PLANT LIVE GROW

TREES AND ROADS

A COMPENDIUM OF RESOURCES TO HELP YOU STRIKE THE BALANCE BETWEEN SAFE ROADS AND ROADSIDE TREES

Prepared by the VT Urban and Community Forestry Program
for the Vermont Local Road Program

FORESTS, PARKS & RECREATION VERMONT
AGENCY OF NATURAL RESOURCES

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

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Roles and Responsibilities of Local Government Officials Concerning Vegetation Management on Rural Roads*

In each municipality there are several officials who are concerned with rural roads.

Tree Warden

The tree warden in each town is appointed by the Selectboard to act as overseer of public trees, organizing and implementing tree pruning, maintenance and protection programs. The tree warden has the responsibility of caring for the shade and ornamental trees and enforcing all laws relating to trees in public ways and places. The tree warden shall hold a public hearing for removal of a public shade tree within the residential part of town, unless it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety. When disease or insects threatens public or privately owned trees, the tree warden will call upon the expertise of the Department of Forests Parks & Recreation and put into practice such control measures as these agencies may recommend. The tree warden may negotiate with private land owners concerning control measures to be used upon the trees on their lands, but has the right to use those measures without the owner's permission if necessary (24 VSA Chapter 67).

Selectboards

The selectboard is responsible for ensuring town roads are in good and sufficient repair. The selectboard appoints a road foreman or road commissioner and is responsible for road expenditures. The Selectboard is also responsible for appointing a tree warden. The tree warden should not be a member of the Selectboard (19 VSA Chapter 003).

Road Commissioner, Road Foreman and Road Crews

In many towns the road commissioner regularly reports to the selectboard on the status of the town roads and requests specific expenditures, suggests when roads should be reclassified, and sees that roads are properly graded, surfaced, graveled, and maintained for winter use. The road commissioner has no independent authority to act, and can only carry out the orders of the Selectboard. Frequently, the Selectboard asks the road commissioner to use judgment on the job (19 VSA Chapter 003).

Conservation Commissions

A conservation commission may be created upon a vote of the town or upon a vote of the Selectboard if the town charter so permits. The Selectboard appoints the commission members for four-year terms. The conservation commission may make an inventory and conduct studies of the municipal natural resources. The conservation commission may administer municipal lands acquired to protect certain attributes. The conservation commission may also advise the Selectboard and the planning commission. (24 VSA Chapter 118).

Utilities

Lines of telegraph, telephone, electric wires and two-way wireless telecommunication facilities, may, subject to provisions of Section 1111 of Title 19, be constructed and maintained by a

person or corporation upon or under a highway, in such manner as not to interfere with repairs on such highway or the public convenience in traveling upon or using the same. (30 VSA Title 2502).

A tree within a street or highway shall not be cut or injured in constructing, maintaining or repairing a line of wires, without the written consent of the adjoining owner or occupant, unless the highway board or the selectmen of the town in which the tree is situated, after due notice to the parties and upon hearing, shall decide that such cutting or injury is necessary. A person or corporation cutting or injuring such trees shall pay the damages, if any, awarded on such hearing before cutting or injuring the trees. A person or corporation that violates a provision of this section shall be fined not more than $50 or less than $5 for each tree so cut or injured. (30 VSA Title 2506).

Highway Rights-of-Way

Before working on any roadside, road crews should verify the limits of the right-of-way for that road and so as not to work outside that limit. Typically, a town right-of-way is three rods or a total of 49.5 feet across, but the width may vary from road to road. State rights-of-way are often wider.

Clear Zones

Clear zones along rural roads provide space for ditches, snow storage and a safe recovery area for vehicles that accidently leave the road. Motorists need a clear unobstructed roadside in order to see oncoming vehicles and other objects. Trees at intersections, for example, often obstruct the driver's view of oncoming traffic.

Recommended clear zone distances on rural roads, measured from the edge of the traveled way, vary from seven to 24 feet depending on average daily traffic and the design speed. Seven feet of clear zone is considered the minimum width for roadside ditches and snow storage. It may be necessary to remove or prune healthy trees growing close to the road. Use discretion, however, since roadside trees, especially large trees, have many benefits. Seek the opinions of others, especially nearby property owners. Work with them to reach a compromise between safety and aesthetics.

**From the Vermont Highway Vegetation Management Manual, written by Harry Chandler, Vermont Woodlands Association*

Vermont Tree Warden Statutes

TITLE 24: Municipal and County Government

CHAPTER 033: MUNICIPAL OFFICERS GENERALLY

§ 871. Organization of selectmen; appointments

Forthwith after their election and qualification, the selectmen shall organize and elect a chairman and, if so voted, a clerk from among their number, and file a certificate of such election for record in the office of the town clerk. Such selectmen shall thereupon appoint from among the legally qualified voters the following officers who shall serve until their successors are appointed and qualified, and shall certify such appointments to the town clerk who shall record the same:

1. Three fence viewers;
2. A poundkeeper, for each pound; voting residence in the town need not be a qualification for this office provided appointee gives his consent to the appointment;
3. One or more inspectors of lumber, shingles and wood;
4. One or more weighers of coal; and
5. A tree warden. (Amended 1963, No. 74, § 2.)

TITLE 24: Municipal and County Government

CHAPTER 067: PARKS AND SHADE TREES

§ 2502. Tree wardens and preservation of shade trees

Shade and ornamental trees within the limits of public ways and places shall be under the control of the tree warden. The tree warden may plan and implement a town or community shade tree preservation program for the purpose of shading and beautifying public ways and places by planting new trees and shrubs; by maintaining the health, appearance and safety of existing trees through feeding, pruning and protecting them from noxious insect and disease pests and by removing diseased, dying or dead trees which create a hazard to public safety or threaten the effectiveness of disease or insect control programs. (Amended 1969, No. 238 (Adj. Sess.), § 1.)

§ 2503. Appropriations

A municipality may appropriate a sum of money to be expended by the tree warden, or if one is not appointed, by the mayor, aldermen, selectmen or trustees for the purpose of carrying out this chapter. (Amended 1969, No. 238 (Adj. Sess.), § 2.)

§ 2504. Removal of trees, exception

The tree warden may remove or cause to be removed from the public ways or places all trees and other plants upon which noxious insects or tree diseases naturally breed. However, where an owner or lessee of abutting real estate shall annually, to the satisfaction of such warden, control all insect pests or tree diseases upon the trees and other plants within the limits of a highway or place abutting such real estate, such trees and plants shall not be removed. (Amended 1969, No. 238 (Adj. Sess.), § 3.)

§ 2505. Deputy tree wardens

A tree warden may appoint deputy tree wardens and dismiss them at pleasure.

§ 2506. Regulations for protection of trees

A tree warden shall enforce all laws relating to public shade trees and may prescribe such rules and regulations for the planting, protection, care or removal of public shade trees as he deems expedient. Such regulations shall become effective pursuant to the provisions of chapter 59 of this title. (Amended 1969, No. 238 (Adj. Sess.), § 4.)

§ 2507. Cooperation

The tree warden may enter into financial or other agreements with the owners of land adjoining or facing public ways and places for the purpose of encouraging and effecting a community wide shade tree planting and preservation program. He may cooperate with federal, state, county or other municipal governments, agencies or other public or private organizations or individuals and may accept such funds, equipment, supplies or services from organizations and individuals, or others, as deemed appropriate for use in carrying out the purposes of this chapter. (Amended 1969, No. 238 Adj. Sess.), § 5.)

§ 2508. Cutting shade trees; regulations

Unless otherwise provided, a public shade tree shall not be cut or removed, in whole or in part, except by a tree warden or his deputy or by a person having the written permission of a tree warden.

§ 2509. - Hearing

A public shade tree within the residential part of a municipality shall not be felled without a public hearing by the tree warden, except that when it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety, no hearing shall be required. In all cases the decision of the tree warden shall be final except that when the tree warden is an interested party or when a party in interest so requests in writing, such final decision shall be made by the legislative body of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 6.)

§ 2510. - Penalty

Whoever shall, willfully, mar or deface a public shade tree without the written permission of a tree warden or legislative body of the municipality shall be fined not more than $50.00 for the use of the municipality. Any person who, willfully, critically injures or cuts down a public shade tree without written permission of the tree warden, or the legislative body of the municipality shall be fined not more than $500.00 for each tree so injured or cut, for the use of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 7.)

§ 2511. Control of infestations

When an insect or disease pest infestation upon or in public or private shade trees threatens other public or private trees, is considered detrimental to a community shade tree preservation program or threatens the public safety, the tree warden may request surveys and recommendations for control action from the commissioner of agriculture, food and markets. On recommendation of the commissioner of agriculture, food and markets, the tree warden may designate areas threatened or affected in which control measures are to be applied and shall publish notice of the proposal in one or more newspapers having a general circulation in the area in which control measures are to be undertaken. On recommendation of the commissioner, the tree warden may apply measures of infestation control on public and private land to any trees, shrubs or plants thereon harboring or which may harbor the threatening insect or disease pest. He may enter into agreements with owners of such lands covering the control work on their lands, but the failure of the tree warden to negotiate with any owner shall not impair his right to enter on the lands of said owner to conduct recommended control measures, the cost of which shall be paid by the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 8.)

§ 2512. Repealed. 1969, No. 238 (Adj. Sess.), § 9.

TITLE 32: Taxation and Finance

CHAPTER 017: FEES AND COSTS

§ 1680. Tree warden

When a town or incorporated village fails to fix the compensation of a tree warden or his deputies, they shall receive such compensation as the selectmen or trustees determine.

Other Statutes Related to Trees

TITLE 30: Public Service
CHAPTER 071: TELEGRAPH, TELEPHONE AND ELECTRIC WIRES

§ 2506. Trees not to be injured; exception; penalty
A tree within a street or highway shall not be cut or injured in constructing, maintaining or repairing a line of wires, without the written consent of the adjoining owner or occupant, unless the transportation board or the selectmen of the town in which the tree is situated, after due notice to the parties and upon hearing, shall decide that such cutting or injury is necessary. A person or corporation cutting or injuring such trees shall pay the damages, if any, awarded on such hearing, before cutting or injuring the trees. A person or corporation that violates a provision of this section shall be fined not more than $50.00 nor less than $5.00 for each tree so cut or injured. (Amended 1989, No. 246 (Adj. Sess.), § 31.)

TITLE 13: Crimes and Criminal Procedure
CHAPTER 077: TREES AND PLANTS

§ 3606. Treble damages for conversion of trees or defacing marks on logs
If a person cuts down, destroys or carries away any tree or trees placed or growing for any use or purpose whatsoever, or timber, wood, or underwood standing, lying or growing belonging to another person, without leave from the owner of such trees, timber, wood, or underwood, or cuts out, alters or defaces the mark of a log or other valuable timber, in a river or other place, the party injured may recover of such person treble damages in an action on this statute. However, if it appears on trial that the defendant acted through mistake, or had good reason to believe that the trees, timber, wood, or underwood belonged to him, or that he had a legal right to perform the acts complained of, the plaintiff shall recover single damages only, with costs. (Amended 1959, No. 61, eff. March 26, 1959.)

TITLE 19: Highways
CHAPTER 009: REPAIRS, MAINTENANCE AND IMPROVEMENTS

§ 901. Removal of roadside growth
A person, other than the abutting landowner, shall not cut, trim, remove or otherwise damage any grasses, shrubs, vines, or trees growing within the limits of a state or town highway, without first having obtained the consent of the agency for state highways or the board of selectmen for town highways. (Added 1985, No. 269 (Adj. Sess.), § 1.)

§ 902. Penalty for removal
A person who willfully or maliciously cuts, trims, removes or otherwise damages grasses, shrubs, vines or trees within highway limits in violation of section 901 of this title shall be fined not more than $100.00 nor less than $10.00, for each offense. (Added 1985, No. 269 (Adj. Sess.), § 1.)

§ 903. Agreements for planting

The agency or the board of selectmen may enter into agreements with individuals or organizations who wish to plant grasses, shrubs, vines, trees or flowers within highway limits. (Added 1985, No. 269 (Adj. Sess.), § 1.)

§ 904. Brush removal

The selectmen of a town, if necessary, shall cause to be cut and burned, or removed from within the limits of the highways under their care, trees and bushes which obstruct the view of the highway ahead or that cause damage to the highway or that are objectionable from a material or scenic standpoint. Shade and fruit trees that have been set out or marked by the abutting landowners shall be preserved if the usefulness or safety of the highway is not impaired. Young trees standing at a proper distance from the roadbed and from each other, and banks and hedges of bushes that serve as a protection to the highway or add beauty to the roadside, shall be preserved. On state highways, the secretary shall have the same authority as the selectmen. (Added 1985, No. 269 (Adj. Sess.), § 1.)

THE LAW OF TREES

Compiled by Paul Gillies

In the law, a tree can be either public or private property. It can be real of personal property, depending on the circumstances. Trees are funny that way. They depend.

A tree's status depends on where it's located. If it's in the public right-of-way – that area usually three rods in width that is controlled by the town for highway purposes – it isn't yours to cut and split into cordwood, without permission of a public official. Town officials can, if they think it right, remove the tree and leave you the wood, unless they can figure some way to use it in the building of the highway.

A tree's status also depends on its health. If a tree has a disease that can infect other trees, public officials also have authority to spray it, cut it down, and burn the wood to protect other trees in the area.

Trees have been around much longer than any law, but the traditions and understanding of people toward trees have been translated into law in ways that every landowner ought to understand. This brochure is intended to give you an idea of how the law treats trees, and to describe your rights and duties toward our leafy friends.

The Players

Let's meet the people who administer the law of trees in Vermont.

Every town ought to have a **tree warden**, as the law requires one to be appointed annually by the select board. The statutes devote an entire chapter to the office. The domain of this official includes all shade and ornamental trees within the limits of the public ways and places. Tree wardens decide when old trees should come down and when new trees should be planted, what pest control measures are needed and where to prune. They may enact ordinances for the planting, protection, care, or removal of public shade trees. It's important to appoint someone, with a good background in the subject, to this office, one who is both familiar with the science of trees and who will serve as an advocate for them in an official capacity.

The **select board** hears appeals from decisions of the tree warden. It has no authority to interfere with this officer, if no one appeals. The **voters** approve budgets that raise money for caring for these trees. The **town road commissioner** has continuing responsibility for maintaining the public rights-of-way.

The **private landowner** is bound by the law to work with the tree warden to ensure the health and preservation of public shade and ornamental trees.

The **Commissioner of Forests, Parks and Recreation** has a continuing role in assisting communities and landowners to keep forests healthy, and operates a cost-sharing program for the planting and maintenance of trees by towns through the town tree warden. The **Commissioner of Agriculture** recommends

The Anomaly of the Bee Tree

Shortly after the Civil War, a man found a bee tree on his neighbor's land. He visited the neighbor and told him about his find and his intention to remove the honey. The neighbor told his cousin about the tree. With the neighbor's permission, the cousin went looking for the tree, found it, and took the honey for himself. The original finder then sued for damages claiming he was entitled to the honey.

He was, even though the tree was not on his own land. The common law recognized his rights as first finder of a bee tree. The Vermont Supreme Court acknowledged his right to cut it down, even without asking permission, and take the honey for himself.

Whether this is still good law in Vermont is unclear, but the story illustrates how curious the law of trees can be. The usual rules of private property ownership do not always apply. Trees have a special status in the law. All landowners ought to know their rights and those of their trees.

control measures to protect public trees from infestation and authorizes the tree warden to take the necessary steps to save these trees.

Utilities, including power and telephone companies, also have rights within the public right-of-way. With permission from the town, they may prune or cut trees that interfere with lines and poles along the roadside.

Law enforcement officials enforce the laws making the cutting of trees on other people's property or within the public right-of-way a crime.

Defining "Shade and Ornamental Trees" and Other Terms

The term "shade and ornamental trees" appears throughout the law of trees, but the law does not define the term. A public shade tree provides shade to people using public places, including roads, the town commons, and public institutions. An ornamental tree is one that is cultivated for decorative purposes. Neither shade nor ornamental trees are limited to particular age or size. Assume that any tree or shrub within the public right-of-way, or in a public place, is protected by the law. Don't try to be sly with definitions to get around the law.

The public right-of-way is an easement that allows the public to walk and ride across private property. Highways are the most obvious public rights-of-way, but the term also includes public trails. The public right-of-way is usually three rods wide (49 ½'), but in some cases may be wider, depending on the original action of the town in laying it out. Within the right-of-way, public officials my take any action necessary to ensure safe travel by the public.

Public places include cemeteries, greens, parks, and the lawns surrounding public buildings. Often these properties are owned outright by the town, but the rules on cutting and pruning shade and ornamental trees apply as forcefully there as in the road right-of-way. This means that other town officials – the road crew, the town clerk, the cemetery commissioners – must consult with and gain the written approval of the tree warden before cutting or pruning trees in these public places.

Finding the Law

The law relating to town tree wardens is found in Title 24 of the Vermont Statutes Annotated, Sections 2502 through 2511. The law on tree crimes (crimes involving the cutting of trees, that is) is in Title 13, Sections 3601 through 3609. The town clerk can show you how to find these laws and make copies of them for review.

Most of the law relating to trees is common law, meaning that it is found in court cases, many of them from the earliest reported decisions of the Vermont Supreme Court. You should visit the State Law Library for references to these cases, or contact the Vermont Institute for Government for further help.

The purpose of the law is to mediate between the interests of the public and those of private landowners whose property includes public shade and ornamental trees. The public's interests include safe travel, provision of utilities, shade and beauty, calming of traffic, and neighborhood preservation. Private interests include the maintenance of a buffer between living areas and the public highway, creation of a view of the land beyond the boundary of the property, and the ability to choose the design and look of a private residence.

Trespass?

At this point, owners of real property are wondering just how private property really is, especially as it relates to trees in the public right-of-way. What are your rights and obligations? Here is a short list:

1. The right to a public hearing. The decision to cut down public trees is made by the tree warden only after a public hearing. You may attend. You may appeal the decision to the select board to overturn the tree warden's decision.
2. The right to the lumber cut, except in the remote instance where the public official needs the lumber to construct the road or bridge. The town should at least offer you the trees it cuts.
3. The obligation to allow the tree warden access to your land to conduct control measures against infestation.
4. The obligation to obtain permission from the warden before you cut or plant any tree or shrub within the public right-of-way.

And the penalty for failing to conform to the law on public trees? You can be fined for cutting (or "injuring") a public shade tree without written permission of either the tree warden of the select board, up to $500 for each tree.

Before controversy develops, a town might think seriously about adopting a policy on public shade trees. By establishing a protocol for tree maintenance and removal, the town can avoid the accusation that the landowner has been singled out for special treatment and provide for regular care and tending of these important resources. There's a public protection advantage with such a program, since it is possible that a town might be found liable for failing to maintain public shade

trees that cause traffic accidents. If the record shows the town has done nothing to fulfill this responsibility, it may create difficulties in waging a proper defense if a lawsuit develops.

Boundary Lines

Trees often serve as boundaries between lots. Early deeds frequently refer to a beech tree or an elm tree as a corner or side boundary marker. A special set of laws, most of them established by courts as part of the common law, have grown up around such trees.

A tree sometimes is a monument, establishing a corner in the description of conveyed land. Those trees are owned jointly by the owners of the land on either side of the line, and cannot be cut without permission of both owners.

Trees near a boundary tend to hang over the line or grow troublesome roots that invade foundations or driveways. Those landowners affected by the alien tree are authorized by law to cut the offending branches or roots and sometimes win damage suits against the owners of the trees, especially when a tree, obviously diseased, falls on the neighbor's house or car.

Trees on or near the boundary of the public right-of-way create special problems; roots can damage the road bed. In close cases, we think the best plan is to consult with the tree warden, just to be sure.

The fruit falling from a tree onto a neighbor's property is often falsely regarded as belonging to the neighbor, but the neighbor's rights only include to the removal of the offending fruit when it interferes with the neighbor's property, not to the general enjoyment of any apple hanging invitingly on a limb over the line. If the trunk is on your land, your neighbor can't pick the fruit, even on overhanging limbs, without your permission.

If a tree on someone else's property grows tall and wide and blocks your view, you have no right to complain. The English common law doctrine of *ancient lights* does not apply in Vermont, and the only way you can legally ensure the continuation of your view is to obtain an easement from your neighbor. This is usually created by deed, allowing you to cut portions of the trees on your neighbor's property that interfere with your view of the valley or mountains beyond.

Timber

Cutting wood on your own land is an act of ownership; cutting it on the land of another is a trespass. If you cut or deface a tree belonging to someone else by mistake – maybe you think the trees are on your land – you owe the landowner the value of the timber taken. If you do it knowing the trees aren't yours you pay treble damages – three times the value of the wood taken.

Suppose you cut somebody else's trees, load them on your truck, and then are stopped by a police officer who suspects you've stolen them. The law has something special for you too. The officer may stop you and ask for a bill of sale or some writing showing your rightful possession, and if you don't have one, that's enough evidence to convict you of a crime for which you may be imprisoned up to six months or fined not more than $3000 or both. Of course, if you can show where you obtained the trees, or how you had a license or authority to cut them, you may be found innocent.

This law is particularly important for those who, during the holiday season, cut Christmas trees and tie them to their cars to bring them home. A bill of sale is an important defense to arrest and prosecution.

Then there's adverse possession, the statutory right to land you haven't purchased. If you've used the land openly and continuously for at least fifteen years, in spite of the rights of its original owner, you may persuade a court to recognize your right to the land. It's not easy to generalize about adverse possession, but it's enough for our purposes to tell you that it's possible under the right circumstances.

A majority of Vermont towns own and maintain municipal forests. In some cases, these forests are available to residents for harvesting firewood, in others; the common use is as a public recreational area. Check with the town clerk to learn what your rights are in your municipal forest.

The Bundle of Rights

The mantra of property law is simply stated – property is a bundle of rights, among them the right to sell and use land and everything growing on it. You can convey a right-of-way to your neighbor if you like, dividing off one of the pieces of the bundle, and that authorizes your neighbor to cut whatever trees are found along the way to make the road.

You can also convey timber rights to your land, while retaining the rest of the property. The problem is what use you have left. Your use of the land will then be limited to those portions not forested. Arguably, you can't even pull up saplings without permission of the owner of the timber rights, even on your own front lawn.

