior to removing an old tree or planting a new one. Depending on the source of funding for the work, for example if the tree work is part of a project that received a state or federal grant, you may be required to consult with the MHC. In this case, MHC staff would review the project to assess its potential impact on any historic resources, archaeological or otherwise. MHC staff can also help determine the sensitivity of the site, if you are unsure.



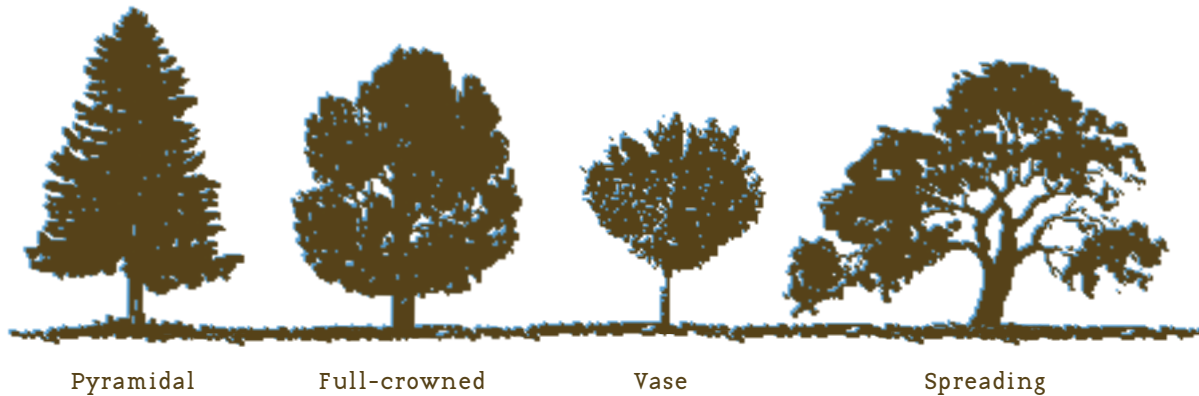
Longwood Mall, Brookline

Interplanting, or the practice of planting young trees among mature trees, anticipates the loss of older trees and insures the establishment of new trees. This young European beech has been appropriately placed among the surrounding grove of 170-year-old trees.

"Trees are the best monuments that a man can erect to his own memory.

They speak his praises without flattery, and they are blessings to children yet unborn." Lord Orrery

A man does not plant a tree for himself, he plants it for posterity. Alexander Smith



CHOOSING APPROPRIATE REPLACEMENT TREES: WHAT'S IN A SPECIES?

Many important factors come into play when choosing what type of tree to plant. Trees in dense, urban settings may be selected based on their mature height and maintenance requirements as well as the site's physical constraints and soil quality. It is best to choose a tree that is appropriate to the existing environmental conditions and that the managing agency has the resources to maintain. In a historic landscape, however, additional factors must be considered. The types of trees in a historic landscape have an enormous impact on the site's character. The designer of a historic garden likely chose tree species and varieties very deliberately for their size, shape, leaves and flowers, among other factors. The types of trees in landscapes that were not professionally designed may be equally important. For example, a rural road lined with deciduous trees that provide a shady summer canopy, such as white oaks, will have a different quality than a road lined with an upright, coniferous species, such as eastern white pine.

Ideally, decisions about the treatment of historic trees and the selection of appropriate replacement species are made in the context of an overall landscape preservation plan. A preservation plan includes: information about the historic development of the landscape, an assessment of the site's overall condition, an assessment of the condition of individual features including vegetation; and the identification of a preservation treatment approach. A thorough plan will specify certain species and varieties of trees for the landscape, ideally based on historic plans and photographs. Tree replacement selection should be consistent with the recommendations of existing planning documents. If the landscape is municipally owned, the local historical commission should know if a preservation plan has been completed for the landscape.

Sometimes, it may be necessary to make a decision about a replacement species without the benefit of a landscape preservation plan. In these cases, ask the following questions before making a species selection:

Is the tree to be planted replacing an existing tree? When was the existing tree planted - is it historic and does it add to the character of the site?

Is the site a designed landscape and laid out according to a specific plan? If so, what type of tree was specified in the plan? If plans do not survive, are there historic photographs of the landscape? Is the historic species and variety still available and matching in form, texture, and color?

Is the site a vernacular landscape (not laid out by a landscape designer or according to a design tradition)? Has the landscape traditionally contained certain species of trees?

In many cases, replacement in kind - that is, planting the same type of tree that was historically planted - is the most appropriate action. But replacement in kind is not always possible, practical or desirable. The exact variety of tree specified for a formal garden may no longer be readily available. While the town park may once have been planted with just one or two species of trees, it may be best to choose several different types to reduce the chances of a species-specific disease decimating large numbers of trees at once (in the mid-1900s, Dutch elm disease claimed countless American elms throughout the United States). Changing environmental conditions - such as the prevalence of cars, carbon monoxide and road salt - may necessitate the selection of a particularly hardy species of street tree. It is important to make the best selection from a landscape preservation standpoint, but to balance those considerations with practical factors. A certified arborist may be able to recommend appropriate species substitutions. A landscape architect who has experience with historic properties could assist with species selection and, if needed, develop an overall preservation plan for the landscape.