Owners of land abutting public highways have not lost their interest in the land if the town has a right-of-way, but their rights to use that land are severely limited. Although the trees still belong to the

Why Appoint a Tree Warden? Every town will benefit from the appointment of a tree warden, if someone good can be found who will take the position seriously. Trees need someone looking out for their interests, and the whole community benefits from this work. You don't need to have a forestry degree to qualify. All it takes is an interest in trees and a willingness to provide a public service to your town. Once appointed, you can obtain more information about trees and your duties as tree warden from UVM Extension or from the Vermont Department of Forests, Parks and Recreation. Talk to the select board members if you are interested, and show them this pamphlet.

landowner, there is no private right to cut them down, without a public hearing.

The tree warden can't just cut any tree, either, without a public hearing, unless the trees are diseased and dying. But the warden can plant trees and shrubs within the public right-of-way for the purpose of shading and beautifying the public ways and places, without the need for a hearing, or the permission of the landowner. Suppose, however, the tree warden cuts a tree (not dying or diseased) growing in the right-of-way, without a hearing. The landowner may sue for damages against the officer individually, as that warden would be acting outside the scope of authority.

The bundle of rights is tied securely with the rope of public law, always in the name of public protection. Public protection goes a long way these days. In 1997, the legislature first regulated heavy cutting of Vermont land over forty acres at a time. Now you need the authorization of a state forester to cut that much at one time.

Curiouser

The law of trees is an odd assortment of rules and principles, many of which stretch traditional notions of private property to the limit. A closer examination reveals a thread of common sense running through the whole canon of tree law in Vermont. It makes sense that some official should have the say on whether trees in public ways are cut or planted, for the sake of public safety and aesthetics. It makes sense that trees should be respected by the law as a species of property subject to special protections from intruding neighbors and meandering loggers and that landowners should know where their property ends and another's begins and be held to a high standard of liability for knowing violations.

A Word about The Vermont Institute for Government

The Vermont Institute for Government (VIG) is a nonprofit corporation dedicated to improving educational opportunities for local officials and the public on how government works. It consists of representatives from each of the major groups in Vermont that offer such training.

The VIG has published other pamphlets that may be of use or interest to you. They include:

- ***The Meeting Will Come to Order***, covering town meeting procedures.
- ***Changing the World***, about how to increase your effectiveness in meetings of local and state boards and commissions.
- ***Are You Appealing?***, which covers the tax grievance and appeal processes at the local level.
- ***Isn't This My Land?***, relating to local planning and zoning.
- ***The Vermont Citizenship Comprehensive Examination***, a fun test of basic information a citizen ought to know about Vermont government.
- ***The Public Right of Way and You***, covering town highways
- ***How and Why to Read a Town Report***, it can tell you a great deal about your town.
- ***It's Your Turn: A Call to Local Office***, how to get involved in your local government.
- ***Reforming Local Government by Charter***, how to change your local government.
- ***The Development Review Board***: Strengthening the planning and zoning functions.
- **Do It Yourself Zoning**: A guide to zoning hearings and appeals
- **Do It Yourself Act 250**: A citizen's guide

Contact VIG through UVM Extension at 802-223-2389
or email: Mary.Peabody@uvm.edu

Trees in the Highway Right-of-way: Who owns them?
The adjoining landowner typically owns the land underlying the highway easement and the trees within the right-of-way subject to the (very confusing) statutory authority of the town to maintain and remove them.

The authority of the town to maintain and remove a tree depends upon the size and nature of the tree, its location, and its purpose, and actions undertaken by the owner.

Trees in the Highway Right of Way: The Statutes
Persons, other than abutting landowner, may not remove a tree growing within the highway right-of-way without the consent of the selectboard. 19 V.S.A. 901

The selectboard, if necessary, must remove from the right-of-way trees that obstruct the view of the highway, cause damage to the highway, or that are "objectionable from a material or scenic standpoint." 19 V.S.A. 904

However, shade and fruit trees marked by the abutting landowners must be preserved if the usefulness or safety of the highway is not impaired. 19 V.S.A. 904

Young trees standing at a proper distance from the roadbed and from each other must be preserved. 19 V.S.A 904

Shade and ornamental trees within the limits of public ways and places are under the control of the town tree warden. 24 V.S.A 2502

A public shade tree may not be cut or removed except by a tree warden or his or her deputy or by a person having the written permission of a tree warden. 24 V.S.A. 2508

A public shade tree within the residential part of a municipality shall not be felled without a public hearing by the tree warden, except that when it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety, no hearing shall be required. 24 V.S.A. 2509

In all cases the decision of the tree warden shall be final except that when the tree warden is an interested party or when a party in interest so requests in writing, such final decision shall be made by the legislative body of the municipality. 24 V.S.A 2509

The problem: The Legislature has never defined shade tree, public shade tree, or residential part of a municipality.

Shade Tree: A tree planted chiefly to provide shade from sunlight. American Heritage College Dictionary, 3rd Edition 1997

The best approach when you are not sure
Contact the abutting landowners and explain what work you plan to do.

Get a sense of their reaction.

If there is a possibility that the landowner might object or the tree might be considered a "public shade tree" have the tree warden hold a hearing.

Holland Tree Removal Case Summary

FAILURE TO HOLD A TREE WARDEN HEARING VIOLATES LANDOWNER'S DUE PROCESS RIGHTS

The failure of your tree warden to hold a hearing prior to cutting down a public shade tree within the limits of public ways and places could cost your municipality tens of thousands of dollars. Fortunately, for the Town of Holland it only cost $1.00 (not including legal fees of course).

Back in 2001, the Town of Holland selectboard sought to widen a half-mile stretch of town highway called Lackey Road so that it could accommodate large vehicles. The selectboard's original plan called for the removal of trees, blasting ledges, digging drainage ditches, and installing culverts. This plan was eventually scaled back to tree cutting, improving existing ditching, dumping gravel and widening a traveled portion of the highway.

Before the work began, an adjoining landowner brought suit in Orleans Superior Court seeking declaratory and injunctive relief to prevent the Town from cutting down the trees. The landowner also claimed that the Town's actions constituted altering a public highway, which would necessitate performing a survey. "When selectmen accept, lay out, or *alter* a highway, as provided in this chapter, they shall cause a survey to be made. . ." 19 V.S.A. § 704. (Emphasis added.) The Town filed for summary judgment, arguing that its tree warden was not required to hold a public hearing prior to felling the trees because they contributed to the narrowness of the road, and thus created a public safety hazard. The Town also characterized its work to widen the road not as an alteration, but as "maintenance" within the bounds of 19 V.S.A. §§ 904, 950, and 952. As such, it argued, the work did not require a survey.

At trial, the Superior Court granted the Town's motion for summary judgment, which the landowner then appealed to the Vermont Supreme Court. On appeal, the Court agreed with the landowner that the tree warden had no authority to remove the trees without first holding a public hearing and reversed and remanded the case back to the lower court. The landowner, represented by new counsel, subsequently supplemented his complaint, claiming that the tree warden's failure to hold a public hearing deprived him of his constitutional right to due process. On remand, the Superior Court agreed and awarded the landowner $1.00 in nominal damages and $15,000 in attorney's fees. It also held that, although the road work was more than just routine maintenance, it did not rise to the level of "a major alteration to the road as that term is defined in [19 V.S.A.] § 701" and, therefore, did not require a survey.

The Town appealed the Superior Court's grant of attorney's fees and the landowner appealed its conclusion that the road project was not an alteration requiring a survey. The Supreme Court determined that the Town's changes to the road did not in the aggregate equate to an "alteration" as contemplated by 19 V.S.A. § 701(2) ["a major physical change in the highway such as a change in width from a single lane to two lanes"] because it did not extend beyond the road's existing three-rod right-of-way. The Court did, however, affirm the Superior Court's ruling that the Town's refusal to hold a tree warden hearing violated the landowner's due process rights, but refused to grant him damages beyond those nominal damages in the $1.00 award, as he had failed to justify his replacement costs. Finally, the Court overturned the Superior Court's grant of attorney's fees in the amount of $15,000 because the landowner's due process rights had been vindicated by his previous attorney, for whom such fees had not been requested.

Garrett Baxter, Attorney, VLCT Municipal Assistance Center

VLCT News, February 2008

STATUTORY PROCESS MUST BE FOLLOWED IF ALTERING HIGHWAYS, REMOVING PUBLIC SHADE TREES

The Vermont Supreme Court, in Hamilton v. Town of Holland (No. 2002-222), recently clarified the procedures that a selectboard must follow when removing trees to facilitate the alteration or widening of a public way, even if the trees are being cut for public safety reasons. The decision also clarifies when a tree warden may cut down public shade trees without a public hearing under the "hazard to public safety" exception contained in 24 V.S.A. § 2509. Finally, the Court clarifies the standing requirements necessary to assert violations of the Open Meeting Law. This case should be of particular interest to municipalities because, according to the Town's brief, this is only the second time the Vermont Supreme Court has addressed the issue of tree wardens' authority under 24 V.S.A. §§ 2502-2511.

The relevant facts relied on by the Vermont Supreme Court are as follows. The Town's selectboard, with the concurrence of the Town's tree warden, decided at a public selectboard hearing to remove approximately 30 trees along a half-mile section of a Class 3 Town highway. The Town concluded that the removal of the trees was necessary to facilitate the alteration or widening of a narrow portion of a public way that was determined to constitute a safety hazard. The proposed work would require the use of bucket loaders; the removal of ledges; ditch digging; and possibly some blasting. The Plaintiff, who owns property abutting the public way, and on whose property four of the trees were located, spoke in opposition to the proposal at the hearing; another resident was not allowed to comment.

In response to the selectboard's decision to proceed with the proposed work, the Plaintiff filed a complaint in superior court alleging that:

1) The Town is required to follow the requirements of Title 19 when widening a public way;
2) The Tree Warden Statute does not authorize the selectboard to remove healthy, non-diseased trees to facilitate a road widening project; and
3) The Town violated the Open Meeting Law by prohibiting a member of the public from speaking at a public hearing. The Town subsequently filed a motion for summary judgment that was granted by the superior court. The Plaintiff then appealed to the Vermont Supreme Court.

Altering a Highway

The Plaintiff argued that the selectboard's decision to proceed with the proposed tree removal and roadwork is ineffective because the Town did not comply with Title 19 procedural requirements for accepting, laying out, or altering a highway. 19 V.S.A. §§ 704 *et seq.* The Plaintiff contended that the selectboard was required to follow the requirements of Title 19 because the work constituted a widening of the public way, or in the alternative, an alteration of the public way, triggering the applicability of Title 19. In response, the Town argued that Title 19 did not apply because the work did not constitute an alteration, widening, or major physical change in the public way, but was being conducted as part of the Town's responsibility to maintain the town's highways in accordance with 19 V.S.A. § 304(1).

The Vermont Supreme Court ruled in favor of the Plaintiff and held that Title 19 did apply to the Town's project because the project was not merely road maintenance but constituted a "major physical change" of a highway that involved substantial amounts of work and a significant change in the area abutting the existing public way. The Supreme Court did state, however, that whether a road project involves a "major physical change" of a highway, triggering the applicability of Title 19, will depend on the particular facts of a project.

Removing a Public Shade Tree

Generally, a tree warden must hold a public hearing prior to felling a public shade tree located within a public way located in a residential area. However, no public hearing is required when the tree is "infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety." 24 V.S.A. § 2509.

The Plaintiff argued that the Town failed to present evidence to support its contention that the trees at issue were located on the public way, and not on private property, or that the trees were diseased and a hazard to public safety. The Town, however, argued that its actions were proper under the tree warden's authority. Agreeing with the Plaintiff, the Vermont Supreme Court reversed the superior court and held that the Town's tree warden had no authority to remove the trees without a public hearing because it was undisputed that the public safety hazard the Town sought to eliminate was the narrowness of the public way, and not the trees themselves, and that this was not the type of hazard to public safety contemplated by 24 V.S.A. § 2509.

Although the Court ruled in favor of the Plaintiff on both the Title 19 and Tree Warden issues, it did uphold the superior court's determination that the Plaintiff did not have standing to seek redress for the Town's Open Meeting Law violation because he was not prevented from speaking and failed to show how he was aggrieved by the fact that his neighbor was not allowed to speak at the public hearing. The message municipal officials should take from this case is that when you are deciding to conduct roadwork that exceeds mere maintenance and that could be construed as a widening or alteration of a public way, follow the procedures contained in Chapter 7 of Title 19. Moreover, tree wardens be warned - hold a public hearing prior to felling public shade trees unless the tree is diseased or the tree itself poses a hazard to public safety, such as when a tree limb is hanging precariously over a heavily traveled public way. If the threat isn't imminent, err on the side of caution and hold a public hearing prior to taking action. It will provide a forum in which the proposed plan can be discussed, alternatives can be considered, and hopefully litigation can be avoided.

- Julie Fothergill, Attorney, VLCT Municipal Assistance Center

VLCT News, May 2003

Ask the League

(continued from previous page)

seek abatement of property taxes, the taxpayer also be informed of the opportunity to request extraordinary relief under 32 V.S.A. § 3206.

Jim Barlow, Senior Staff Attorney
VLCT Municipal Assistance Center

The road crew has started summer maintenance along our town roads. The maintenance activities are entirely within the town's highway right of way. As part of this process, some trees will be removed. Should we notify landowners before we take the trees down?

Yes. Not only should you notify property owners, but a town should heed the ruling of the Vermont Supreme Court and hold a tree warden hearing to avoid any claim of due process violations. *Hamilton v. Town of Holland*, 950 A.2d 1183, 2007. Anyone who drives on Vermont's rural roads knows that trees, with their arching canopy and sense of enclosure, provide a scenic beauty that marks the change of each passing season. There are other reasons to preserve trees within the highway right of way, such as protection of properties and uses along the highway, and their provision of shade and erosion control. Trees, however, can be an obstruction ro highway maintenance and harbor disease and insects that can harm the health of the tree canopy. In order to balance the competing interests of maintaining a highway and preserving the health of trees, the legislature created the office of tree warden, whose responsibility it is to protect and manage "shade and ornamental trees within the limits of the public ways." 24 V.S.A. §§ 871 and 2509.

Highway law allows a town to remove trees and bushes from the highway right of way when they "obstruct the view of the highway ahead" or "cause damage to the highway" or "are objectionable from a material or scenic standpoint." 19 V.S.A. § 904. But before any tree is removed, the town must hold a tree warden hearing. 24 V.S.A. § 2509. The law doesn't provide a notification process; VLCT recommends the tree warden provide direct notification by mail to the affected property owners, as well as posting the notice in three places in town at least 15 days before the hearing. The road foreman should attend and be prepared to explain the maintenance project and indicate which trees will be removed, the reasons why, and answer any questions posed by the public. After the hearing, the tree warden should write up a brief decision and send a copy to the attendees.

There is an exception to the hearing process for trees "infested with or infected by a recognized tree pest" or that "constitute a hazard to public safety." 24 V.S.A. § 2509. Still, the Municipal Assistance Center believes that it is easier to hold a hearing in all instances before removing trees than to end up in litigation with landowners.

Stephanie Smith AICP, Senior Associate
Municipal Assistance Center

Coming Soon

MAC Workshop Schedule for Fall 2013 - Spring 2014

Save The Date

13ST

MAC's 2013-2014 Calendar of Events and Training will be available in early September, at which time we'll notify you via email and U.S. mail, and also note its arrival on the home page of the VLCT website (www.vlct.org). If you have any suggestions for or questions about our workshops, please contact Abby Friedman at afriedman@vlct.org or 800-649-7915 ext. 1926.

For registration and other information, please visit www.vlct.org/events-calendar/upcomingevents, call 800-649-7915, or email info@vlct.org.

Are towns responsible for removing a tree in a town highway right-of-way that is a danger to private property?

No. While towns have the sole authority to cut down trees in a public right-of-way (24 V.S.A. § 2291(3), 19 V.S.A. § 904), this is a power that they *may*, not must, exercise. Nevertheless, VLCT recommends that towns cut down a tree if it lies within the public right-of-way and constitutes a hazard to public safety.

A public right-of-way is an easement that allows the public to traverse private property. The most obvious are highways and trails. The less visible include that right-of-way which extends 24 ¾ feet (unless otherwise recorded) out from each side of the center of highways and trails, often times extending onto private property. 19 V.S.A. § 32. Questions such as "Who owns these trees?" and "Who is responsible for their care?" often arise when this overlap occurs. Typically, the answer is the same for both questions – the owner of the property is responsible for the tree's care. This is not the case with trees in the public right-of-way.

Think of property rights as a bundle of sticks. Each stick represents a different right on the property. The landowner holds the stick of ownership while the town holds the stick to cut the tree down (pardon the pun). Despite the landowner's ownership of the tree, it is the town that has the final say in who may cut it down. "(A) public shade tree shall not be cut or removed, in whole or in part, except by a tree warden or his deputy or by a person having the written permission of a tree warden." 24 V.S.A. § 2507.

The tree warden must afford interested parties an opportunity to be heard by holding a public hearing before cutting down a public shade tree in residential areas. An exception exists if the tree is infected or infested or "constitutes a hazard to public safety, (then) no hearing shall be required." 24 V.S.A. § 2509. Ideally, the landowner will cut down the tree after the town determines that the tree is in the public right-of-way, is a hazard to public safety, and grants permission; however, if the landowner persists in asking the town to cut the tree down, it should.

The duty for caring for trees in the public right-of-way or on any public property resides exclusively with the town. 24 V.S.A. § 2291(3). It is that exclusivity of control that makes it potentially liable for any damage resulting from breaching that duty.

From this loss prevention perspective it will be far cheaper for a town to pay the cost of cutting down a tree than to pay the court ordered costs of repairing a home it may fall upon.

- Garrett Baxter, Associate, Municipal Assistance Center

VLCT News, August/September 2004

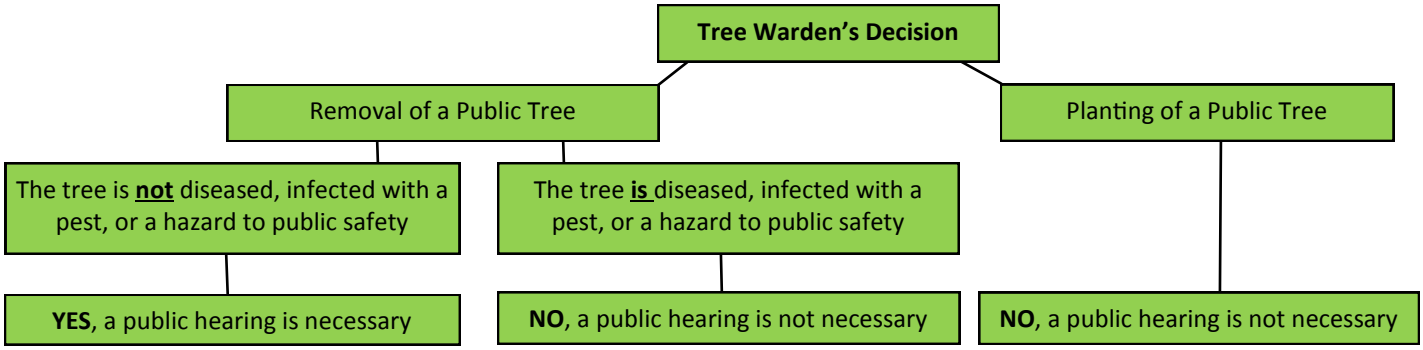
GUIDELINES for PUBLIC HEARINGS for TREE REMOVAL

In each Vermont town, the tree warden is responsible for the protection, care, planting, and removal or public shade and ornamental trees on town property and along the public right-of-ways. Tree wardens decide if and when aging or damaged trees need to come down, and also approve requests for removal of trees on town property by town officials. The public has the right to appeal tree warden decisions for public tree removal. According to the Vermont Tree Warden Statutes,

A public shade tree within the residential part of a municipality shall not be felled without a public hearing by the tree warden, except that when it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety, no hearing shall be required. In all cases the decision of the tree warden shall be final except that when the tree warden is an interested party or when a party in interest so requests in writing, such final decision shall be made by the legislative body of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 6.)

It is therefore the responsibility of the tree warden to hold a public hearing prior to the removal of a public ornamental or shade tree, unless the tree is diseased or dying or constitutes a hazard to public safety. Failure to hold a public hearing means that the tree warden acted outside the scope of their authority and, as seen in the example of the Holland Case below, could lead to legal action if pursued by landowners.

SO WHEN is a PUBLIC HEARING NECESSARY?



The Law in Action: The Holland Case

In 2001, the Town of Holland sought to widen a class 3 town highway in a residential area to accommodate large vehicles. The plan for the road expansion called for removal of approximately 30 trees and additional tree cutting, among other things.

Before the work began, an adjoining landowner brought suit in Orleans Superior Court to prevent the Town from cutting down the trees. The Town filed for summary judgment, arguing that the tree warden was not required to hold a public hearing prior to felling the trees because they contributed to the narrowness of the road, and thus created a public safety hazard.

The case ended up in the Vermont Supreme Court, where at trial the Court agreed with the landowner that the tree warden had no authority to remove the trees without first holding a public hearing. Thus the Holland case determined that the due process rights of a land-owner were violated when the town didn't hold a public hearing for removal of trees.

INSERT PICTURE HERE

EIGHT STEPS for HOLDING a PUBLIC HEARING for TREE REMOVAL*

Step 1: Determine where and when the public hearing will take place. The tree warden should provide direct notification by mail to the affected property owner(s), as well as posting a **public notice** in a minimum of three public places in town, at least 15 days before the hearing. The public notice should include the time, date, location, and purpose of the hearing.

Step 2: Before the hearing begins, make sure that someone is designated to take good notes and, if possible, record the proceedings of the hearing.

Step 3: At the beginning of the hearing, identify the **parties** that will be involved in the proceedings. Only those affected are parties: i.e., the landowner, the neighbor, town officials. Inform others in attendance that they have no official role in the hearing.

What Does a Written Decision Look Like?

After the public hearing, the tree warden needs to write up a brief decision along these lines and send a copy to each of the parties who attended the hearing:

On _____, 2013, at __ p.m., I, _____, Tree Warden for the Town of _____, held a hearing at the _____ Town Office to consider removal of trees from a portion of the right-of-way for Town Highway No. __, also known as _____ Road. Present at the hearing were _____, Road Foreman for the Town of _____. Also present were _____, and _____ (*list all attendees*).

The parties offered the following testimony: _____

Based on the testimony provided at the hearing, authority is (*or is not*) granted to _____, Road Foreman for the Town of _____ to remove trees from the following portion of the right-of-way for Town Highway No. __.: _____.

In accordance with 24 V.S.A. 2509, Persons interested in this decision may appeal the decision in writing within ___ days from the date of the decision to the _____ select board.

Signed,

_____, Tree Warden for the Town of _____

Step 4: At the public hearing, swear in everyone who will speak before the evidence is taken. Here is an example of an oath used to swear in individuals: "Do you solemnly swear, in the cause now under consideration before the tree warden, to tell the whole truth and nothing but the truth so help you God ?"

Step 5: Ask the party requesting that the tree be removed to speak first and to describe the details and their views on the removal, in as logical an order as possible. Make sure everyone who speaks gives his or her name first, every time, to make a clean transcript later on if one is needed.

Step 6: Allow the other parties to ask questions of the first speaker and those called to assist the first speaker.

Step 7: Repeat steps 5 and 6 for the other parties, one at a time, allowing them to give their reasons, and allowing them to be questioned by the other parties.

Step 8. Adjourn, and then issue a written decision (*see example at left*) within a reasonable period of time, starting with findings of fact, then applying the facts to the law, then a decision, and finally a notice of a right to appeal. Send copies by certified mail to each **party**, and have one copy for the town clerk for public record.

Additional Resources:

Vermont Urban & Community Forestry Program's Tree Warden Resources: www.vtfpr.org/urban/tree_wardens.cfm

Vermont League of Cities & Towns, Municipal Assistance Center: www.vlct.org/municipal-assistance-center/overview/

The Law of Trees, compiled by Paul Gillies, Vermont Attorney: www.uvm.edu/crs/resources/citizens/trees.pdf

* Based on recommendations provided by Vermont Attorney Paul Gilles.

Sample Landowner Tree Removal Request

Mr. and Mrs. Landowner
111 Wideawake Road
Manchester Center, VT 05255

Dear Mr. and Mrs. Landowner:

Thank you for contacting me regarding the large pine trees that you wish to take down alongside Wideawake Road. As Joe Blair explained to you, and as we have discussed, Vermont law requires the consent and approval of the Tree Warden before trees within the public highway right of way or on public lands may be removed. The trees in question here are clearly within the highway right of way.

Vermont law allows the Tree Warden to authorize removal of trees that are diseased, dying, or which present a hazard. If these conditions are not present, then the Tree Warden must hold a public hearing before authorizing removal.

At your request, I have visited your property, and have looked at the trees. I did not observe any obvious, external conditions that would lead me to believe that these trees are diseased, dying, or hazardous. Indeed, I find that these trees (like the many other mature trees that line our public roads) add much to the character of this stretch of road. Therefore, under Vermont law I do not find that I can allow these trees to be removed without further inquiry.

I believe there are two options available to you: you can engage a qualified arborist (such as Joe Blair or Bartlett Tree Experts, among others) to study these trees in further detail. If such qualified expert were to offer, in writing, evidence or proof that these trees were in fact diseased, dying, or a public hazard, then I might have new information upon which to make a different informed opinion.

Alternatively, I can hold a public hearing to consider whatever information or evidence you wish to offer as to why I should allow these trees to be removed from the public right of way. In order to do so, I will ask that you cover certain direct costs involved with that hearing (publishing a legal

notice in the newspaper, postage for notice required to adjoining landowners). If you are willing to do so, then I will warn a public hearing for a time convenient for us both.

While I always keep an open mind in public affairs, I'd like you to know up front that absent new, compelling reasons or information, I am not inclined to approve the removal of these mature trees from the public highway right of way.

Thank you. Please feel free to follow up when you have had a chance to read and review this information.

Respectfully,

Manchester Tree Warden

VERMONT TREE WARDENS

Permit for Public Tree Removal

Name of Person Requesting Tree Removal: _____

Address: _____

_____

Phone: _____

Number of Trees: ☐

Tree Location (Description):

_____
_____
_____
_____
_____
_____

Tree Location (Map):

Purpose of Removal

Hazard

- ❑ Defects
- ❑ Utility Line Maintenance/Safety
- ❑ Line of Sight

Other (specify):

_____
_____
_____

Request for Tree Removal

- ❑ Granted
- ❑ Requires a Public Hearing

Explanation:

_____
_____
_____

Tree Warden's Signature: _____

Date: _____

VERMONT STATUTES

TITLE 24: Municipal and County Government

CHAPTER 067: PARKS AND SHADE TREES

§ 2508. Cutting shade trees; regulations

Unless otherwise provided, a public shade tree shall not be cut or removed, in whole or in part, except by a tree warden or his deputy or by a person having the written permission of a tree warden.

§ 2509. - Hearing

A public shade tree within the residential part of a municipality shall not be felled without a public hearing by the tree warden, except that when it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety, no hearing shall be required. In all cases the decision of the tree warden shall be final except that when the tree warden is an interested party or when a party in interest so requests in writing, such final decision shall be made by the legislative body of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 6.)

§ 2510. - Penalty

Whoever shall, willfully, mar or deface a public shade tree without the written permission of a tree warden or legislative body of the municipality shall be fined not more than $50.00 for the use of the municipality. Any person who, willfully, critically injures or cuts down a public shade tree without written permission of the tree warden, or the legislative body of the municipality shall be fined not more than $500.00 for each tree so injured or cut, for the use of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 7.)

TREE ORDINANCES

What is a tree ordinance?

A tree ordinance is a municipal regulatory tool used by communities to attain and support healthy, vigorous, and well managed urban & community forests. A municipality's tree ordinance reflects the goals and perspectives of the community, and should be based on local management goals, needs, and capacity.

What are the benefits of a tree ordinance?

A tree ordinance provides the opportunity for a municipality to:

- Identify roles and responsibilities;
- Protect the town from liability;
- Define language locally, such as what qualifies as a public shade tree;
- Establish and prioritize procedures for tree plantings, removals, and protection;
- Establish procedures for the prevention and control of damage from forest pests;
- Demonstrate a town's commitment to its community forest; and
- Become eligible for the Tree City USA designation through the Arbor Day Foundation.

What's the difference between a tree policy and a tree ordinance?

In general, a policy is a general statement of principles while an ordinance is an adopted decree that has legal authority. A policy is easier to change but is less enforceable. For ordinances, there is a formal legislative process for adoption and revision and the provisions within are enforceable in court.

But aren't municipalities already covered under the Vermont Tree Warden Statutes?

Under the Vermont Tree Warden Statutes enacted in 1904, each municipality shall appoint a tree warden from among the town's legally qualified voters (24 V.S.A. § 871). The tree warden, among other things, shall enforce all laws relating to public shade trees and may prescribe such rules and regulations for the planting, protection, care or removal of public shade trees as he deems expedient . . . (Amended 1969, No. 238 (Adj. Sess.), § 4)

Vermont's Tree Warden Statutes provide a mechanism for public tree management. However, they are limited in scope and lack specificity including defining key terms such as what is a *public shade tree.* A municipal tree ordinance allows a community to develop local regulations that meet its needs and helps enhance its ability to protect, manage, and grow its urban forest.

Building on the Vermont Tree Warden Statutues

The **town of Brattleboro** included in their ordinance a definition for a public shade tree that uses both their local zoning units to identify areas of the town and the size of a tree - in rural zoning areas, trees need to be at least 9 inches in diameter and in the downtown commercial district trees only need to be 2 inches in diameter. This allows them to manage various tree regulatory processes differently across the town and overcomes the lack of definition for both a public shade tree and residential part of town.

In the **town of Hartford's** tree policy, they not only define what a public tree is, they also define: street tree, park tree, hazardous tree, obstructive tree, heritage tree, and private tree. By defining these terms and the conditions under which a tree could be removed (when it is an obstructive tree and interferes with the flow of traffic and visibility, for example), Hartford's tree policy reduces the circumstances under which a public hearing is necessary.

What makes a tree ordinance effective?

Although each municipality's tree ordinance will vary widely in content and complexity, an effective tree ordinance should meet these basic criteria:

- Establish and define authority and responsibility over public trees;
- Create municipal goals for urban & community forestry management;
- Define a process for managing trees when they constitute a hazard to public safety or infested by a pest or pathogen;
- Set basic performance guidelines, standards and process for tree planting, maintenance, and removal; and
- Define nuisance conditions for both public and private trees.

Tree ordinance planning process

If your community is considering establishing a tree ordinance, the following steps can help:

1. **Foster community support:** Your first steps should be to determine community interest and sentiment regarding a tree ordinance and develop a working relationship with interested individuals and groups, such as the tree warden, tree groups, garden clubs, and conservation commission.
2. **Form a tree ordinance team:** Does your town have a tree board or commission? Would this be an opportunity to consider advocating for one? Who are the stakeholders that should be included in developing a tree ordinance? Members of the ordinance development team will work collaboratively to coordinate and communicate information, interact with community members and municipal officials, and draft the tree ordinance. Consider having participation from those involved with road maintenance, public works, planning, and/or parks and recreation.
3. **Brief the decision makers in your town:** Municipal officials are ultimately responsible for adopting and implementing a tree ordinance in your community. Make sure the appropriate officials are involved in the process from the beginning; these could include selectboard members, mayor and/or the town manager.
4. **Define the goals of the ordinance:** Establishing a collective vision and defining the goals of the ordinance are important steps; these elements will guide the ordinance's development and should be based on community input as well as realistic assessments of the capacity of your municipality to implement and enforce it, and need.
5. **Establish a timeline and decide who is responsible for writing the ordinance:** at is a realistic timeline and process for developing, reviewing, and adopting the tree ordinance?
6. **Refer to our *'Guide to Tree Ordinances for Vermont Municipalities:'*** This document will help guide the writing of an ordinance. It outlines the various ordinance components, their purpose and sample wording; allowing you to feel confident that all the ordinance elements are comprehensive and present.
7. **Solicit community input:** After the draft is complete, how will community members be able to provide feedback? Be prepared for questions and record all public comments for review.
8. **Formalize and implement the ordinance:** Once revisions are made, how will it become formalized? What are the ordinance adoption procedures in your municipality?

Tree Ordinances Resources

Visit **www.vtcommunityforestry.org** and go to our **'Tree Ordinance'** page for supporting resources including:

- Our ***'Guide to Tree Ordinances for Vermont Municipalities'***
- Sample municipal ordinances from Vermont communities
- Staff contact information so we can assist you in the process

The Vermont Department of Forests, Parks and Recreation in partnership with the University of Vermont Extension. 2013.

Town of Grand Isle
Tree Policy

A) Purpose and Intent:

1) It is the purpose of this policy to promote, protect, and enhance public health, safety, and general welfare by providing a policy governing the planting, maintenance, protection, and removal of trees, shrubs, and other woody plant material within public rights-of- way and public places within the Town of Grand Isle.
2) It is the intent of the Grand Isle Selectboard that the terms of this policy shall be construed so as to promote:
    a) the planting, maintenance, protection, and survival of desirable trees, shrubs, and other woody plant materials within the Town and in accordance with standards and practices recognized by the International Society of Arboriculture (ISA), and the Urban & Community Forestry Program, Vermont Department of Forests Parks and Recreation, and,
    b) the protection of community residents and property from damage caused or threatened by storm damaged, diseased and/or insect infested trees, and/or the improper planting, maintenance, or removal of trees, shrubs, and other woody plant material within the Town.

B) Definitions applicable to the Policy:

Public tree, shrub, or other woody plant material: Trees, shrubs, or other woody plant material located on any property owned or controlled by the Town on any public street, alley, median, sidewalk, highway, park, cemetery, forest, other right- of- way, school sites, and easements. For this policy, public trees, shrubs, and woody plant material shall be further defined in general as tree(s).

C) Authority and Administration of the Policy:

The Selectboard shall appoint, annually, a Town Tree Warden. The Tree Warden shall have knowledge of ISA recognized standards and practices and shall be experienced in the planning for, and planting, maintenance, protection, and removal of public trees. The Tree Warden, in addition to State Public Shade Tree statute Ref. 2502 Title 24/ Chapter 33 & 67, and all other applicable State statutes, shall have the authority and administrative responsibility to apply the policy. The Tree Warden shall advise any regulatory boards, planning boards, Selectboard, Public Works Director, and the Zoning Administrative Officer of the Town in matters of tree selection, planting, health, care, maintenance, and removal as needed.

D) Public Tree Care

The Town shall have the right to plant, prune, maintain, remove, and protect trees within the Town right-of-ways and on Town owned land, as may be necessary to insure public safety or to preserve or enhance the symmetry and beauty of such public grounds as set forth in the following guidelines.

1) Selection and Planting of Public Trees

Tree species shall be selected from the booklet, "Recommended Trees for Vermont Communities", published by Vermont's Urban & Community Forestry Program, a copy of which shall be maintained by the Zoning Administrative Officer. The planting of trees shall conform to standards and recommendations found in the aforementioned publication, pertinent ISA publications, and any applicable American National Standards Institute standards.
Trees shall be planted based on available green space, soil volume, site specific considerations, and the avoidance of infrastructure conflicts. Trees purchased, donated, or by any other means planted in public spaces shall conform to American Standard for Nursery Stock, ANSI Z60.1. All newly planted public trees will carry a three year maintenance and replacement guarantee.

2) Maintenance of Public Trees

a) All tree maintenance and pruning shall conform to ISA and ANSI A300.
b) Lawn care contractors employed by the Town shall be directed to avoid damaging tree trunks and branches with lawn care equipment.
c) Unless specifically authorized by the Tree Warden, no person shall intentionally damage, cut, carve, transplant, or remove any tree: attach any rope, wire, nails, advertising posters, or other contrivance to any tree: allow any gaseous, liquid or solid substance which is harmful to such trees to come in contact with said trees: or set fire or permit any fire to burn when such fire or the heat thereof will injure any portion of any tree.
d) Topping of trees shall be prohibited.

3) Removal of Public Trees

The Town, in consultation with the Tree Warden, may remove or cause to be removed, any tree or part thereof which is in an unsafe condition or which by reason of its nature is injurious to the municipal infrastructure or other public improvements, or is affected with any injurious fungus, disease, insect, or other pest.

4) Removal of Public Tree Stumps

The removal of any stumps of trees shall not be mandatory unless it is deemed necessary by the Town to allow for a replanting or other reasons as may arise.

5) Removal of Private Trees

The Town and the Tree Warden shall follow all applicable State statutes when dealing with the removal of hazardous, dead, insect infected, and diseased trees on private property, when such trees constitute a hazard to life and/or property or constitute a potential threat to other trees within the Town.

6) Pruning and Corner Clearance

It shall be the responsibility of each property owner of any tree overhanging any public road or right-of-way within the Town to prune the branches so that such branches shall not obstruct the light from any street lamp or obstruct the view of any street intersection, so that there shall be a clear area above the travel surface to allow for pedestrian and vehicular traffic and safety. Said owners shall remove all dead, diseased, insect infested, or dangerous trees, or broken or decayed limbs which constitute a threat to public safety. The Town shall have the right, in consultation with the Tree Warden, to prune any tree on private property when such tree interferes with the proper spread of light along the street from a streetlight, or interferes with visibility of any traffic control device, sign, sight distance, or sight triangle at intersections, Town roads, or right-of-ways. Pruning shall conform to applicable ANSI and ISA standards.

7) Protection of Public Trees During Construction

Public trees shall be protected from construction related damage in accordance with standards defined in the publications: “Tree Preservation During Construction” by Gary Johnson, and “Protecting Trees from Construction Damage, A Homeowners Guide, by Johnson, Rathke, & Miller, copies of which shall be maintained by the Zoning Administrative Officer.

E) Developments

In Planned Unit Developments (PUD), Historical Planned Unit Developments (HPUD), and in minor, major, and single lot subdivisions, where the potential exists for the establishment of public trees, the Selectboard shall encourage the Planning Commission, the Development Review Board, and the Zoning Administrative Officer to consult with the Tree Warden during the plan review process to insure the proper selection, planting, maintenance, protection, and care of trees. The intent of Item (E) is to have the Tree Warden act in an advisory capacity, and only when proposed developments and/or subdivisions have existing and/or the potential for public trees.

F) Review by the Grand Isle Selectboard

The Grand Isle Selectboard shall have the right to review the conduct, acts, and decisions of the Tree Warden. Any person may appeal any ruling or order of the Tree Warden within 30 days to the Selectboard, who may hear the matter and make a final decision.

Chapter 14

STREETS AND SIDEWALKS

ARTICLE 1 GENERAL USE REGULATIONS

Sec. 14-1 (a). Obstruction of sidewalks by trees, shrubbery, etc. prohibited.

No person shall allow limbs of trees, shrubbery, fence posts, gates or other material to obstruct the sidewalks so as to interfere with their free use by pedestrians.

Sec. 14-1(b). Obstruction of Vision.

No wall, fence or other structure shall be erected or maintained, and no hedge, tree or other obstruction shall be maintained that does, will or may cause danger by obstructing the view of traffic, vehicular or pedestrian, on a public sidewalk or street.

Sec. 14-2. Placement, maintenance of signs, awnings, shades, etc., restricted.

(a) No person shall suspend or display or cause to be suspended or displayed any sign, flag, article, awning, shade, or merchandise or other thing over any sidewalk or street in the town unless the same be safely and securely fastened and so located and constructed as to leave the way unobstructed unless the lowest part thereof be at least seven (7) feet above the sidewalk or street. In no case shall an awning or shade extend beyond the line of the sidewalk., No such sign, flag, article or merchandise or other thing shall be so suspended or maintained without written permission from the selectmen, which permission shall be revocable. Any person having such permission and suspending or displaying any such signs, flags, articles or merchandise or other things shall in all respects conform to any direction in relation to the location, extent, construction and maintenance thereof, which shall be given by the selectmen.

(b) No sign, article of personal property, merchandise, artifacts or works of art shall be displayed or maintained on any public street, sidewalk, parking area, common or other public property except for a limited time only and upon the prior written approval of the board of selectmen, for due cause shown.

Sec. 14-3. Roof guards required in certain instances.

A person owning or controlling a building from which snow, ice or water slides or falls, or may slide or fall upon a street or sidewalk within the limits of the town, shall construct and maintain such guard upon the roof of said building as will prevent snow, ice or water from sliding or falling

from the same upon the street or sidewalk.

Sec. 14-4. Removal of snow from sidewalks on certain streets - Required.

Upon the following streets or portions of streets each property owner shall clear all snow and ice from any sidewalk or sidewalks adjacent to his property within forty-eight (48) hours of the accumulation thereof: Main Street, Elliot Street to its intersection with School Street, Harris Place, Flat Street, Elm Street, High Street to its intersection with Retting Place, Canal Street to its southerly intersection with Clark Street, and Bridge Street.

Sec. 14-5. Same - By town upon owner's failure; collection of costs.

(a) In the event that any property owner shall neglect or otherwise fail to remove all snow and ice within forty-eight (48) hours of the accumulation thereof, the town may remove or cause to be removed the same at the expense of the property owner.

(b) In the event that said property owner shall not reimburse the town for such expense within a reasonable time after receiving notice thereof, the town may recover such expense, together with all legal costs, in an action of contract brought under this section.

Sec. 14-6. Reserved.

Sec. 14-7. Removal of litter and debris from sidewalks.

(a) Upon the following streets or portions of streets it shall be the duty of each property owner or person in possession of any business located on the street level of a building to maintain in a clean and orderly fashion any sidewalk or sidewalks and curbs adjacent to their property and sweep or otherwise remove and dispose of debris, including, but not limited to, litter and dirt within twenty-four (24) hours of accumulation thereof: Main Street; Elliot Street to its intersection with School Street; Harris Place; Flat Street; Elm Street; High Street to its intersection with Retting Place; Canal Street to its southerly intersection with Clark Street; and Bridge Street. Debris shall not be placed in streets or in storm sewers of drains but shall be disposed of in a sanitary manner.

(b) Failure to comply Section 14-7(a) shall be deemed a public nuisance and unlawful. Persons found in violation of Section 14-7(a) shall receive a warning for the first offense and a twenty dollar ($20.00) fine for each subsequent offense and the waiver fee shall be ten dollars ($10.00). Each day that a violation shall continue to exist shall constitute a separate violation.

Sec. 14-8. Penalty.

A person who violates any provision of this Chapter, unless otherwise provided for, shall be fined fifty dollars ($50.00) and the waiver fee shall be twenty five dollars ($25.00).

ARTICLE II NAMING OF STREETS AND ROADS

Sec. 14-9. Naming of Streets

The Board of Selectmen shall name all streets within the town. The Board of Selectmen may change the names of streets within town when necessary to promote the public welfare.

ARTICLE III NUMBERING OF BUILDINGS AND PROPERTY

Sec. 14-10. Numbering system established.

A uniform system of numbering properties and principal buildings as shown on the property tax maps which are maintained by the Board of Listers is hereby adopted for use in the Town of Brattleboro.

Sec. 14-11. Administration.

The Board of Listers shall number parcels as necessary and update the property tax maps annually according to the method of numbering set forth in section 14-12. Existing numbering of parcels not in conformity with this chapter shall be changed to conform to the system herein adopted only where necessary to maintain the integrity of the overall system or to protect the public safety.

Sec. 14-12. Method of numbering.

All parcels on public streets and roads shall be assigned numbers with the number "1" on the right hand and the number "2" on the left hand, and shall proceed continuously using whole numbers only, from the place of beginning with the odd and even numbers on opposite sides. Five numbers shall be allowed for each side in 100 feet increments. Each principal building shall bear the number assigned to the frontage on which the main entrance is located. A multiple family structure composed of three or more units, shall bear one number for the principal building and each dwelling unit shall affix a letter or apartment number suffix.

Sec. 14-13. Display of Number.

(a) Each principal building shall post numerals of a minimum of four (4) inches in height which shall be clearly identifiable from the public highway. If numerals on the building cannot be visible from the street, numerals shall be installed on a post or mailbox near the main driveway and adjacent to the public highway.