A variety of factors must be considered when choosing appropriate substitute species. However, it is generally best to choose a replacement species that resembles the historic species. Consider the following characteristics of both the historic species and possible replacements before making a final selection:

SIZE - How tall is the tree when fully grown? How far do its branches extend?

SHAPE/FORM - What is the natural shape of the tree? Is it pyramidal, full-crowned, vase-shaped or spreading?

TEXTURE - Is the tree evergreen or deciduous? What shape are its leaves or needles? Does it produce cones?

COLOR - What color are the leaves or needles? Does the color change according to season? Does the tree produce fruit, flowers or berries?



For information about landscape preservation plans, consult *Preservation Briefs #36: Protecting Cultural Landscapes*, available for free at www.cr.nps.gov/hps/tps/briefs/brief36.htm or for purchase at <http://bookstore.gpo.gov/> or (866) 512-1800. Also see Issue No. 1 of *Terra Firma*, available at www.mass.gov/dcr/stewardship/histland/histland.htm or (617) 626-1250.

For general information on how to choose a tree, consult the ISA's brochure on tree selection at www.treesaregood.com/treecare/tree_selection.asp or (888) 472-8733.



Limb damage, New Marlborough

Falling tree limbs can do permanent damage to grave markers and other historic artifacts within a burial ground.



Tree trunk damage, Chelsea Garden Cemetery

Trees that are located too close to a grave marker may topple or even grow around the stone.



Root damage, First Church of Jamaica Plain Cemetery

Roots can often cause more damage than trunks or limbs by destroying tomb walls and displacing stonework.

TREES IN HISTORIC BURIAL GROUNDS: SPECIAL CONSIDERATIONS

Burial grounds may simultaneously be resting places for the dead, outdoor museums of funerary art, or valuable parcels of open space as well as significant historic landscapes. A cemetery's layout, topography, circulation systems, gravemarkers, tombs, mausoleums, fences and vegetation all contribute to the site's character. A burial ground will suffer if its gravemarkers are broken or damaged; similarly, the decline or inappropriate treatment of a cemetery's vegetation will also detract from the landscape's integrity.

The presence and extent of vegetation in burial grounds has varied over time. In the seventeenth and eighteenth centuries, cemeteries were austere and, for the most part, contained no ornamental plantings. In contrast, the rural cemetery movement of the early nineteenth century advocated for the establishment of expansive, extensively planted grounds. In the late-1800s, many earlier burial grounds were updated with elaborate, Victorian-style plantings. Despite their not being original to the site, such alterations may warrant preservation. Trees and shrubs may contribute to the site's visual character, screen undesirable views and, by representing different periods of cemetery development, serve as evidence of changing attitudes toward death and burial.

Nonetheless, trees sometimes have an uneasy relationship with other elements of a burial ground, most notably grave-

markers. If a tree falls or loses a large limb, it can easily destroy an ancient headstone - an irreplaceable historic artifact. If it lacks adequate space to grow, a tree can damage nearby landscape elements; its trunk may grow around a gravemarker or its roots may displace a fence at a family plot. Volunteer trees or shrubs can grow to the point of obscuring a gravemarker from view which may, in turn, prevent proper air circulation and encourage damaging biological growth on the stone. These problems are largely preventable with basic maintenance and thoughtful intervention. Regular inspections of a cemetery's trees will help identify hazardous trees and other issues. Pruning and cabling can extend the life of a tree while reducing its threat to other landscape features. Frequent removal of "volunteer" vegetation will prevent the growth of trees in inappropriate locations.

Sometimes, a tree may be dying or sufficiently hazardous as to require removal. As noted on page 7, removal of a mature tree in a historic landscape must be approached very carefully, due to the potential to harm other landscape elements or disturb archaeological artifacts. This is particularly true in cemeteries, where a tree's root system may extend into burial plots and excavation could disturb human remains. Don't rely on cemetery records or existing gravemarkers to provide definitive locations of all the graves in a cemetery;

records are often incomplete, markers may have disappeared over time or the burial ground may have included a potter's field for the burial of the poor, where graves were often unmarked. When removing a tree in a cemetery, it is generally recommended that its trunk be cut to grade and either left to decay naturally or ground down to its full diameter. Chemicals that may speed the decay process are generally not recommended, due to their potential to harm gravemarkers; a stone conservator can provide advice for specific situations.