(b) The Street Numbering Ordinance shall be enforceable by the Board of Selectmen. Penalty for failure to timely affix or permanently affix the given street number or road sign shall be $10.00 for the first offense and the waiver fee shall be five dollars ($5.00). If the landowner fails to affix the number within 45 days of a first offense, said failure shall be penalized in the amount of $30.00 and the waiver fee shall be fifteen dollars ($15.00). Such fine will be levied only after a written notice is sent to the property owner informing him of his failure to comply with this ordinance. Any landowner who fails to properly affix a number in compliance with Sec. 14-13(a) shall hold harmless and release the Town of Brattleboro for

any damages or liability in conjunction with any emergency response.

ARTICLE IV. REGULATION OF COASTING, SLEDDING, AND SKATEBOARDING ON SIDEWALKS AND STREETS

Sec. 14-14. No person shall course, coast, slide upon any skateboard, board, sleigh, sled, vehicle, or other thing, excluding children's carriages and wheelchairs (with or without motors), upon any sidewalk or on any street or highway except such sidewalks or streets as may be designated by the selectmen.

Sec. 14-15. It shall be lawful to operate a skateboard in compliance with the regulations set forth in section 14- 16 except it shall be unlawful to operate a skateboard on any of the following public places, streets and sidewalks adjacent to said streets:

a) Numbered Routes:

- Route 5, Putney Road

b) Downtown Business District:

- Arch Street -- entire length
- Bridge Street -- entire length
- Bullock Street -- entire length
- Chapin Street -- entire length
- Elliot Street from Main Street to School Street
- Elm Street -- entire length
- Flat Street -- entire length
- Green Street from High Street to Church Street
- Grove Street -- entire length
- Harris Place -- entire length
- High Street from Main Street to the intersection of Western Avenue and Green Street
- Linden Street from Main Street to Cedar Street
- Main Street -- entire length
- Oak Street -- entire length
- Park Place -- entire length
- South Main Street from Main Street to Pearl Street
- Walnut Street -- entire length
- Whipple Street -- entire length

c) West Brattleboro:

- Garfield Drive -- entire length
- George Miller Drive -- entire length
- Hayes Court -- entire length

- Melrose Terrace -- entire length

(d) All Municipal Parking Lots, including the entire Brattleboro Transportation Center. (Amended 12/2/03)

Sec. 14-16. Skateboard operators shall follow the applicable provisions of the Town Traffic Code and the following regulations. Skateboard operators shall:

(1) stop operating in order to yield the right of way to any pedestrian;

(2) obey all traffic control devices, use due care at intersections and give hand signals when turning and stopping;

(3) keep to the right of sidewalks and ride in single file;

(4) wear a reflective vest or jacket that can be seen clearly in the dark and/or a white light armband visible for at least 500 feet and red reflector visible for 300 feet to rear while operating from one half hour after sunset until one half hour before sunrise

Sec. 14-17. Penalty.

Any person who violates any section of Article IV of this Chapter shall be fined fifty dollars ($50.00) and the waiver fee shall be twenty five dollars ($25.00).

ARTICLE V. REGULATION OF PUBLIC TREES

(Amendment of 2/17/04)

Sec. 14-20. Definitions.

Public Trees: "Public Trees" are herein defined as trees and shrubs located on Town-owned land or within the Town right-of-way.
Street Trees: "Street Trees" are herein defined as Public Trees on either side of all streets, avenues, bike paths and located within the bounds of a Town owned public right-of-way.
Public Shade/Ornamental trees are herein defined as:

Any tree 9 inches or greater in caliper (trunk diameter one foot above ground level) in the Rural and Rural Residential zoning districts;
Any tree 6 inches in caliper or greater in the Residential, Multiple Residential and Residential Office zoning districts;
Any tree 3 inches or greater in caliper in all other zoning districts; and
Any Public Tree intentionally planted which has not yet attained the requisite size.

Caliper measured at 4½ feet (DBH) for takedowns, mature tree removal.
Caliper measured at 1 foot above ground level for nursery stock and tree replacement.

Sec. 14-21. Creation and Establishment of a Town Tree Board.

There is hereby created and established the Brattleboro Tree Advisory Board (hereafter referred

to as the Board) which shall consist of five members, whom shall be appointed by the Selectboard. The Brattleboro Tree Advisory Board shall function under this ordinance and 24 VSA, Chapter 67, or its successor provision. The Brattleboro Tree Advisory Board shall be an advisory organization that works with the Tree Warden to promote the improvement and preservation of a healthy environment of the town as it relates to Public Trees. The Board is subject to the Vermont Open Meetings Law (1 VSA Sec. 310-314).

Sec. 14-22. Term of Office of members of the Brattleboro Tree Advisory Board.

Each member will be appointed for a period of three years. In the event that a vacancy shall occur during the term of any member, his or her successor shall be appointed for the unexpired portion of their term. Any member may be removed from the Board for good cause. Cause shall include but not be limited to excessive absences from scheduled board meetings and clearly identified conflicts of interest. To remove a member from the Board shall require a majority vote of the Board and the concurrence of the Selectboard.

Sec. 14-23. Compensation for members of the Brattleboro Tree Advisory Board.

Members of the Board shall serve without compensation.

Sec. 14-24. Duties and Responsibilities of the Brattleboro Tree Advisory Board.

It shall be the responsibility of the Board to study, investigate, and develop and/or update annually a written plan for the care, preservation, pruning, planting, removal, or disposition of trees and shrubs in parks, along streets and in other public areas. The Board, when requested by the Town Tree Warden or any Town department, board or commission, shall consider, investigate, make finding, report and recommend upon any special matter of question coming within the scope of its responsibilities.

Sec. 14-25. Operation of the Brattleboro Tree Advisory Board

The Board shall choose its own chairperson on an annual basis during a regularly scheduled meeting in the month of October. A member will also be chosen as secretary and will properly warn and keep the minutes of each meeting. The Town Tree Warden will attend all meetings and will serve in the capacity of advisor to the Board. It will be the Tree Warden's additional responsibility to act as the liaison between the Board and other regulatory bodies within the Town. Meetings will be held once a month. If less than a majority of the members are in attendance, there is no quorum and no meeting where official actions can be taken.

Sec. 14-26. Tree Warden's Jurisdiction, Public Shade Trees. Ref.: 2502 Title 24/ Chapter 33.

The Tree Warden shall have and the sole authority over any and all trees, shrubs, or plants planted and growing or hereafter to be planted and grown in the public right-of-way, or on any public property to which the public has free access in the Town of Brattleboro. Trees so located shall be deemed public Shade/Ornamental trees as defined in Section 14-20 of this ordinance. No Public Shade/Ornamental Tree may be removed by a private property owner without written

permission of the Tree Warden.

The Tree Warden shall have all powers granted to Tree Wardens under 24 VSA, Chapter 67 (24 VSA §2508), or its successor provisions.

The Tree Warden shall advise any regulatory boards of the Town in matters of tree health, care and maintenance as needed. All actions taken by the Tree Warden will be reported to the Tree Board and maintained in a historical file.

(The following sections 14-27 through 14-30 of the ordinance do not apply to pre-existing non-conforming Shade Trees)

Sec. 14-27. Street Tree Species to be Planted.

All species planted as Street Trees shall be selected from the booklet, *Recommended Trees for Vermont Communities* by Vermont's Urban and Community Forestry Program (Appendix A), a copy of which shall be maintained in the Planning Services Department. The planting of non-conforming species can be appealed to the Tree Warden.

Sec. 14-28. Spacing.

Spacing of Street Trees shall be in accordance with the three species size classes listed in Appendix A of this ordinance.

Sec. 14-29. Distance from Curb and Sidewalk.

The distance trees may be planted from curbs, edges of roads and sidewalks will be in accordance with the three species size classes listed in Appendix A.

Sec. 14-30. Distance from Street Corners and Fire Hydrants.

No Street Tree shall be planted closer than 30 feet of any street corner measured from the point of nearest intersecting curbs or edges of roads. No Street Tree shall be planted closer than 10 feet of any fire hydrant. Exceptions may be granted only by approval of the Town Tree Warden, after the Tree Warden's consultation with the Department of Public Works and the Tree Advisory Board as appropriate.

Sec. 14-31. Utilities.

No Street Trees other than those species listed as small trees (30' and under) may be planted under or within 10 lateral feet of any overhead utility wire. Medium and large trees shall be planted one-half the listed canopy diameter from any overhead utility line. Small trees shall be planted at least 5 feet, medium trees at least 10 feet, and large trees at least 15 feet from any underground utility line. Refer to (Appendix A) for overhead utilities recommendations.

Sec. 14-32. Construction in Vicinity of Town Trees.

Any construction within 10 lateral feet of Public Trees requires consultation with the Town Tree Warden who may provide specific written recommendations for additional protection of trees. American National Standards Institute – A300 or the current version available at the Planning Services Department will apply.

Sec. 14-33. Public Tree Care.

The Town shall have the right to plant, prune, maintain and remove Public Trees within the Town rights-of-way and on Town-owned land, as may be necessary to insure public safety or to preserve or enhance the symmetry and beauty of such public grounds as set forth in the following guidelines.

Maintenance:

1. All Public Tree maintenance, pruning and planting shall be in accordance with ANSI A300 standards.

2. Every reasonable effort should be made to inform the public when potentially hazardous Public Trees need extensive pruning.

3. The Town Tree Warden, at times, may need to hire an arborist to obtain further information and options on tree issues, but only upon the prior approval of the Selectboard or relevant Town Department.

Removal:

1. Department of Public Works and Recreation & Parks Department employees who have been notified of or recognize a concern or a problem with a Public Tree need to determine if the concern or problem is a hazard to the public's safety.

2. If the employee, in his or her judgment, determines that there is a hazard to public safety, then the employee shall contact a supervisor and secure the area, if needed.

3. The supervisor will then contact the Tree Warden for a determination. If the Tree Warden determines that the Public Tree needs to be removed, the process will proceed according to standard Town practices.

4. If the Tree Warden feels that further information should be obtained before a decision can be made, then the area should be secured, if needed, until a determination can be made.

5. If, in the opinion of the Tree Warden, a Public Shade/Ornamental Tree constitutes no hazard to public safety and is determined to be healthy but needs to be removed, then the Tree Warden will warn a public hearing and shall be held in accordance with 24 VSA §2509:

> A Public Shade Tree within the residential part of a municipality shall not be felled without a public hearing by the tree warden,

except that when it is infested with or infected by a recognized tree pest, or when it constitutes a hazard to public safety, no hearing shall be required. In all cases the decision of the tree warden shall be final except that when the tree warden is an interested party or when a party in interest so requests in writing, such final decision shall be made by the legislative body of the municipality. (Amended 1969, No. 238 (Adj. Sess.), § 6.)

6. Two weeks or more before scheduled removal, the public will be notified via the Selectboard meeting and/or paper of record and a sign will be posted on the Public Tree of the proposed action to be taken, and the Public Hearing time, date and place.

7. Anyone contesting the take down of a Public Tree must do so to the Tree Warden between the time of posting the tree and the hearing, at the hearing or within 24 hours of the decision having been made. After informing the Tree Warden, a written appeal must be submitted within two weeks to the Tree Warden and the Selectboard. The Tree Warden will notify the appellant by certified mail of the hearing date with the Selectboard. The decision of the Selectboard is final. Its decision and findings will be in writing and mailed to the appellant.

8. (a) The Town Tree Warden may remove or cause to be removed any public Shade Tree or part thereof which is infested with or infected by a recognized tree pest or when it constitutes a hazard to public safety. Pursuant to 24 VSA §2509, no public hearing shall be required when a public Shade Tree is infested, infected or when it is a hazard to public safety. Such tree shall be considered a hazardous tree.

   (b) The Town Tree Warden may remove or cause to be removed any Public Shade Tree or part thereof which is injurious to town sewers, electric power lines, water lines or other public improvements or can otherwise be considered a public nuisance. Such tree shall be considered a nuisance tree. A public hearing shall be held before such public Shade Tree is removed. Public hearing guidelines stated above in this section will be followed.

9. Exceptions may be made with prior notice to, and acceptance by, the Tree Warden for Town employees who are maintaining roadbanks or engaging in accepted practices of right of way clearance and tree management.

Sec. 14-34. Tree Removal Mitigation. (Amended 5/18/04)

a) For every non-hazardous Public Shade Tree taken down, a tree or trees shall be planted equal to the total caliper of inches taken. The tree(s) planted shall be consistent with Section 4344 of the Town of Brattleboro's zoning bylaws. Bare root plantings may be no less than 1 ½" in caliper when planted. Trees shall be replaced by the caliper inch, such that for every inch of diameter at 4½ feet (DBH) removed, one or more trees totaling an equal number of caliper inches shall be planted. In lieu of replacement tree(s), the Tree Warden may allow payment to be made into a

mitigation fund.

b) The planting need not be done at the site of the take-down, but shall be carried out in accordance with the needs of the most current version of the Streetscape Master Plan. The Tree Advisory Board may advise the Tree Warden as to where the new tree or trees shall be planted.

c) The cost of replacement or compensation for tree removal of a Public Shade Tree will be established by the Tree Warden in the permit for removal. The property owner will bear the cost of replacement and removal. The Tree Warden will administer this section of the ordinance. Should the Tree Warden or property owner deem it necessary to further negotiate the fee, the mitigation board will be called in to consult and advise. The mitigation board will consist of three members, one of whom will be the Tree Warden. The value and cost of the tree will be determined by the mitigation board and Tree Warden based on location, health, specie, community value, and other considerations. Failure to apply for mitigation does not preclude assessment of a mitigation fee. The mitigation fee may be appealed to the Selectboard within thirty days of written notification to the person or agency responsible for payment.

d) For construction projects requiring the removal of over five Public Shade Trees, a tree removal mitigation plan will be developed prior to the removal of the trees, and enacted within a year of the project's completion.

e) In cases of appeal or litigation, a professional arborist will be consulted to appraise tree values, using ISA formula. All projects using federal funds are required to use the ISA formula for valuing trees.

f) If no present need is identified, mitigation funds (equal to what a planting would have cost) will be set aside for future planting or maintenance in a fund created for that purpose.

g) A property owner can expect to access their property. If a Public Tree is a hindrance to their access and no reasonable alternative exists, after consultation with the Tree Warden no penalties for tree removal will be levied.

h) The Town will not be held to the mitigation clause.

Sec. 14-35. Tree Topping.

It shall be unlawful for any person, firm or Town department to top any Public Tree. Topping is defined as the severe cutting back of limbs to stubs larger than three inches in diameter within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Public Trees severely damaged by storms or other causes, or certain trees under utility wires or

other obstruction where other pruning practices are impractical may be exempted from this section of the ordinance at the determination of the Tree Warden.

Sec. 14-36. Prohibited Activities and Substances Harmful to Tree Life.

It shall be unlawful for any person or agency owning, using or having control of substances harmful to tree life to allow such substance or substances to come in contact with the soil surrounding the roots of any Public Tree in such a manner as may injure or destroy the tree or plants.

Unless specifically authorized in writing by the Tree Warden, no person or town agency shall damage, cut, carve, attach any rope, wire, nails, advertising posters or other contrivance to any Public Tree or shrub.

Sec. 14-37. Pruning, Corner Clearance.

It shall be the responsibility of each property owner of any tree overhanging any Town right-of-way or Town-owned land to prune the branches so that such branches shall not obstruct the light from any street lamp or obstruct the view of any street intersection, and so that there shall be a clear area above the surface of the street and/or sidewalk to allow for pedestrian and vehicular safety and travel. Said owners shall remove all dead, diseased or dangerous trees, or broken or decayed limbs, which constitute a menace to the safety of the public. The Town shall have the right to prune any tree or shrub on private property when it interferes with the proper spread of light along the street from a State or Town street light or interferes with visibility of any State or Town traffic control device or sign, or to maintain an appropriate clear space above the surface.

Sec. 14-38. Tree Removal on Private Property.

(a) The Town Tree Warden may remove or cause to be removed any private Shade Tree on private property within the town when such private tree is infested with or infected by a recognized tree pest or when it constitutes a hazard to public safety. The Town Tree Warden shall notify the owner of such private Shade Tree in writing by certified mail that removal of the tree is necessary. The appeal of this action may be taken by the private property owner, to the Selectboard. This appeal must be submitted in writing within 15 days of the receipt of certified written notification from the Tree Warden. The Selectboard will make their decision at its next meeting. The property owner will receive their decision and findings in writing.

In the event of the failure of the owner to comply, after a final adjudication that the private tree constitutes a hazard to public safety, the town shall have the right to remove the private Shade Tree pursuant to 24 VSA § 2511. A person who violates subsection (a) and fails to remove the private Shade Tree within the time required, after a final adjudication that the private tree constitutes a hazard to public safety, shall be subject to a fine of $500.00 for each day the private Shade Tree remains and is not removed.

(b) The Town Tree Warden may remove or cause to be removed any private Shade Tree or part thereof which is injurious to town sewers, electric power lines, water lines or other public improvements or can otherwise be considered a public nuisance. The Town Tree Warden shall

notify the owner of such private Shade Tree in writing by certified mail that removal of the tree is necessary. The property owner may appeal this decision. Guidelines for appeal shall be the same as section 14-38 (a) . If it is determined that such private Shade Trees need to be removed, the town may remove it at its own expense.

Sec. 14-39. Obstruction of Streets.

It shall be the duty of any person owning private property bordering on a public street to ensure that trees and shrubs on that property are pruned in a manner that will not obstruct or shade streetlights, obstruct the passage of pedestrians on sidewalks, obstruct vision of traffic signs or obstruct the view of any street or alley intersection. If trees are interfering with utility wires, it is the obligation of the appropriate utility company to correct the situation.

Sec. 14-40. Arborist and Bond.

Before securing a contract with the Town for arborcultural services, a contractor must have possession of liability insurance in the minimum amounts of $1,000,000 aggregate, general liability per occurrence indemnifying the Town or any person injured or damage resulting from the pursuit of such endeavors as herein described. All tree work performed on Public Trees must conform to the most recent ANSI A300 Standards.

Sec. 14-41. Penalties

Any person violating any provision of this ordinance shall be subject to a fine of $500.00 for each offense; and a separate offense shall be deemed committed on each day on which a violation occurs or continues.

Identifying Hazard Trees*

The first step in any roadside vegetation management strategy is to identify hazard trees. It is important to deal with hazard trees before they cause injury or property damage.

A hazard tree is a defective tree, or tree part that could fall into the road and cause injury or property damage or any tree obstructs motorist vision.

There are two general types of hazard trees:

Hazard trees caused by *tree defects* and hazard tree *obstructing motorist line of sight.*

Hazard Trees Caused by Tree Defects

A sound tree becomes a hazard tree when the tree's woody structure is weakened by defects. Defects are visible signs that a tree has failed, is failing or is likely to fail. The main categories of defects are:

Dead trees, tops or branches are the most common defect in roadside hazard trees. Any tree within the right-of-way that is dead or has a dead top is a hazard tree that should be removed. Dead tops indicate poor tree vigor and many trees with dead tops will die in a few years. Broken branches (hangers) can be easily detected by the brown, wilted leaves that tend to be retained on the limbs or by the unusual angle of the branch. Hangers without attached leaves may be more difficult to detect. Look for broken ends and unusual angles.

Cracks and seams are a separation of the wood or the fissure in the bark. Most cracks and seams develop from improper closure of wounds or from forks or weak branch unions. Cracks and seams indicate that the tree is already failing. The wood behind a crack or seam may be sound or decayed.

Sharp branch angle characterizes weak branch and stem unions. They contain bark pockets that weaken the union. In most cases the branch eventually breaks off or the tree splits.

V-shaped stump sprout connections often have extensive internal decay and many of the sprouts will eventually break off. These defects commonly fail during ice or wind storms.

Stem or branch decay is wood that is rotted, or a cavity where wood is missing. Fungi that infect wounds in the bark and wood cause decay. Decayed wood is very weak. Signs of internal decay include fungal fruiting bodies (conks, mushrooms or toadstools), cavities and woodpecker holes.

Cankers are areas of dead bark or exposed sapwood. Stems and branches often break near cankers. They can be caused by fungi, insects, weather of mechanical damage. Cankers caused

by fungi are often called “target” cankers because the annual growth rings look like an elongated bull’s eye pattern.

Root problems include partial windthrow or partial uprooting, root smothering and extensive root rot. Recent or sudden leaning and soil mounding on the side opposite the tree lean is evidence of partial windthrow or partial uprooting. Heavy snow, ice accumulation or high winds often cause tree lean. Trees with lopsided crowns are apt to be partially uprooted. Decreasing soil drainage, flooding, compaction or excessive amounts of wood chips can cause root smothering. Root rot can be detected by fungal fruiting bodies near the base of the tree itself or near the root collar. Trees with root smothering or root rot problems usually show signs of low crown vigor, i.e. thin or off-color foliage and dead branches. Roads crews should use caution when ditching and snow plowing. Snow plow wing blades and grader mold boards can cause serious damage to tree roots.

Hazard Trees Obstructing Motorist’s Line of Sight

Trees that obstruct a motorist’s line of sight create unsafe conditions and are hazard trees. Automobile crashes attributed to these hazard trees can result in large lawsuits against municipalities. Clear vision should be maintained along rural roads, especially at intersections and along curves.

Management of Hazard Trees

- Subsection on utilities under hazard tree mgmt.
- Bring attn. to utility; clarify utility and town roles and responsibilities (ask Duane)—pg 8 and 13
- Photos/diagram to clarify which trees threaten utilities (pg 8 and 13)—phone vs power line, hazard tree, danger distance
-

Once a tree has been identified as a hazard tree, it should be pruned or removed as soon as possible to avoid liability problems. If a municipality needs to remove a large number of hazard trees, it may be necessary to develop a priority list. Remove the most serious problems first, such as dead trees or trees with a great deal of dead wood. It is also important to maintain a record of hazard tree management in case the municipality is challenged if tree failure occurs.

When managing hazard trees, the road commissioner, tree warden and abutting landowners should discuss the following questions:

- Are any of the hazard trees valuable shade trees or of historical importance? If so, are special treatments such as cabling bracing warranted?

- Would the municipality and the landowner be willing to share the expense of pruning or removing the hazard trees?
- Does the landowner want the wood resulting from hazard tree pruning or removal?
- Can a replacement tree be planted that will reduce future problems?

If a hazard tree must be removed and is not within the utility corridor, and all safety equipment is available, proceed with the removal. If the tree is exceptionally large or in a challenging condition or location, the municipality should consider contracting with a professional tree care company. The municipality may be able to save money by developing a substantial list of trees for contract removal.

Always contact the local utility company when a hazard tree is close to a power line. Rural road crews should not work within a power line right-of-way, nor should they attempt the removal or pruning of any tree that could fail onto power lines.

**From the Vermont Highway Vegetation Management Manual, written by Harry Chandler, Vermont Woodlands Association*

Roadside Tree Assessment

Inspectors(s) #:_____ _____ ____ Date: _____

Road Name/Section: _____ ___ From: _____ To: _____

Desired clear zone for this section: _____feet Comments:_____

Tree(s) Location: ***Street address, tree species, other identification information***	**Number of Trees**	**Conflicts**			**Tree Defects or Hazards**						**Line of Site**			**Selective Cutting**		**Action**		
		In clear zone	Equipment conflict (plow, grader)	Overhanging branches	Dead	Decay	Cankers	Seams	Crown	Roots	Signs	Intersection	Corner	Treescaping	Vistas	* Consult Tree Warden	Recommendation	Date Completed

Before removing trees, you should consult with your tree warden, especially if the tree(s) could be considered a shade or ornamental tree and is in the residential part of town.

Vermont Roadside Tree Assessment Inventory Protocol

Inventory Approach

The roadside tree assessment is designed to capture a quick snapshot of back roads to identify hazardous trees, pruning needs and flag any forest health issues. The roadside inventor y is an inexpensive, quick and effective procedure whereby a cursor y visual inspection and count can be made by trained volunteers or municipal staff from a vehicle. Trees with hazardous defects and pest and disease concerns can be flagged for a follow-up inspection by a qualified professional. Inspection may include all public trees in the town ROW or a representative sample.

The Shade Tree Inventory on the other hand is a more detailed, systematic inventor y of public shade trees within a specified area or along high use roads or densely settled neighborhoods to identify species diversity, size class diversity, hazardous trees, structural or tree health concerns, and maintenance needs.

There are two options for conducting a Roadside Assessment based on your town's needs:

The **Rapid Assessment** is not designed to take information on individual trees. In fact, we encourage this assessment to be done in a moving car, with one person driving and another collecting the information. As you drive each road, tally each tree you identify that needs to be removed or pruned in the corresponding box related to its' diameter class and who is responsible for its' removal or maintenance:

T—Town

U—Utility

P—Private

Due to the close proximity of the Emerald Ash Borer, a non-native invasive insect that kills ash trees, to Vermont we are encouraging communities to estimate the number of ash within their public ROW in order to budget and prioritize removals. (Once these ash are attacked by EAB they die within 2-4 years and become a hazard to public safety.) As you drive each road, tally each ash tree you find by diameter class and condition:

G—Good

F—Fair

D-Dead

The **Individual Assessment** allows you to collect information on individual trees to identify those that need to be removed, pruned and indicate where a consultation is needed to evaluate hazardous trees or tree health issues.

The information will be collected on paper forms. Once the information has been collected, you have the option to enter the data into an excel spreadsheet for further analysis and reports.

When should this inventory take place?

The best time of year to conduct this assessment depends on your overall goals. If the goal of the assessment is to evaluate tree health, summer is the ideal time to conduct the survey. If the goal of the survey is to identify hazards, you may consider holding off until after the leafs have dropped so hanging limbs, widow makers or other hazards can be easily identified

Who should be involved?

Before you hit the road, consider who in the community may be interested in the information you are collecting. If you haven't already contacted them, please consider including

- Road crew foreman and members
- Public Works employees
- Tree Warden
- Conservation Commission Members
- Planning Commission Members

Getting Started

Depending on how many miles of roads your town is responsible for maintaining, getting started with a roadside tree assessment may seem daunting. We recognize that a 100% survey of all town roads may not be reasonable, or necessary. In fact, before you get started we recommend you prioritize roads or, or areas of town for surveying, and establish an inspection cycle.

<u>Setting Priorities</u>

To help your community prioritize where a roadside tree assessment should be conducted, we offer the following criteria:

Categories	**Examples of Criteria**
High Priority Areas	• High use roads (ie. Class 1 and 2 roads) • Dense residential areas • Emergency Access Routes (ie hospitals, emergency facilities, etc…) • Schools and Playgrounds
Medium Priority	• Secondary roadways (Class 2 roads) • Main or moderately used thoroughfares • Residential areas
Low Priority	• Low use roads (Class 3 and 4 roads) • Dispersed residences

Vermont Road Classifications

Class 1 highways are any State highways that are maintained by the town.
Class 2 highways are well-traveled roads carrying traffic to or from Class 1 highways.
Class 3 highways are all other regularly maintained town highways.
Class 4 highways are essentially not maintained by anyone.

Inspection Cycles

Although annual inspections are ideal, we recognize that they are not possible for every community. Depending on your community's needs and resources, we recommend you develop an inspection cycle. Here are some criteria to consider when developing a cycle.

- Road Mileage- How many miles of back roads does your community maintain?
- Public Use- How frequently are the roads traveled? How much use do they get?
- Town's Capacity- What resources does your town have to manage trees along your roads? How are removals handled?

Field	Description
Team	Enter the initials of who is doing the survey.
Date	Enter the date (month/ day/year) the road segment is surveyed.
Road Name/Section	Enter the road name or segment
From	Enter the closest 911 address to the start of the segment surveyed
To	Enter the closest 911 address to the end of the segment surveyed
Ash	Emerald Ash borer is a potential threat to ash trees along our roads. If EAB is found in your community, you will need a plan to address affected trees. To assist you in developing this plan, you will need to have a sense as to what percent of your roadside tree are ash, and how big there are. We have added this column to assist you in collecting this information. It is optional- however, if EAB arrives- we bet you'll wish you had collected it.
Tree Id	Assign each tree an unique id number
Species	Identify the species to the genus (maple), and if possible species (sugar maple)
Condition	Assign a condition rating to the tree, G-Good (no more than 75% dieback in crown, no major structural or hazard issues), F-Fair (more than 75% dieback with structural or hazard issues, D-Dead

	(very little to no live foliage)
Removal	Enter any removal needs along this section of road.
Why?	
In Clear Zone	Enter a dot tally for each tree (by dbh) that needs to be removed because it is in the clear zone in the column indicating who's responsible (i.e. Town, Utility Company or Private Landowner)
Equipment Conflict	Enter a dot tally for each tree (by dbh) that needs to be removed due to conflicts with equipment in the column indicating who's responsible (i.e. Town, Utility Company or Private Landowner).
Line of Sight	Enter a dot tally for each tree (by dbh) that needs to be removed because it is in the line of site in the column indicating who's responsible (ie. Town, Utility Company or Private Landowner) .
Hazard	Enter a dot tally for each tree (by dbh) that needs to be removed because it is a hazard in the column indicating who's responsible (i.e. Town, Utility Company or Private Landowner).
Other Needs	Enter other action steps, needs or opportunities along this section of road.
Prune	Enter a dot tally for each tree (by dbh) that needs to be pruned in the column indicating who's responsible (i.e., Town, Utility Company or Private Landowner)
Plant	Even along rural roads there are opportunities to plant trees. Whether to recreate tree lined roads, or improve the gateway to the community, consider collecting vacant planting spots. Enter a dot tally of vacant planting spots in the column indicating who's responsible (ie Town, Utility Company or Private Landowner).
Notes	This feature allows you to flag follow-up actions or features. See below for a full list.

Additional features you may wish to flag during the survey

- Consult needed
- Dead trees
- Hazardous defects
- Significant dieback
- Potential hazards
- Planting opportunities
- Large concentration of ash or other invasive forest pest host species
- Community resource trees
- Invasive plants

Rapid Roadside Assessment

Rd: From: _____ To: _____

Team: _____ Date: _____

DBH	Removal			Prune			Ash		
	T	U	P	T	U	P	G	F	D
0-6"									
6-12"									
13-18"									
19-24"									
25-30"									
31-36"									
37-43"									
>43"									
	T- Town U-Utility P-Private						G- Good F-Fair D-Dead		

Rapid Roadside Assessment

Rd: From: _____ To: _____

Team: _____ Date: _____

DBH	Removal			Prune			Ash		
	T	U	P	T	U	P	G	F	D
0-6"									
6-12"									
13-18"									
19-24"									
25-30"									
31-36"									
37-43"									
>43"									
	T- Town U-Utility P-Private						G- Good F-Fair D-Dead		

Vermont Roadside Individual Tree Assessment

Road Name/Section: _____ **Team: _____** **Date:_____**

Ash Trees:		0-6"	6-12"	13-24"		25-36"		Over 36"
Good								
Fair								
Dead								

Tree #	**Species**	**Location**	**Condition**	**Removal**		**Other Needs**		**Notes**
				WHY?	**WHO?**	**PLANT (Who?)**	**PRUNE (Who?)**	

Location:	**Condition:**	**Why?**	**Who?**	**Notes:**
Lat/Long or Waypoint	**G-Good**	**CZ-Clear Zone**	**T-Town**	**Add notes about health, follow-up actions, consult needed, etc...**
	F-Fair	**E-Equipment**	**U-Utility**	
	D-Dead	**L-Line of Sight**	**P-Private**	

HOW to

Recognize Hazardous Defects in Trees

United States Department of Agriculture
Forest Service
Northeastern Area State & Private Forestry

NA-FR-01-96

How to

Recognize Hazardous Tree Defects

Contents Page

Introduction

Trees add to our enjoyment of outdoor experiences whether in forests, parks, or urban landscapes. Too often, we are unaware of the risks associated with defective trees, which can cause personal injury and property damage. Interest in hazard tree management has increased in recent years due to safety and liability concerns resulting from preventable accidents. Recognizing hazardous trees and taking proper corrective actions can protect property and save lives.

A “hazard tree” is a tree with structural defects likely to cause failure of all or part of the tree, which could strike a “target.” A target can be a vehicle, building, or a place where people gather such as a park bench, picnic table, street, or backyard.

This brochure was created to help home owners and land managers in recognizing hazardous defects in trees and to suggest possible corrective actions. We recommend that corrective actions be undertaken by professional arborists.

Because of the natural variability of trees, the severity of their defects, and the different sites upon which they grow, evaluating trees for hazardous defects can be a complex process. This publication presents guidelines, not absolute rules for recognizing and correcting hazardous defects. When in doubt, consult an arborist.

Inspecting Trees

Inspect trees under your responsibility every year. Tree inspections can be done at any time of year, leaf-on or leaf-off. To be thorough, inspect trees after leaf drop in fall, after leaf-out in spring, and routinely after severe storms.

Inspect trees carefully and systematically. Examine all parts of the tree, including the roots, root or trunk flare, main stem, branches, and branch unions. Be sure to examine all sides of the tree. Use a pair of binoculars to see branches high off the ground.

Consider the following factors when inspecting trees:

Tree Condition: Trees in poor condition may have many dead twigs, dead branches, or small, off-color leaves. Trees in good condition will have full crowns, vigorous branches, and healthy, full-sized leaves; however, green foliage in the crown does not ensure that a tree is safe. Tree trunks and branches can be quite defective and still support a lush green crown.

Tree Species: Certain tree species are prone to specific types of defects. For example, some species of maple and ash in the Northeast often form weak branch unions (page 5), and aspen is prone to breakage at a young age (50-70 years) due to a variety of factors, including decay (page 7) and cankers (page 8).

Tree Age and Size: Trees are living organisms subject to constant stress. Pay particular attention to older trees, which may have accumulated multiple defects and extensive decay.

What to Look For

Hazardous defects are visible signs that the tree is failing. We recognize seven main types of tree defects: dead wood, cracks, weak branch unions, decay, cankers, root problems, and poor tree architecture. A tree with defects is not hazardous, however, unless some portion of it is within striking distance of a target.

Dead wood

Dead wood is “not negotiable”-- dead trees and large dead branches must be removed immediately! Dead trees and branches are unpredictable and can break and fall at any time (Fig. 1). Dead wood is often dry and brittle and cannot bend in the wind like a living tree or branch. Dead branches and tree tops that are already broken off (“hangers” or “widow makers”) are especially dangerous!

Take immediate action if...

- A broken branch or top is lodged in a tree.
- A tree is dead.
- A branch is dead and of sufficient size to cause injury (this will vary with height and size of branch).

Figure 1. Dead branches can break and fall at any time.

Cracks

A crack is a deep split through the bark, extending into the wood of the tree. Cracks are extremely dangerous because they indicate that the tree is already failing (Fig. 2).

Take action if...

- A crack extends deeply into, or completely through the stem.
- Two or more cracks occur in the same general area of the stem.
- A crack is in contact with another defect.
- A branch of sufficient size to cause injury is cracked.

Figure 2. A serious crack like this one indicates that the tree is already failing!

Weak Branch Unions

Weak branch unions are places where branches are not strongly attached to the tree. A weak union occurs when two or more similarly-sized, usually upright branches grow so closely together that bark grows between the branches, inside the union. This ingrown bark does not have the structural strength of wood, and the union is much weaker than one that does not have included bark (Fig. 3). The included bark may also

Figure 3. This weak branch union has failed, creating a highly hazardous situation.

act as a wedge and force the branch union to split apart. Trees with a tendency to form upright branches, such as elm and maple, often produce weak branch unions.

Weak branch unions also form after a tree or branch is tipped or topped (page 15), i.e., when the main stem or a large branch is cut at a right angle to the direction of growth leaving a large branch stub. The stub inevitably decays, providing very poor support for new branches ("epicormic" branches) that usually develop along the cut branch.

Take action if...

- A weak branch union occurs on the main stem.
- A weak branch union is cracked.
- A weak branch union is associated with a crack, cavity, or other defect.

Decay

Decaying trees can be prone to failure, but the presence of decay, by itself, does not indicate that the tree is hazardous. Advanced decay, i.e., wood that is soft, punky, or crumbly, or a cavity where the wood is missing can create a serious hazard (cover photo). Evidence of fungal activity including mushrooms, conks, and brackets growing on root flares, stems, or branches are indicators of advanced decay.

A tree usually decays from the inside out, eventually forming a cavity, but sound wood is also added to the outside of the tree as it grows. Trees with sound outer wood shells may be relatively safe, but this depends upon the ratio of sound to decayed wood, and other defects that might be present. Evaluating the safety of a decaying tree is usually best left to trained arborists (Fig. 4).

Take action if...

- Advanced decay is associated with cracks, weak branch unions, or other defects.
- A branch of sufficient size to cause injury is decayed.

Figure 4. This seriously decayed tree should have been evaluated and removed before it failed.

- The thickness of sound wood is less than 1" for every 6" of diameter at any point on the stem.

Cankers

A canker is a localized area on the stem or branch of a tree, where the bark is sunken or missing. Cankers are caused by wounding or disease. The presence of a canker increases the chance of the stem breaking near the canker (Fig. 5). A tree with a canker that encompasses more than half of the tree's circumference may be hazardous even if exposed wood appears sound.

Take action if...

- A canker or multiple cankers affect more than half of the tree's circumference.

Figure 5. The large canker on this tree has seriously weakened the stem.

- A canker is physically connected to a crack, weak branch union, a cavity, or other defect.

Root Problems

Trees with root problems may blow over in wind storms. They may even fall without warning in summer when burdened with the weight of the tree's leaves. There are many kinds of root problems to consider, e.g., severing or paving-over roots (Fig. 6); raising or lowering the soil grade near the tree; parking or driving vehicles over the roots; or extensive root decay.

Soil mounding (Fig. 7), twig dieback, dead wood in the crown, and off-color or smaller

Figure 6. Severing roots decreases support and increases the chance of failure or death of the tree.

than normal leaves are symptoms often associated with root problems. Because most defective roots are underground and out of sight, aboveground symptoms may serve as the best warning.

Take action if...

- A tree is leaning with recent root exposure, soil movement, or soil mounding near the base of the tree.

.

- More than half of the roots under the tree's crown have been cut or crushed. These trees are dangerous because they do not have adequate structural support from the root system.

Figure 7. The mound (arrow) at the base of this tree indicates that the tree has recently begun to lean, and may soon fail.

- Advanced decay is present in the root flares or “buttress” roots.

Poor Tree Architecture

Poor architecture is a growth pattern that indicates weakness or structural imbalance. Trees with strange shapes are interesting to look at, but may be structurally defective. Poor architecture often arises after many years of damage from storms, unusual growing conditions, improper pruning, topping, and other damage (Fig. 8).

A leaning tree may be a hazard. Because not all leaning trees are dangerous, any leaning tree of concern should be examined by a professional arborist.

Take action if...

- A tree leans excessively.
- A large branch is out of proportion with the rest of the crown.

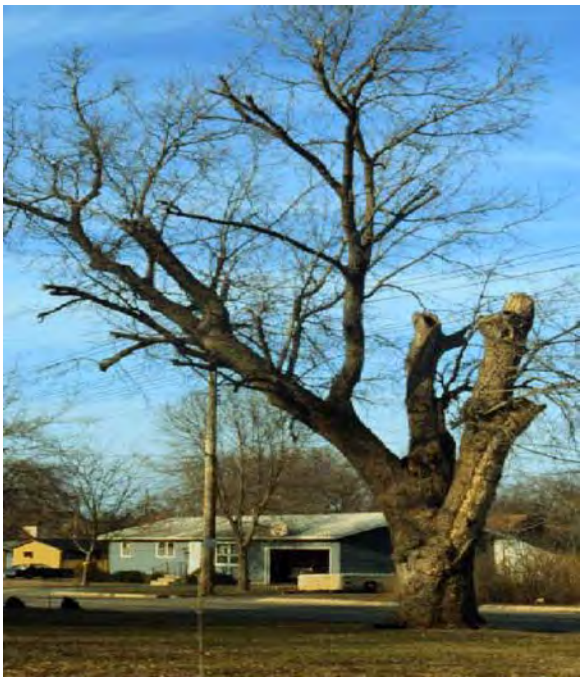


Figure 8. This tree is decayed and badly out of balance because of poor maintenance. It is dangerous, and extremely unattractive!

Multiple Defects

The recognition of multiple defects in a tree is critical when evaluating the tree's potential to fail. Multiple defects that are touching or are close to one another should be carefully examined. If more than one defect occurs on the tree's main stem, you should assume that the tree is extremely hazardous.

Corrective Actions

Corrective actions begin with a thorough evaluation. If a hazardous situation exists,

there are three recommended options for correcting the problem: move the target, prune the tree, or remove the tree.

Move the Target

Removing the target is often an inexpensive and effective treatment for correcting a hazard tree. Easily moved items like play sets and swings, RV's, and picnic tables can be placed out of the reach of the hazardous tree with little effort and expense.

If the target cannot be moved and a serious hazard exists, consider blocking access to the target area until the hazard can be properly eliminated.

Prune the Tree

A hazardous situation may be caused by a defective branch or branches, even though the rest of the tree is sound. In this case, pruning the branch solves the problem.

Prune when

- A branch is dead.
- A branch of sufficient size to cause injury is cracked or decayed.
- A weak branch union exists and one of the branches can be removed.
- Branches form a sharp angle, twist, or bend.
- A branch is lopsided or unbalanced with respect to the rest of the tree.
- A broken branch is lodged in the crown. Remove the branch and prune the stub.

Pruning a tree properly early in its life is a good way to effectively avoid many potential problems when the tree is older and larger. When done correctly, routine pruning of trees does not promote future defects. If done improperly, immediate problems may be removed, but cracks, decay, cankers, or poor architecture will be the ultimate result, creating future hazards.

We recommend that the "natural target" pruning method be used. This pruning method is fully described in How to Prune Trees (Bedker, O'Brien & Mielke, 1995).

Remove the Tree

Before cutting a tree down, carefully consider the alternatives. The effects of removing a tree are often pronounced in landscape situations and may result in reduced property values. Tree removal should be considered as the final option and used only when the other two corrective actions will not work. Tree removal is inherently dangerous and is even more serious when homes and other targets are involved. Removal of hazardous trees is usually a job for a professional arborist.

Cabling and Bracing

Cabling and bracing does not repair a hazard tree, but when done correctly by a trained arborist, it can extend the time a tree or its parts are safe. Done incorrectly, it creates a more serious hazard. We do **not** recommend cabling or bracing as treatment for a hazard tree unless the tree has significant historic or landscape value.

Topping and Tipping--Poor Pruning Practices

Topping is the practice of pruning large upright branches at right angles to the direction of growth, sometimes used to reduce the height of the crown. Tipping is the cutting of lateral branches at right angles to the direction of growth to reduce crown width. Both of these practices are harmful and should **never** be used. The inevitable result of such pruning wounds is decay in the remaining stub, which then serves as a very poor support to any branches that subsequently form. Trees that are pruned in this manner are also misshapen and esthetically unappealing (see Fig. 8).

Conclusions

Evaluating and treating hazard trees is complicated, requiring a certain knowledge and expertise. This publication outlines some of the basic problems that may alert you to a hazardous situation. Never hesitate if you think a tree might be hazardous. If you are not sure, have it evaluated by a professional. Consult your phone book under "Arborists" or "Tree Service."

Remember that trees do not live forever. Design and follow a landscape plan that includes a cycle of maintenance and replacement. This is the best way to preserve the health of our trees and ensure a safe and enjoyable outdoor experience.

Suggested Reading

Albers, J.; Hayes, E. 1993. How to detect, assess and correct hazard trees in recreational areas, revised edition. St. Paul, MN: Minnesota DNR. 63 p.