Similarly, planting a new tree in a cemetery must be done with caution. Substantial digging may be required, and the possibility of disturbing archaeological resources is great. It is often best to plant a new tree in the location of a former tree, where the soil has already been disturbed. Also bear in mind the size of the tree and extent of its root system when it is fully grown, so as to minimize the chance of the tree interfering with or damaging graves or other landscape

features. Lastly, carefully consider the species of tree to be planted (see page 8). In addition to choosing a historically appropriate type, it is wise to consider a species' unique characteristics and maintenance demands. Some trees, such as poplar, red maple and willow, are particularly susceptible to storm damage and breakage, and should generally be avoided. Prior to planting a tree in a cemetery, contact the Massachusetts Historical Commission to discuss proposed tree locations so that MHC staff can assess the potential for disturbing archaeological artifacts or unmarked burials.

If, when removing or planting a tree, human remains are discovered, Massachusetts law requires that you cease all work immediately, contact the state medical examiner and, if the bones are likely to be 100 years old or older, contact the state archaeologist (Massachusetts General Laws Chapter 38, Section 6B and Chapter 9, Section 27C).



More information on the care, removal and replacement of trees in historic cemeteries may be found in the DCR's Preservation Guidelines for Municipally Owned Historic Burial Grounds and Cemeteries, free and available for order at www.mass.gov/dcr/stewardship/histland/histland.htm or (617) 626-1250.

To insure that tree planting does not disturb archaeological artifacts or human remains, contact the MHC archaeological staff at (617) 727-8470 before work begins.

If a tree removal or planting project uncovers human remains, cease work immediately and contact the state medical examiner at (617) 267-6767 and the state archaeologist at (617) 727-8470.

BUILDING A TREE CARE TEAM

A variety of private individuals and municipal groups may have a stake in the treatment, removal or planting of trees in a historically significant landscape. Obtaining input from all parties at the start will minimize chances for misunderstanding, and can help lay the foundation for teamwork on future tree projects. Depending on the community and the landscape, decisions about the treatment of any given tree may fall to the tree warden, parks department or park commissioners. The Department of Public Works may be responsible for maintenance. The local historical commission should weigh in on the project from a preservation perspective; they may know of existing planning documents that address the landscape. If the tree is located in a burial ground, the town's cemetery commission should be involved. Some communities have an active garden club and some landscapes have a friends group – these advocates may have knowledge to share or volunteer services to offer.

Some situations call for outside expertise. If your town does not have a certified arborist on staff, you may need to retain a private contractor to devise treatment plans, undertake advanced work or suggest appropriate replacement species. If the tree in question is part of a larger landscape that requires a plan to guide its overall care and rehabilitation, a landscape architect with experience in historic properties may be hired to create a landscape preservation plan addressing all elements of the site, including vegetation.

TREE CARE RESOURCES

In addition to those referenced in the text, the following resources provide useful information on the care of historically significant trees.

Massachusetts Department of Conservation and Recreation
 (617) 626-1250
 Historic Landscape Preservation Initiative
www.mass.gov/dcr/stewardship/histland/histland.htm

Bureau of Forestry
www.mass.gov/dcr/stewardship/forestry/index.htm

The Massachusetts Urban and Community Forestry Program
 (617) 626-1468
www.mass.gov/dcr/stewardship/forestry/urban/index.htm

The DCR and the University of Massachusetts Extension have collaborated on a series of publications, available at (413) 256-1601.
 Guide to Common Insects and Diseases
 Helping Trees Recover from Stress: A Homeowner's Guide
 Homeowner's Guide to Hazardous Trees
 Cultural Practice Problems of Trees and Shrubs in the Landscape and Nursery

USDA Forest Service
 (202) 205-8333
www.fs.fed.us

American Forests
 (202) 955-4500
www.americanforests.org

Massachusetts Tree Wardens' and Foresters' Association
 (781) 894-4759
<http://masstreewardens.org>

Arnold Arboretum
 (617) 524-1718
www.arboretum.harvard.edu/index.html

Massachusetts Arborists Association
 (508) 653-3320
www.massarbor.org

Scenic America – Model Tree Protection Ordinance
 (202) 638-0550
www.scenic.org

International Society of Arboriculture
 (888) 472-8733
www.isa-arbor.com/home.asp
 Tree care brochures and other information for the general public may be found at www.treesaregood.com

Olmsted Center for Landscape Preservation
 (617) 566-1689
www.nps.gov/oclp
 Contains their publication: Replacing Historic Trees in Cultural Landscapes

American Society of Consulting Arborists
 (301) 947-0483
www.asca-consultants.org
 A useful glossary of terms may be found at www.asca-consultants.org/what_glossary.html

Massachusetts General Laws
<http://www.mass.gov/legis/laws/mgl/mgllink.htm>
 Information on state laws that specifically protect trees (Chapter 40: Section 15C-Scenic Roads and Chapter 87-Shade Trees)

The National Arbor Day Foundation
 (888) 448-7337
www.arborday.org
 Tips on identifying trees may be found at www.arborday.org/trees/treeid.cfm

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