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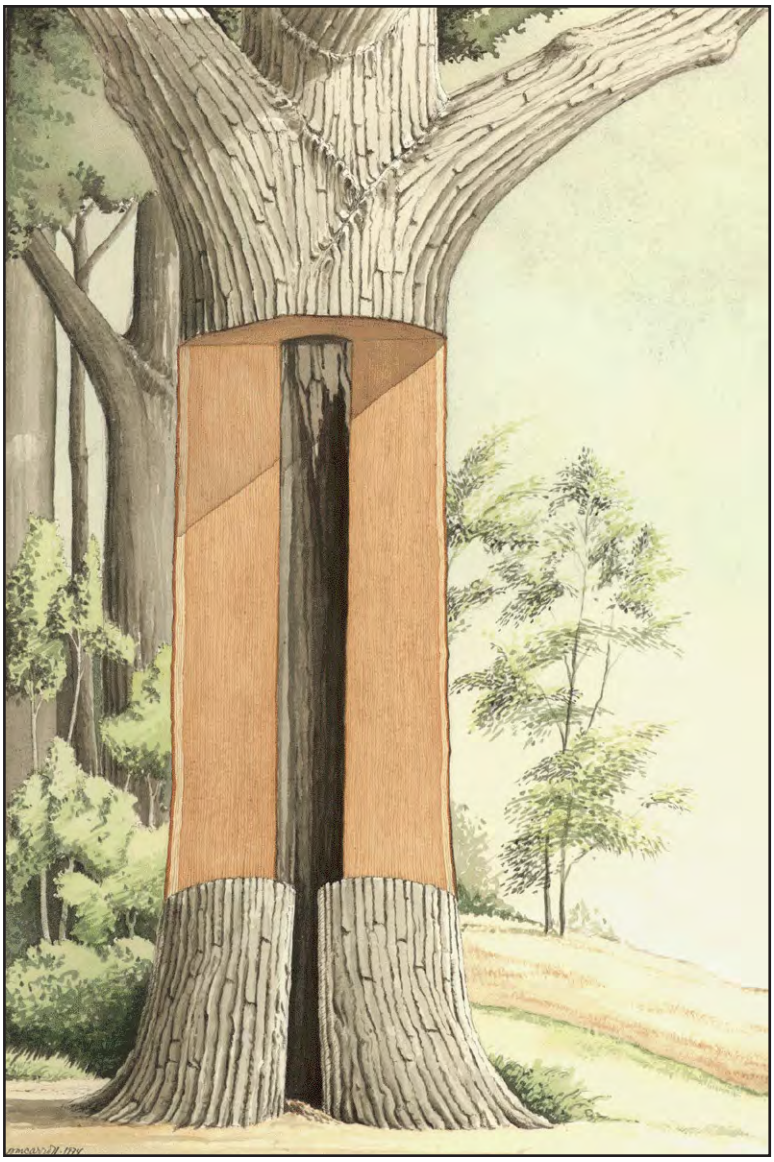
Notes

How to Recognize Hazardous Defects in Trees was written to help people identify potential problems with trees. Trees with serious defects can pose an extreme hazard and should be treated with caution. The best way to correct a hazardous tree is to hire a professional arborist. Information in this publication can help to identify trees that require attention.

How to Recognize Hazardous Defects in Trees

For further information, contact:



A First Look at Tree Decay

An Introduction to How Injury and Decay Affect Trees

by Kevin T. Smith and Walter C. Shortle

Northeastern Research Station
USDA Forest Service

USDA
Forest Service

Northeastern Area
State and Private Forestry
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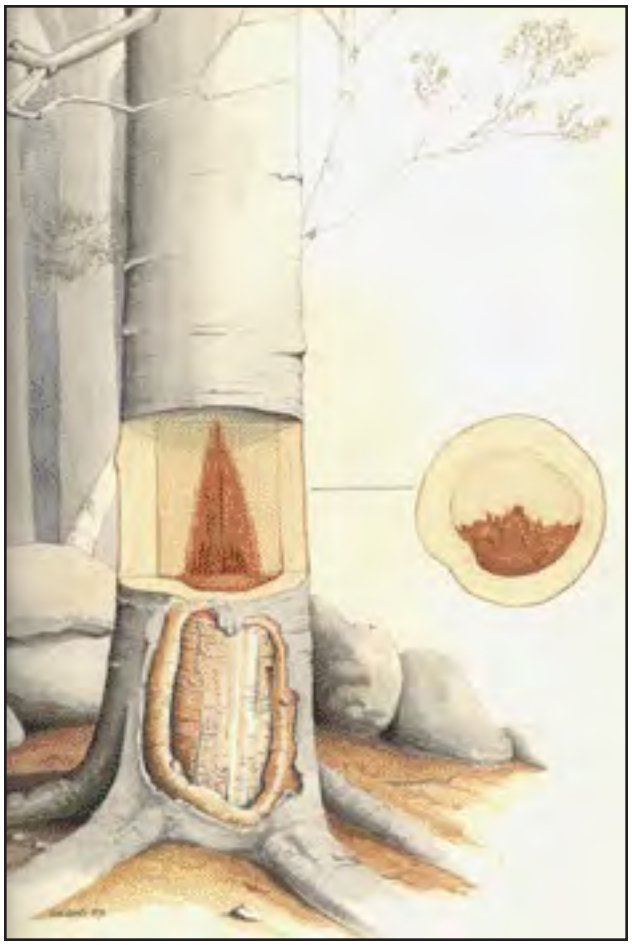
Original watercolors by David Carroll.

A First Look at Tree Decay

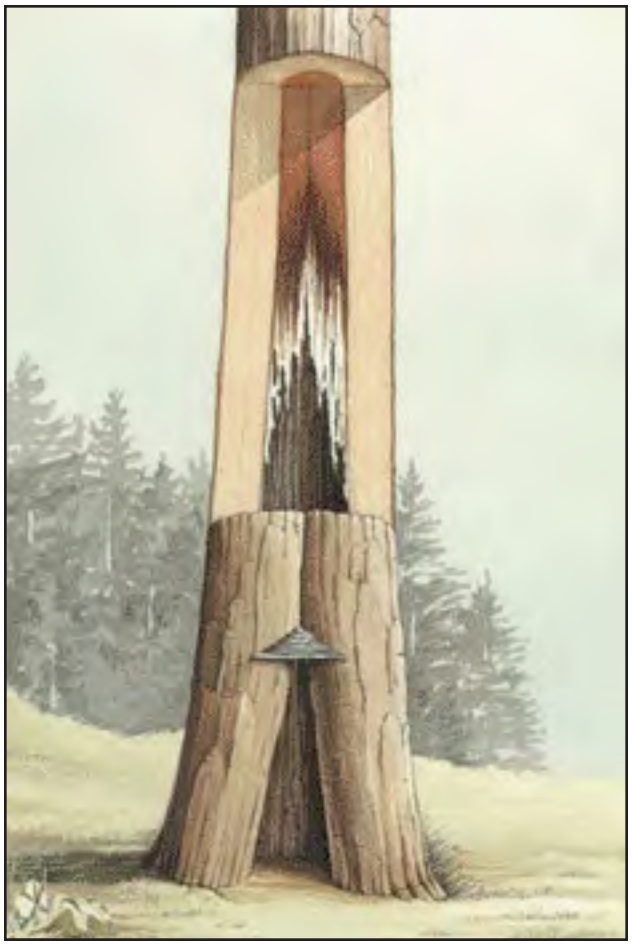
Photosynthesis and decay are the two most essential processes in nature.

Photosynthesis by green plants captures and stores energy from the sun. This energy is used to form wood and other tree parts. Photosynthesis also removes carbon dioxide and adds oxygen to the atmosphere.

Decay releases stored energy and essential elements by the breakdown of wood. Fungi decay the wood in living and dead trees as part of a vital web of microorganisms, insects, and wildlife. Decay organisms enter trees through wounds, large and small. Trees have survival strategies that can resist the spread of decay.



Wound at the base of paper birch



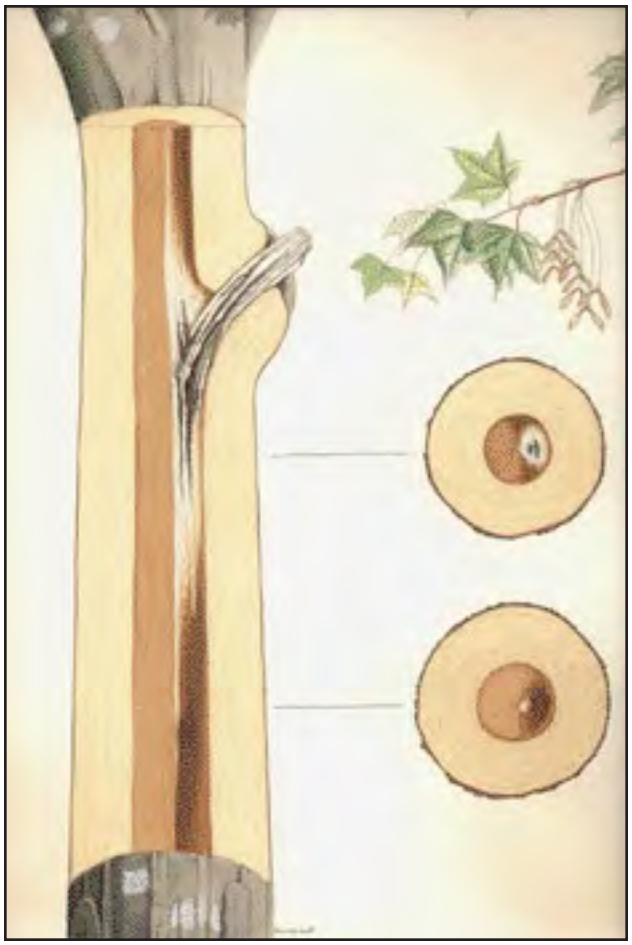
Wound at the base of white pine

Trees compartmentalize or "wall off" wounded areas. This process resists the spread of defect, infection, and decay and confines it to wood present at the time of wounding, thereby protecting future growth. The response to wounds causes chemical changes, some of which are visible as wood discolorations. Some discolorations are protective for the tree but "stain" and reduce the value of wood for lumber.

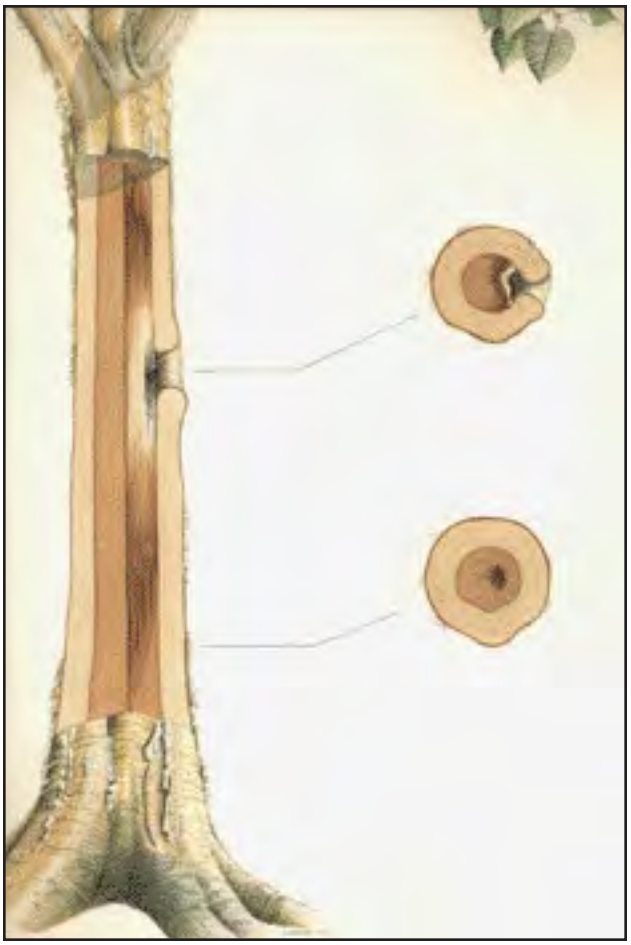
Large wounds at the base of the trunk cause the greatest injury to the tree and the greatest loss of timber value from stain and decay. Such wounds are infrequent in nature and are most often made by roadbuilding and logging.

When a branch breaks, decay organisms can infect the exposed wood. Decay moves slowly through the broken branch towards the main stem or trunk. Decay organisms are usually stopped from entering the trunk by chemicals formed in the base of the branch. Consequently the breakage of small branches, especially those high in the crown and distant from the stem, are not likely to be a major cause of discoloration and decay in the trunk.

Injury and decay are much worse when the stem that surrounds the branch base is wounded. This occurs when the bark below a branch is torn or when a branch is improperly pruned flush with the stem.



Branch stub in maple



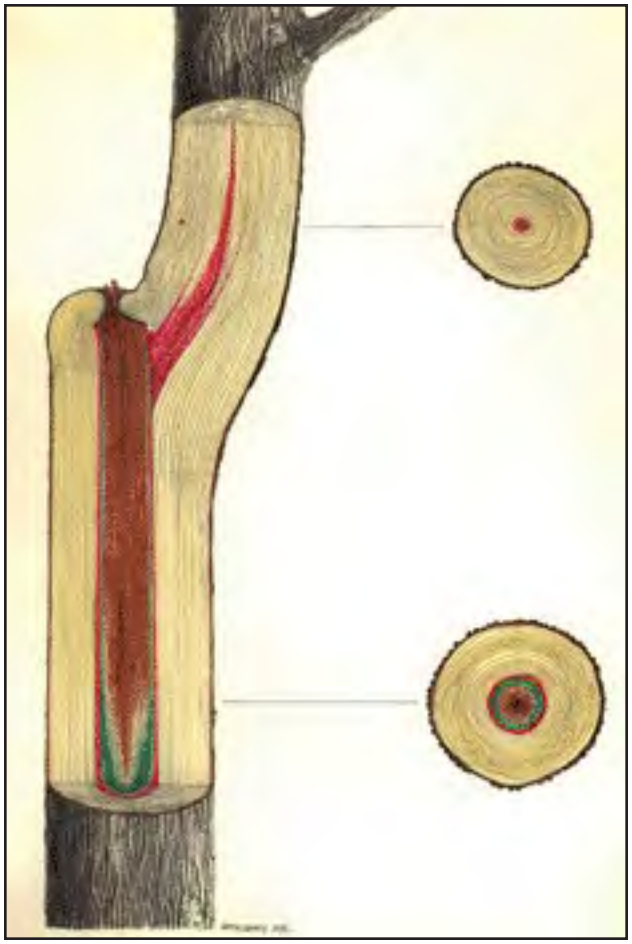
Stem scar of yellow birch

Stem scars can occur from impacts of falling trees during logging or storms. Infection begins where the stem is exposed and spreads vertically in the stem as the tree continues to grow in circumference.

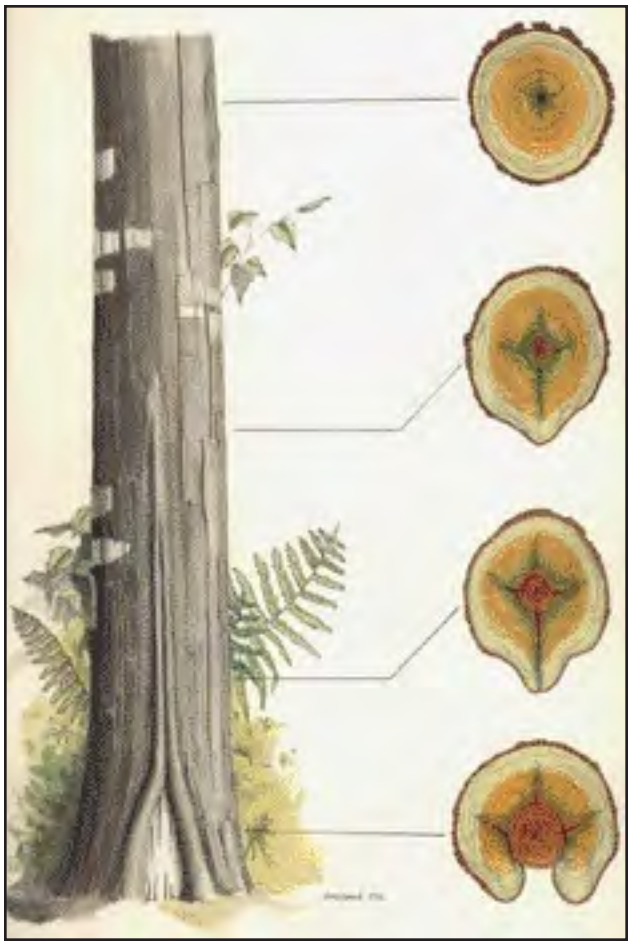
Early stages of infection result in discolored "wetwood." Wetwood dries poorly and can cause defects in wood products. Late stages of infection result in rotted wood. Rotted wood in living trees is separated from healthy wood by compartmentalization boundaries. Although the boundaries are highly effective, biological breakdown or physical injury can breach them and enable infection and decay to spread. Cavities produced from rotted wood can provide shelter for wildlife.

Unlike branch stubs, broken tops and split forks directly expose wood in tree trunks to infection. Discoloration will spread down the stem and tend to be limited to the diameter of the broken top. The rate of spread is variable, but in the Northeast is likely to be no more than 6 - 10 inches per year. A branch will form a new leader that is not likely to be infected from the broken top.

Storm injury that results in the natural breakage of small diameter tops may be unavoidable. Deliberate "topping" of stems should be avoided, especially for stems greater than 4 inches in diameter.



Broken top in red maple



Basal wound of red oak

Ribs of "woundwood" (sometimes called callus) have almost closed the exposed wound at the base of the trunk. The seam from the meeting of the woundwood ribs is mistakenly referred to as a "frost crack."

Although the tree survives, internal cracks or "spiderheart" reduce the value of the wood for products. These cracks can extend to the stem surface and may indicate a potentially hazardous tree.

Photosynthesis provides energy for growth and protection. Wood decay provides the energy for the spread of infections within the tree. Decay reduces the value of wood products and increases wildlife habitat and the cycling of essential elements.

VERMONT URBAN AND COMMUNITY FORESTRY PROGRAM

Growing Vibrant Communities

PLANT LIVE GROW

Trees Are the Key to Making Every Community A Vibrant Place to Live, Work, and Play

- Trees are a vital part of any great community.
- They are the building blocks of what experts call our "urban forests," the living, breathing, life-sustaining part of our human habitat. And when they're properly planted and cared for, they can promote human health, save energy, reduce costs to taxpayers—and sometimes simply provide a much-needed place of solace in a bustling urban center. That's why in so many ways—some that are obvious and a lot we're just learning about—trees are the key to growing vibrant Vermont communities.

The Many Benefits of Trees

We know trees beautify our parks, shade our lawns, and enhance the sidewalks of our downtowns and neighborhoods. But they also do so much more:

- Parks and tree-lined sidewalks promote physical activity by creating shaded, comfortable outdoor spaces.
- Trees increase property values and can decrease building energy consumption by providing shade on hot days.
- Trees can reduce the need for costly stormwater systems and treatment facilities by naturally managing runoff.
- Trees increase home values, which benefits homeowners and increases tax revenues for local governments.
- Urban and Community forests in the Vermont contain about 11.9 million trees that provide: 2.3 million metric tons of carbon (C) stored ($52.4 million value), 75,000 metric tons/year of carbon (C) sequestered ($1.7 million value), an d1,610 metric tons/year total pollution removal ($14.2 million value).
- The businesses and government units involved in distributing, installing and maintaining plants, landscapes, trees, and related equipment support jobs and add valuable labor income.
- Schoolchildren with Attention Deficit Hyperactive Disorder (ADHD) show fewer symptoms if they have access to natural settings.
- Trees boost foot traffic in commercial areas and have been shown to increase business sales.
- One study showed that workers who can't see natural surroundings from their desks take 23% more sick days than those whose view includes trees, flowers and wildlife.
- Trees support safer, less violent domestic environments for inner-city residents.
- Urban forests support biodiversity by providing a habitat for native species of birds and other animals.
- Equal access to trees and green spaces for ALL residents provides a strong foundation for overcoming the environmental, health and economic challenges that have plagued neglected neighborhoods.
- Trees contribute to keeping our families healthier and our everyday lives more fulfilling.

How Can I Grow A Vibrant Vermont Community

- Get informed.
- Get Active: Plant a tree. Join or donate to an organization that's caring for urban forests.
- Encourage your community to invest in green infrastructure.
- Trees are the key to keep your community vibrant. It's up to you unlock their potential.

PLANT LIVE GROW

PLANNING TO PURCHASE A TREE

Purchasing a tree is an investment. Like buying a car, you'll want to inspect the trees at the nursery to ensure you are purchasing the highest quality. The quality of the planting stock you purchase is one of the most important factors when it comes to survival and long-term health of new trees. High quality trees will establish themselves more quickly than less healthy trees and require less pruning and maintenance in subsequent years.

Checklist for purchasing a tree

- ✓ Purchase stock from a reputable nursery. For a list of nurseries affiliated with GreenWorks - Vermont Nursery and Landscape Association go to greenworksvermont.org/members/
- ✓ Select the appropriate stock for your planting needs.
- ✓ Inspect the roots.
- ✓ Inspect the trunk.
- ✓ Inspect the crown.

Specifications help you get what you want

If you are contracting out the purchasing and planting of trees, develop detailed specifications of what you want. If the quality of the trees is inferior to your specifications, you have the right to request replacements.

What Type of Stock to Purchase?

Trees and shrubs, often called stock, vary in terms of root mass, size, relative cost, ease of planting, handling and season of availability. In order to purchase the appropriate stock for your planting project, you should understand the differences between them. Trees can be purchased BARE ROOT, in CONTAINERS or POTS, or with the root balls wrapped in burlap (B&B).

CONTAINER trees are grown and marketed in a container or pot.

BARE ROOT trees have been dug from a nursery, but the soil has been removed.

BALLED & BURLAPPED trees are dug from a nursery with roots in a ball of earth that is then bound in burlap and set in a metal basket.

Types of Tree Stock - Pros and Cons

PLANT LIVE GROW

Bare Root

Pros

- Cheaper, a third to a half less than B&B.
- Easier to transport, move and plant.
- More root system remains intact than B&B.
- Easy to inspect roots.
- Planting at proper depth is easier.

Cons

- Roots susceptible to drying, requires extreme care.
- Species, size and seasonal availability limited.
- Often requires staking.

Container

Pros

- Lighter than B&B.
- Greater species and seasonal availability.
- Entire root system intact.

Cons

- Roots can be deformed and/or circling.
- Unable to inspect entire root system.
- Contrast between potting mix and soil.

Balled and Burlapped

Pros

- Less chance of roots drying.
- Maintenance of soil root contact.
- Greater species, size and availability.

Cons

- Heavy, making it difficult and expensive to transport, move and plant.
- Contrast between potting mix and soil.
- Reduced root system, often 90-95% lost when dug.
- Difficult to inspect root system.

Examine Roots Carefully

The root system is the foundation of a tree. Look carefully at the root system when selecting trees. Make sure the main order roots, those that form the root flare, are close to the soil surface, so you can easily remove the excess soil when planting. Container trees with circling roots should be avoided, if possible.

What to look for before you purchase

ROOTS: Seek larger root systems; inspect roots - remove container if possible; avoid deformed and circling roots; soil should be firm & moist; locate main order roots.

TRUNK: Trunk should be centered on root ball; trunk and root ball should move together; examine under wraps for mechanical wounds and pests.

BRANCHES: Branches should be balanced around the trunk with 2-4 inches of new growth that is flexible with healthy, living buds. Branches should make up 60% of live crown ratio.

LEAVES: No spots, blights or wilting visible; reject bare root trees that have leafed out.

FORM: Look for single, straight leader; avoid lollipop shaped trees.

References

Hargrave, R., Johnson, G., and Zins, M. 'Planting Trees and Shrubs for Long Term Health'. University of Minnesota Extension.
Bassuk, N. and Hillman, A. 'Creating the Urban Forest: The Bare Root Method'. Cornell University.

The Vermont Department of Forests, Parks and Recreation in partnership with the University of Vermont Extension.
Factsheets paid for by a grant from the USDA NIFA Forestry Program as part of the University of Connecticut's FREMO initiative.

VERMONT URBAN & COMMUNITY FORESTRY PROGRAM

RIGHT TREE, RIGHT PLACE

PLANT LIVE GROW

Site Assessment and Species Selection

Plant the Right Tree in the Right Place!

Every tree has characteristics (mature size, growth habit, light requirements, soil needs), and every planting site has conditions (growing space, obstructions, soils, light patterns, topography). For optimal tree health and growth, take care to match the tree to the site conditions. To begin, answer the following four questions:

1 Why are you planting the tree?

Tree species and varieties vary greatly. In order to achieve desired outcomes, you need to determine the purpose of the planting. What do you want the trees to provide - shade, fruit, seasonal color, a windbreak or perhaps water treatment?

2 What are the site conditions above and below ground?

Evaluate the site to understand the site's limitations and potentials. Ask yourself:

- Does the space support a large, medium or small tree?
- Are there overhead or below-ground wires or utilities in the vicinity?
- Are there clearance needs for sidewalks, patios or driveways?
- What are the environmental conditions such as hardiness and light exposure?
- Evaluate the soil: what's the soil volume, pH, drainage rate?
- Are there potential pollutants to be aware of like road salt?

3 What type of maintenance is necessary?

While species differ in maintenance needs, all plantings require maintenance, especially watering, during the early stages of establishment. Investing in tree care will greatly improve the prospects for growing healthy, long-lived trees.

- Do you have time to water the newly planted tree until it is established or will you need assistance?
- How will the tree's natural form fit with the site or will it need regular pruning?
- Is the tree susceptible to common diseases and pests?

4 What are the best trees for long term success?

Based on the purpose, site conditions and maintenance requirements develop a set of criteria that will be used to select the most suitable trees. Certain criteria should hold more weight than others, such as a tree's hardiness to low temperature. Choosing a plant based on its' mature size and ability to withstand environmental conditions, will prevent infrastructure conflicts and lead to long-term success for the trees.

Rarely will you find the perfect tree that will fit an entire list of selected criteria, yet answering these important questions can avoid many unforeseen pitfalls. Use the following worksheet to help you match a tree to a site.

Site Assessment & Species Selection Worksheet

PLANT LIVE GROW

Complete the following worksheet to help identify appropriate tree species for the site. Then use the Vermont Tree Guide at vtcommunitytrees.org to select the right species for your site.

Site Location/Description

Hardiness Zone *

- ☐ 5a (-15° to -20°)
- ☐ 4b (-20° to -25°)
- ☐ 4a (-25° to -30°)
- ☐ 3a (-30° to -35°)

Mature Size *

- ☐ Height:
- ☐ Spread:

Size of Planting Area *

- ☐ Small: Tree pits, greenbelts < 6 feet
- ☐ Medium: Larger tree pits, greenbetls >6 feet
- ☐ Large: Parks, open space

Form

- ☐ Spreading
- ☐ Columnar
- ☐ Oval
- ☐ Round
- ☐ Pyramidal
- ☐ Vase

Tree Features

- ☐ Flower
- ☐ Fruit
- ☐ Fall Foliage
- ☐ Winter Interest
- ☐ Evergreen
- ☐ Wildlife
- ☐ Native to VT

Site Limitations *

- ☐ Drought
- ☐ Poor Drainage
- ☐ Alkaline Soil
- ☐ Salt
- ☐ Air Pollution
- ☐ Shade
- ☐ Overhead Space, i.e. power lines, buildings

***** *Indicates the most important criteria for species selection.*

Select For Species Diversity

A monoculture or single species plantings, leaves your landscape vulnerable to disease and insect pests, which can devastate a community's urban forest. Think about Dutch elm disease. When planting, always strive for a diverse species population.

Katsura Tree - *Cercidiphyllum japonicum*
Brattleboro, VT

Examples of Salt Tolerant Trees

American Elm, Bur Oak, Crabapple, English Oak, Ginkgo, Green Ash, Hackberry, Honey Locust, Horse Chestnut, Japanese Tree Lilac, Red and White Oak

References

Recommended Urban Trees Site Assessment and Tree Selection for Stress Tolerance. Cornell University.

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VERMONT URBAN & COMMUNITY FORESTRY PROGRAM

PROTECTING THE INVESTMENT

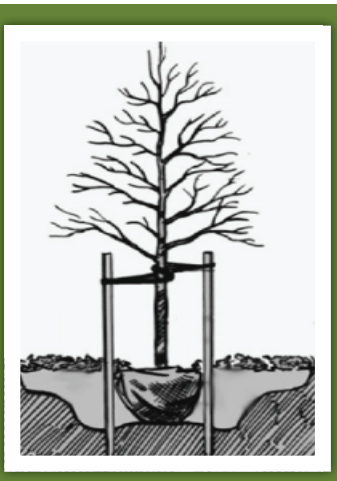
Tree Planting and Establishment

It's exciting and important work to plant trees. Just like bringing a newborn child home from the hospital, planting and caring for your new trees requires nurturing to raise healthy, strong and independent trees. By doing so, life will be a shade better.

10 Steps to Successful Tree Planting

1. **Move the tree.** Young trees are not 2 by 4's; avoid carrying trees by their trunks, unless bare root.
2. **Remove trunk and branch packaging.** Leave root packaging in place.
3. **Find the main root system, and remove excess soil.** Remove soil from the top of the root ball until the top of the main root system is exposed. There should be several roots at least as big around as a pencil extending in opposite directions from the trunk. You may have to remove several inches of soil. **TIP:** Probe the soil ball with a wire, kabob skewer, or screwdriver to find them and estimate how much soil to remove.
4. **Determine how deep and wide to dig.** Measure the height of the remaining root ball. This is exactly how deep you should dig the hole. Measure the approximate width of the root ball or root system. Multiply this by 2, or if your soil is hard (clay or compacted), by 3. This is how wide you should dig the hole.
5. **Dig a hole. Do not put a $100 tree in a $10 hole.** The dimensions of the hole are very important. Dig the hole ONLY as deep as the root system.
6. **Put the tree in the hole.** If the tree has a heavy root ball, slide it into the hole, and straighten the trunk.
7. **Remove root packing.** ***B&B trees:*** Cut, peel back, and remove as much of the wire basket and burlap as possible. **TIP:** Cut the bottom of the wire basket off before placing it in the hole; then you can easily cut up the sides of the basket and peel it away. ***Container trees:*** Remove any circling roots by cutting them off in 5 cuts - four around the ball like a box and one across the bottom.
8. **Backfill with the same soil.** Make sure the trunk is straight. Put the original soil back in the hole, breaking up large clods, and working it in with your hands or a shovel. **TIP:** Do not amend the soil unless you are amending a larger area, this could prevent the roots from leaving the planting hole.
9. **Water.** Water the root ball and entire backfilled area.
10. **Mulch.** Put a 2-4 inch layer of organic mulch over the backfilled area. Pull mulch away from the trunk so none touches the bark. Replenish mulch to maintain this depth; doing so will also improve soil structure. There should never be more than 4 inches of mulch over the roots. Too much can prevent the roots from getting necessary oxygen.

Call to locate underground utilities - before you dig! 1-888-DIG-SAFE



Many tree problems start with poor planting, take the time to protect the investment.

Never mound mulch around the base of a tree like a volcano. This can result in rot and root collar damage.

Apply mulch like a donut around a tree's trunk.

PLANT LIVE GROW

Root Washing: A Technique to Consider

Field applications over the past two decades demonstrate that root washing B&B and container trees leads to improved tree establishment and survival. Using a large bucket or trough, immerse the roots in clean water, allowing the soil to slough off gently. Duration of soaking depends on degree of clay in root ball and soil compaction of root ball, allow for 24 hours. Use a garden hose to gently wash away the remainder of the soil. Use your fingers or three-pronged garden trowel to remove clay and re-orient root system. Prune root defects. Plant on a prepared soil mound arranging roots radially. Backfill with native soil while continually applying water and making a mud slurry – this is called muddying in. Release air bubbles by moving the tree's trunk. Mulch and stake if needed. By using so much water, the tree is typically very stable and generally does not require staking.

Other Helpful Tips

- **Fertilization**- Only apply those nutrients that are deficient in the soil. Applying unnecessary nutrients may be harmful to the tree. Soil tests can be acquired from your local UVM Extension office. Use organic fertilizers, or those with a low salt index.
- **Pruning**- You may remove dead or broken branches are time of planting.
- **Trunk Guards**- If winter rodent damage is of concern, install a trunk guard. However, trunk guards should be removed in the spring to prevent moisture build up around the trunk.

Watering

Water is critical during the first three years after planting. Too little or too much can kill a tree.

- Water where the roots are. The first year they are right around the root bal. Expand the watering area as the tree and roots grow.
- Watering devices such as TREEGATORS ™ or a five gallon bucket with holes release water slowly, soaking the soil while minimizing surface runoff.
- Use less frequent but more thorough watering sessions, rather than frequent shallow watering.
- It is difficult to prescribe a certain amount of water to apply to a tree. Different trees, soils and weather conditions will affect the amount and frequency. As a general guide, ten gallons of water should slowly be applied once or twice a week if rainfall is insufficient.

Staking

Stake only if the root ball is unstable or the trunk is bending. The movement of the tree actually produces hormones that will make the tree stronger. Use wide nylon or canvas straps wrapped around one side of the trunk. Leave enough slack to allow the tree to sway. If the root ball is unstable, use 1-3 stakes attached LOW on the trunk. If the trunk is bending, use one stake attached HIGHER (at least 6 inches below the first set of branches). ***Remove stakes after 1-2 years.***

References

Community Forestry Consultants. *Planting Trees: The Root Washing Method.*
USDA Forest Service, NE Area State & Private Forestry. *Tree Owner's Manual For Northeastern & Midwestern United States.*

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VERMONT URBAN & COMMUNITY FORESTRY PROGRAM

PRUNING YOUNG TREES

PLANT LIVE GROW

Why we prune trees

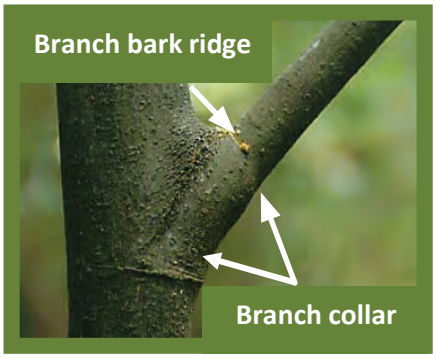
Properly pruned trees are not only more aesthetically pleasing, but stronger. Pruning young trees can significantly reduce the likelihood of limb or structural trunk failure as the tree matures. This means a longer life span for the tree and a better return on your investment. Before you prune, always have an objective in mind. Consider the following reason to prune your tree:

- **Safety:** Remove branches that could fall and cause injury or interfere with utility lines, roads.
- **Health:** Remove disease or insect infected wood, improve structure, reduce likelihood of damage during storms.
- **Fruit Production:** Increase light and air circulation.
- **Appearance:** Control plant size and form, enhance views.

When to Prune?

The ideal time to prune trees is during the winter months when trees are dormant. **Avoid pruning just after leaf emergence and just before leaf fall**. Although branches that are dead, diseased or damaged can be removed anytime. To reduce the stress on newly planted trees, pruning should not begin until 3 years after planting. Spring flowering trees and shrubs, like lilac, redbud and dogwood, should be pruned immediately after flowering to preserve this year's flower crop.

Where to make the cut?



Cut is made from branch bark ridge to branch collar.

Pruning cuts should be made outside the branch collar. The branch collar is made up of trunk tissue and, if left intact, will seal off the pruning wound. The cut should start at the branch bark ridge. These photos illustrate where to make a proper cut.

For large branches, make a three part cut to prevent bark ripping. This photo illustrates the three cut pruning method for branches larger than 1 inch in diameter. The first partial cut is made from below to prevent the bark from tearing. The branch is removed with the second cut. The third cut removes the stub cleanly and without damaging the branch collar or any bark on the trunk.

Keep Your Feet on the Ground…Hire an Arborist

An arborist is a specialist in the care of individual trees. Arborists are knowledgeable about the needs of trees and are trained and equipped to provide proper care. Pruning or removing trees, especially large trees, can be dangerous work - only those trained and equipped to work safely in trees should do tree work. If you can't prune it from the ground, hire an arborist. The International Society of Arboriculture offers arborist certification.

To find a certified arborist near you visit: **www.isa-arbor.com/findArborist/findarborist.aspx**

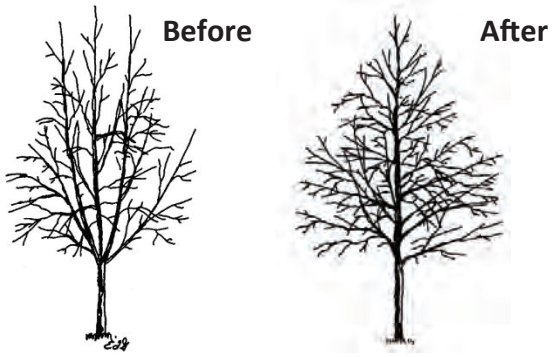
Steps to Tree Pruning

Whether you are pruning to establish good form and branch structure on a young tree or pruning to maintain a healthy mature tree, pruning is a multi-year endeavor. Here are some steps to guide you as your tree grows:

- ✓ Remove broken, diseased, dying and dead branches any time of year, at any stage of the tree's life.

Beginning three years after planting…..

- ✓ Select a central leader (single trunk) and remove or shorten co-dominant leaders or competing leaders.
- ✓ Promote strong branch unions with the main stem structure. Look for "U" shaped unions and the branch bark ridge. Remove or reduce branches with weak or a "V" shaped union.



As the tree grows …

- ✓ Thin the crown. Remove rubbing branches and continue to promote one central leader. Reduce or remove competing leaders.
- ✓ Raise crown to provide clearance for sidewalks, vehicles and buildings. Check local ordinances for minimum branch height mandates (e.g. 8' over sidewalks).
- ✓ Reduce the height and spread of the crown as necessary. Always bring the branch back to a lateral branch at least 1/3 the size of the stem removed.

Helpful Tips

- Understand the trees growth form before you make a cut.
- No more than 25% of the living crown should be removed in one year. Large defective limbs or exceptionally vigorous trees may warrant more aggressive pruning.
- Roughly 1/2 of the foliage should be on branches originating from the lower 2/3 of the main stem. This rule can be useful in guiding your selection of permanent branches.

Choose Bypass Pruners over Anvil Pruners

Bypass pruners have a blade that sweep by the lower jaw. Anvil pruners have a blade that closes against an anvil on the lower jaw. Bypass pruners make a cleaner cut, and reduce the risk of damage to the tree and should be the tool of choice.

Don't Apply Pruning Paint or Wound Dressing: The use of pruning paint, historically thought to protect the tree after the cut, is not recommended today. Proper pruning is the best strategy to help a tree seal the wound properly.

References

Photos and illustrations by Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida.
USDA Forest Service, NE Area State & Private Forestry. *Tree Owner's Manual For Northeastern & Midwestern United States*

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USDA Forest Service

Northeastern Area State and Private Forestry

HOW to Prune Trees

Peter J. Bedker, Joseph G. O'Brien, and Manfred M. Mielke
Illustrations by Julie Martinez, Afton, MN

Introduction

The objective of pruning is to produce strong, healthy, attractive plants. By understanding how, when and why to prune, and by following a few simple principles, this objective can be achieved.

Why Prune

The main reasons for pruning ornamental and shade trees include safety, health, and aesthetics. In addition, pruning can be used to stimulate fruit production and increase the value of timber. Pruning for *safety* (Fig. 1A) involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight on streets or driveways, and removing branches that grow into utility lines. Safety pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them, and have strength and form characteristics that are suited to the site.

Pruning for *health* (Fig. 1B) involves removing diseased or insect-infested wood, thinning the crown to increase airflow and reduce some pest problems, and removing

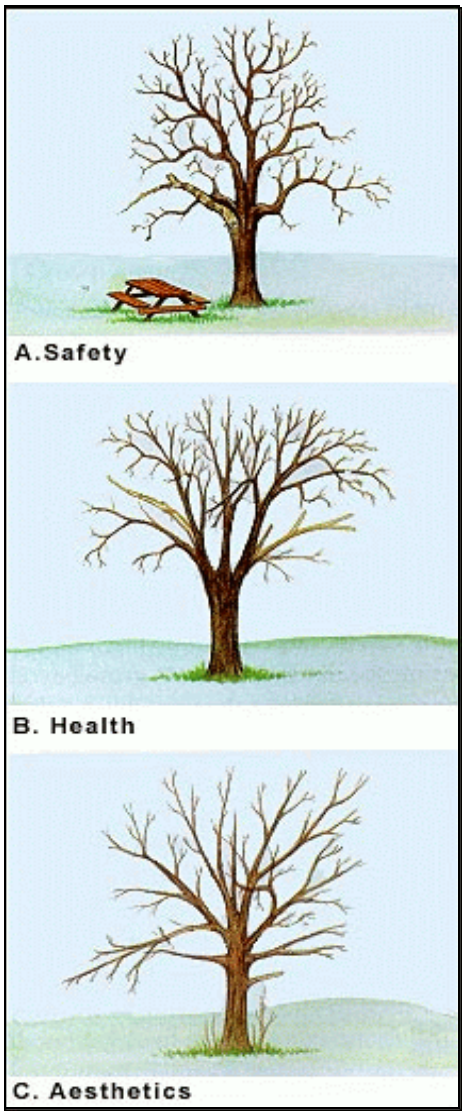


Figure 1. Reasons for pruning.

crossing and rubbing branches. Pruning can best be used to encourage trees to develop a strong structure and reduce the likelihood of damage during severe weather. Removing broken or damaged limbs encourage wound closure.

Pruning for *aesthetics* (Fig. 1C) involves enhancing the natural form and character of trees or stimulating flower production. Pruning for form can be especially important on open-grown trees that do very little self-pruning.

All woody plants shed branches in response to shading and competition. Branches that do not produce enough carbohydrates from photosynthesis to sustain themselves die and are eventually shed; the resulting wounds are sealed by **woundwood** (callus). Branches that are poorly attached may be broken off by wind and accumulation of snow and ice. Branches removed by such natural forces often result in large, ragged wounds that rarely seal. Pruning as a cultural practice can be used to supplement or replace these natural processes and increase the strength and longevity of plants.

Trees have many forms, but the most common types are pyramidal **(excurrent)** or spherical (**decurrent)**. Trees with pyramidal crowns, e.g., most conifers, have a strong central stem and lateral branches that are more or less horizontal and do not compete with the central stem for dominance. Trees with spherical crowns, e.g., most hardwoods, have many lateral branches that may compete for dominance.

To reduce the need for pruning it is best to consider a tree's natural form. It is very difficult to impose an unnatural form on a tree without a commitment to constant maintenance.

Pollarding and **topiary** are extreme examples of pruning to create a desired, unnatural effect. Pollarding is the practice of pruning trees annually to remove all new growth. The following year, a profusion of new branches is produced at the ends of the branches. Topiary involves pruning trees and shrubs into geometric or animal shapes. Both pollarding and topiary are specialized applications that involve pruning to change the natural form of trees. As topiary demonstrates, given enough care and attention plants can be pruned into nearly any form. Yet just as proper pruning can enhance the form or character of plants, improper pruning can destroy it.

Pruning Approaches

Producing strong structure should be the emphasis when pruning young trees. As trees mature, the aim of pruning will shift to maintaining tree structure, form, health and appearance.

Proper pruning cuts are made at a node, the point at which one branch or twig attaches to another. In the spring of the year growth begins at buds, and twigs grow until a new node is formed. The length of a branch between nodes is called an internode.

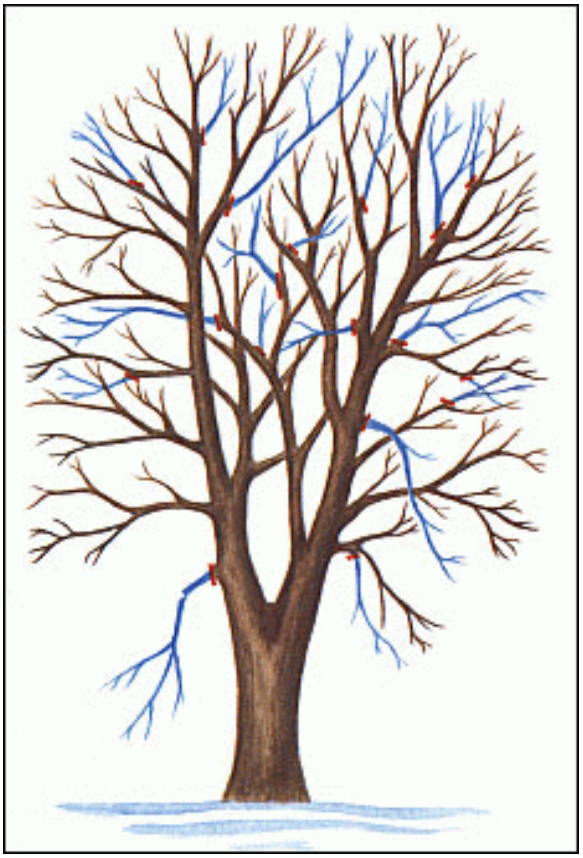


Figure 2. Crown thinning - branches to be removed are shaded in blue; pruning cuts should be made at the red lines. No more than one-fourth of the living branches should be removed at one time.

The most common types of pruning are:

1. *Crown Thinning* (Fig. 2)

Crown thinning, primarily for hardwoods, is the selective removal of branches to increase light penetration and air movement throughout the crown of a tree. The intent is to maintain or develop a tree's structure and form. To avoid unnecessary stress and prevent excessive production of epicormic sprouts, no more than one-quarter of the living crown should be removed at a time. If it is necessary to remove more, it should be done over successive years.

Figure 3. Types of branch unions.

Branches with strong U-shaped angles of attachment should be retained (Fig 3A). Branches with narrow, V-shaped angles of attachment often form **included bark** and should be removed (Fig. 3B). Included bark forms when two branches grow at sharply acute angles to one another, producing a wedge of inward-rolled bark between them. Included bark prevents strong attachment of branches, often causing a crack at the point below where the branches meet. Codominant stems that are approximately the same size and arise from the same position often form included bark. Removing some of the lateral branches from a codominant stem can reduce its growth enough to allow the other stem to become dominant.

Lateral branches should be no more than one-half to three-quarters of the diameter of the stem at the point of attachment. Avoid producing "lion's tails," tufts of branches and foliage at the ends of branches, caused by removing all inner lateral branches and foliage. Lion's tails can result in sunscalding, abundant **epicormic sprouts**, and weak branch structure and breakage. Branches that rub or cross

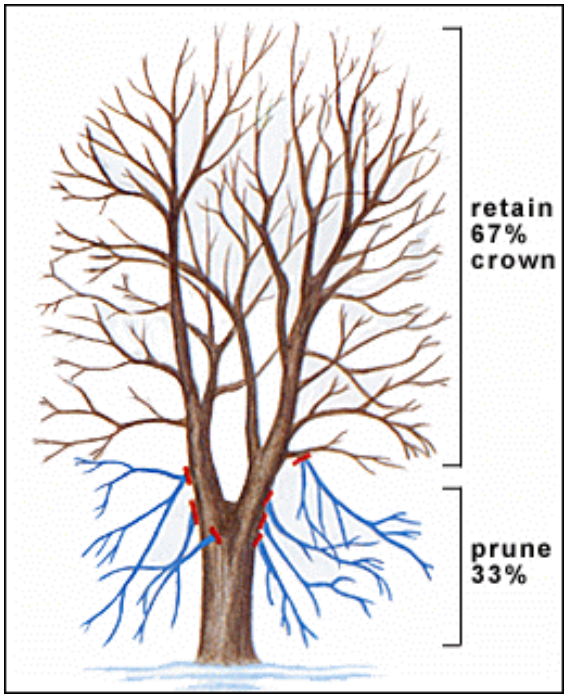


Figure 4. Crown raising - branches to be removed are shaded in blue; pruning cuts should be made where indicated with red lines. The ratio of live crown to total tree height should be at least two-thirds.

another branch should be removed.

Conifers that have branches in whorls and pyramidal crowns rarely need crown thinning except to restore a dominant leader. Occasionally, the leader of a tree may be damaged and multiple branches may become codominant. Select the strongest leader and remove competing branches to prevent the development of codominant stems.

2. *Crown Raising* (Fig. 4)

Crown raising is the practice of removing branches from the bottom of the crown of a tree to provide clearance for pedestrians, vehicles, buildings, lines of site, or to develop a clear stem for timber production. Also, removing lower branches on white pines can prevent blister rust. For street trees the minimum clearance is often specified by municipal ordinance. After pruning, the ratio of the living crown to total tree height should be at least two-thirds (e.g., a 12 m tree should have living branches on at least the upper 8 m).

On young trees "temporary" branches may be retained along the stem to encourage taper and protect trees from vandalism and sun scald. Less vigorous shoots should be selected as temporary branches and should be about 10 to 15 cm apart along the stem. They should be pruned annually to slow their growth and should be removed eventually.

3. *Crown Reduction* (Fig. 5)

Crown reduction pruning is most often used when a tree has grown too large for its permitted space. This method, sometimes called **drop crotch pruning**, is preferred to topping because it results in a more natural appearance, increases the time before pruning is needed again, and minimizes stress (see drop crotch cuts in the next section).

Crown reduction pruning, a method of last resort, often results in large pruning wounds to stems that may lead to decay. This method should never be used on a tree with a pyramidal growth form. A better long term solution is to remove the tree and replace it

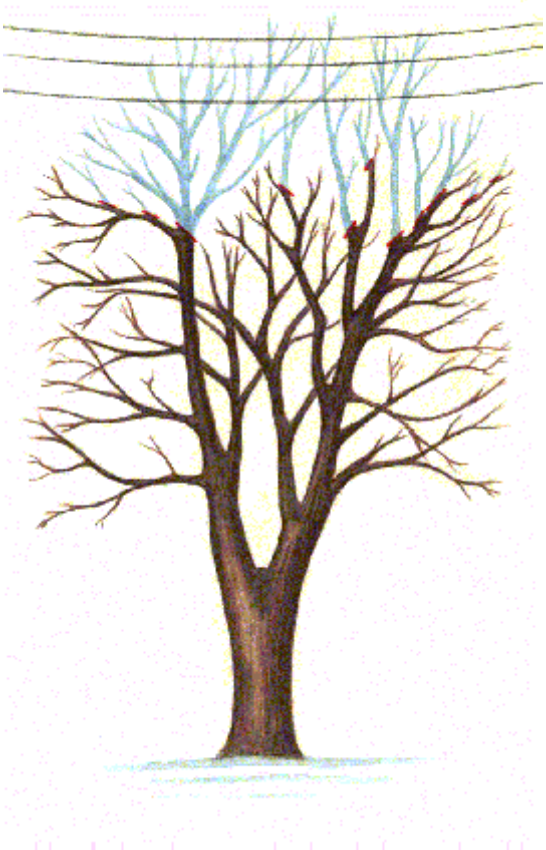


Figure 5. Crown reduction - branches to be removed are shaded in blue; pruning cuts should be made where indicated with red lines. To prevent branch dieback, cuts should be made at lateral branches that are at least one-third the diameter of the stem at their union.

with a tree that will not grow beyond the available space.

Pruning Cuts

Pruning cuts should be made so that only branch tissue is removed and stem tissue is not damaged. At the point where the branch attaches to the stem, branch and stem tissues remain separate, but are contiguous. If only branch tissues are cut when pruning, the stem tissues of the tree will probably not become decayed, and the wound will seal more effectively.

1. *Pruning living branches* (Fig. 6)

To find the proper place to cut a branch, look for the **branch collar** that grows from the stem tissue at the underside of the base of the branch (Fig. 6A). On the upper surface, there is usually a **branch bark ridge** that runs (more or less) parallel to the branch angle, along the stem of the tree. A proper pruning cut does not damage either the branch bark ridge or the branch collar.

A proper cut begins just outside the branch bark ridge and angles down away from the stem of the tree, avoiding injury to the branch collar (Fig. 6B). Make the cut as close as possible to the stem in the **branch axil**, but outside the branch bark ridge, so that stem tissue is not injured and the wound can seal in the shortest time possible. If the cut is too far from the stem, leaving a branch stub, the branch tissue usually dies and woundwood forms from the stem tissue. Wound closure is delayed because the woundwood must seal over the stub that was left.

The quality of pruning cuts can be evaluated by examining pruning wounds after one growing season. A concentric ring of woundwood will form from proper pruning cuts (Fig. 6B). **Flush cuts** made inside the branch bark ridge or branch collar, result in pronounced development of woundwood on the sides of the pruning wounds with very little woundwood forming on the top or bottom (Fig. 7D). As described above, stub cuts result in the death of the remaining branch and woundwood forms around the base from stem tissues.
When pruning small branches with hand pruners, make sure the tools are sharp enough

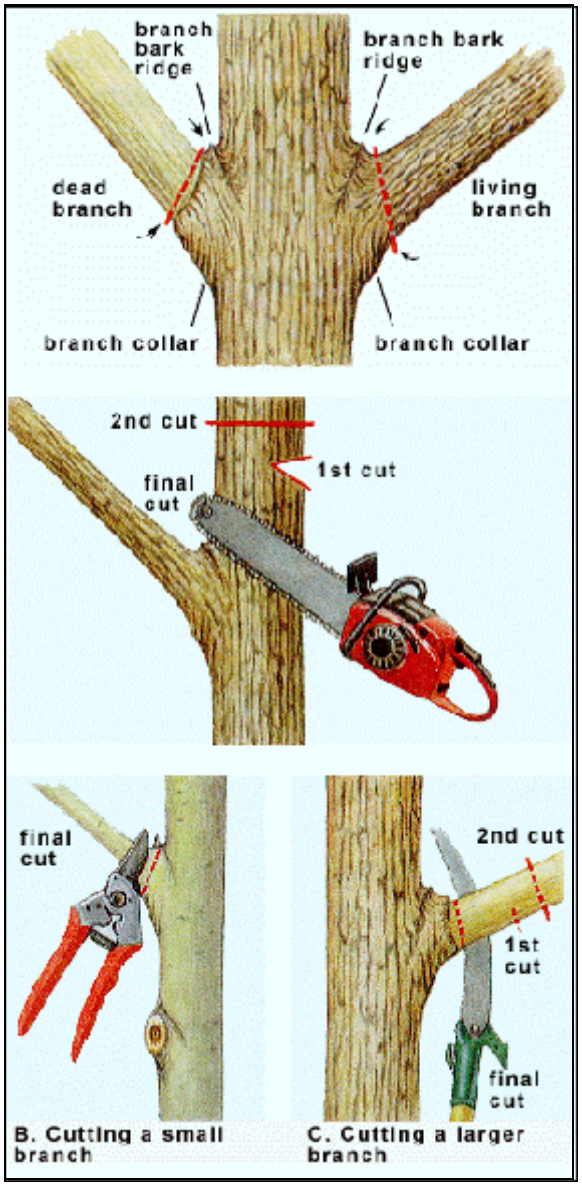


Figure 6. Pruning cuts

to cut the branches cleanly without tearing. Branches large enough to require saws should be supported with one hand while the cuts are made. If the branch is too large to support, make a three-step pruning cut to prevent bark ripping (Fig. 6C).

1. The first cut is a shallow notch made on the underside of the branch, outside the branch collar. This cut will prevent a falling branch from tearing the stem tissue as it pulls away from the tree.
2. The second cut should be outside the first cut, all the way through the branch, leaving a short stub.
3. The stub is then cut just outside the branch bark ridge/branch collar, completing the operation.

2. *Pruning dead branches* (Fig. 6)

Prune dead branches in much the same way as live branches. Making the correct cut is usually easy because the branch collar and the branch bark ridge, can be distinguished from the dead branch, because they continue to grow (Fig. 6A). Make the pruning cut just outside of the ring of woundwood tissue that has formed, being careful not to cause unnecessary injury (Fig. 6C). Large dead branches should be supported with one hand or cut with the three-step method, just as live branches. Cutting large living branches with the three step method is more critical because of the greater likelihood of bark ripping.

3. *Drop Crotch Cuts* (Fig. 6D)

A proper cut begins just above the branch bark ridge and extends through the stem parallel to the branch bark ridge. Usually, the stem being removed is too large to be supported with one hand, so the three cut method should be used.

1. With the first cut, make a notch on the side of the stem away from the branch to be retained, well above the branch crotch.

2. Begin the second cut inside the branch crotch, staying well above the branch bark ridge, and cut through the stem above the notch.
3. Cut the remaining stub just inside the branch bark ridge through the stem parallel to the branch bark ridge.

To prevent the abundant growth of epicormic sprouts on the stem below the cut, or dieback of the stem to a lower lateral branch, make the cut at a lateral branch that is at least one-third of the diameter of the stem at their union.

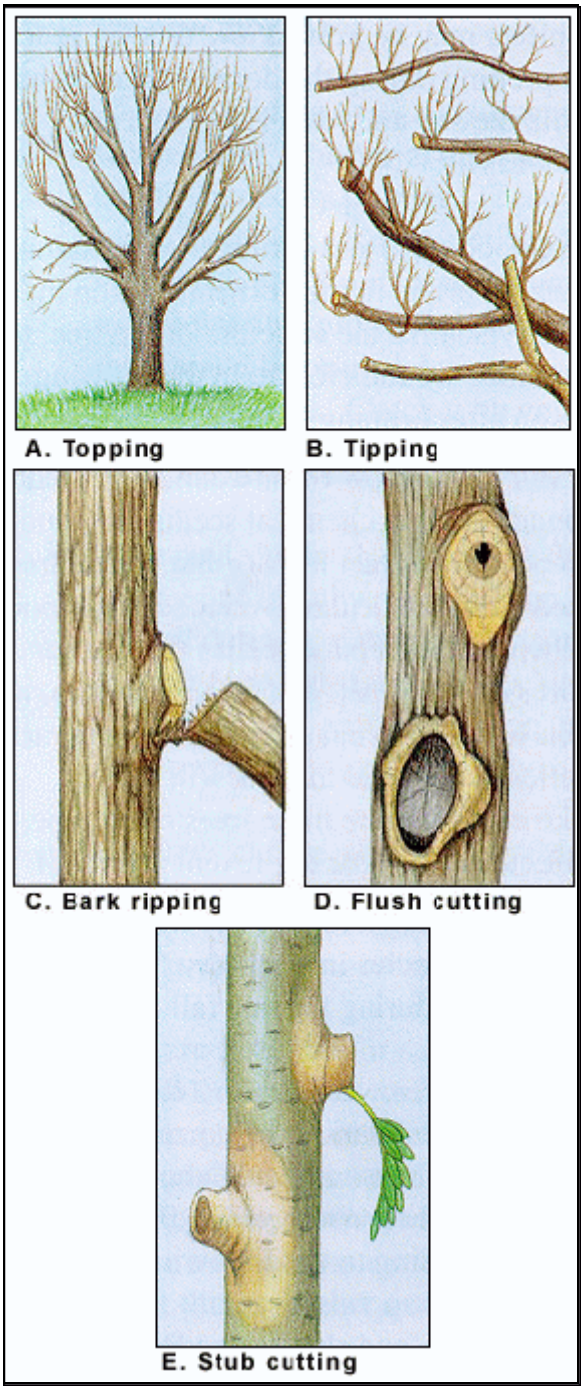
Pruning Practices That Harm Trees

Topping and **tipping** (Fig. 7A, 7B) are pruning practices that harm trees and should not be used. Crown reduction pruning is the preferred method to reduce the size or height of the crown of a tree, but is rarely needed and should be used infrequently.

Topping, the pruning of large upright branches between nodes, is sometimes done to reduce the height of a tree (Fig. 7A). Tipping is a practice of cutting lateral branches between nodes (Fig. 7B) to reduce crown width.

These practices invariably result in the development of epicormic sprouts**,** or in the death of the cut branch back to the next lateral branch below. These epicormic sprouts are weakly attached to the stem and eventually will be supported by a decaying branch.

Improper pruning cuts cause unnecessary injury and bark ripping (Fig. 7C). Flush cuts injure



stem tissues and can result in decay (Fig. 7D). **Stub cuts** delay wound closure and can provide entry to canker fungi that kill the cambium, delaying or preventing woundwood formation (Fig. 7E).

When to Prune

Conifers may be pruned any time of year, but pruning during the dormant season may minimize sap and resin flow from cut branches.

Hardwood trees and shrubs *without showy flowers*: prune in the dormant season to easily visualize the structure of the tree, to maximize wound closure in the growing season after pruning, to reduce the chance of transmitting disease, and to discourage excessive sap flow from wounds. Recent wounds and the chemical scents they emit can actually attract insects that spread tree disease. In particular, wounded elm wood is known to attract bark beetles that harbor spores of the Dutch elm disease fungus, and open wounds on oaks are known to attract beetles that spread the oak wilt fungus. Take care to prune these trees during the correct time of year to prevent spread of these fatal diseases. Contact your local tree disease specialist to find out when to prune these tree species in your area. Usually, the best time is during the late fall and winter.

Flowering trees and shrubs: these should also be pruned during the dormant season for the same reasons stated above; however, to preserve the current year's flower crop, prune according to the following schedule:

- Trees and shrubs that flower in early spring (redbud, dogwood, etc.) should be pruned immediately after flowering (flower buds arise the year before they flush, and will form on the new growth).
- Many flowering trees are susceptible to fireblight, a bacterial disease that can be spread by pruning. These trees, including many varieties of crabapple, hawthorn, pear, mountain ash, flowering quince and pyracantha, should be pruned during the dormant season. Check with your county extension agent or a horticulturist for additional information.
- Trees and shrubs that flower in the summer or fall always should be pruned during the dormant season (flower buds will form on new twigs during the next growing season, and the flowers will flush normally).

Dead branches: can be removed any time of the year.

Pruning Tools

Proper tools are essential for satisfactory pruning (Fig.6). The choice of which tool to use depends largely on the size of branches to be pruned and the amount of pruning to be done. If possible, test a tool before you buy it to ensure it suits your specific needs. As with most things, higher quality often equates to higher cost.

Generally speaking, the smaller a branch is when pruned, the sooner the wound created will seal. Hand pruners are used to prune small branches (under 2.5 cm diameter) and many different kinds are available. Hand pruners can be grouped into by-pass or anvil styles based on the blade configuration. Anvil style pruners have a straight blade that cuts the branch against a small anvil or block as the handles are squeezed. By-pass pruners use a curved cutting blade that slides past a broader lower blade, much like a scissors. To prevent unnecessary tearing or crushing of tissues, it is best to use a

by-pass style pruner. Left- or right-handed types can be purchased.

Slightly larger branches that cannot be cut with a hand pruner may be cut with small pruning saws (up to 10 cm) or lopping shears (up to 7 cm diameter) with larger cutting surfaces and greater leverage. Lopping shears are also available in by-pass and anvil styles.

For branches too large to be cut with a hand pruner or lopping shears, pruning saws must be used. Pruning saws differ greatly in handle styles, the length and shape of the blade, and the layout and type of teeth. Most have tempered metal blades that retain their sharpness for many pruning cuts. Unlike most other saws, pruning saws are often designed to cut on the "pull-stroke."

Chain saws are preferred when pruning branches larger than about 10 cm. Chainsaws should be used only by qualified individuals. To avoid the need to cut branches greater than 10 cm diameter, prune when branches are small.

Pole pruners must be used to cut branches beyond reach. Generally, pruning heads can cut branches up to 4.4 cm diameter and are available in the by-pass and anvil styles. Once again, the by-pass type is preferred. For cutting larger branches, saw blades can be fastened directly to the pruning head, or a separate saw head can be purchased. Because of the danger of electrocution, pole pruners should not be used near utility lines except by qualified utility line clearance personnel.

To ensure that satisfactory cuts are made and to reduce fatigue, keep your pruning tools sharp and in good working condition. Hand pruners, lopping shears, and pole pruners should be periodically sharpened with a sharpening stone. Replacement blades are available for many styles. Pruning saws should be professionally sharpened or periodically replaced. To reduce cost, many styles have replaceable blades.

Tools should be clean and sanitized as well as sharp. Although sanitizing tools may be inconvenient and seldom practiced, doing so may prevent the spread of disease from infected to healthy trees on contaminated tools. Tools become contaminated when they come into contact with fungi, bacteria, viruses and other microorganisms that cause disease in trees. Most pathogens need some way of entering the tree to cause disease, and fresh wounds are perfect places for infections to begin. Microorganisms on tool surfaces are easily introduced into susceptible trees when subsequent cuts are made. The need for sanitizing tools can be greatly reduced by pruning during the dormant season.

If sanitizing is necessary it should be practiced as follows: Before each branch is cut, sanitize pruning tools with either 70% denatured alcohol, or with liquid household bleach diluted 1 to 9 with water (1 part bleach, 9 parts water). Tools should be immersed in the solution, preferably for 1-2 minutes, and wood particles should be wiped from all cutting surfaces. Bleach is corrosive to metal surfaces, so tools should be thoroughly cleaned with soap and water after each use.

Treating wounds

Tree sap, gums, and resins are the natural means by which trees combat invasion by pathogens. Although unsightly, sap flow from pruning wounds is not generally harmful; however, excessive "bleeding" can weaken trees.

When oaks or elms are wounded during a critical time of year (usually spring for oaks, or throughout the growing season for elms) -- either from storms, other unforeseen mechanical wounds, or from necessary branch removals -- some type of wound dressing should be applied to the wound. Do this immediately after the wound is created. In most other instances, wound dressings are unnecessary, and may even be detrimental. Wound dressings will not stop decay or cure infectious diseases. They may actually interfere with the protective benefits of tree gums and resins, and prevent wound surfaces from closing as quickly as they might under natural conditions. The only benefit of wound dressings is to prevent introduction of pathogens in the specific cases of Dutch elm disease and oak wilt.

Pruning Guidelines

To encourage the development of a strong, healthy tree, consider the following guidelines when pruning.

General

- Prune first for safety, next for health, and finally for aesthetics.
- Never prune trees that are touching or near utility lines; instead consult your local utility company.
- Avoid pruning trees when you might increase susceptibility to important pests (e.g. in areas where oak wilt exists, avoid pruning oaks in the spring and early summer; prune trees susceptible to fireblight only during the dormant season).
- Use the following decision guide for size of branches to be removed: 1) under 5 cm diameter - go ahead, 2) between 5 and 10 cm diameter - think twice, and 3) greater than 10 cm diameter - have a good reason.

Crown Thinning

- Assess how a tree will be pruned from the top down.
- Favor branches with strong, U-shaped angles of attachment. Remove branches with weak, V-shaped angles of attachment and/or included bark.
- Ideally, lateral branches should be evenly spaced on the main stem of young trees.
- Remove any branches that rub or cross another branch.
- Make sure that lateral branches are no more than one-half to three-quarters of the diameter of the stem to discourage the development of co-dominant stems.

- Do not remove more than one-quarter of the living crown of a tree at one time. If it is necessary to remove more, do it over successive years.

Crown Raising

- Always maintain live branches on at least two-thirds of a tree's total height. Removing too many lower branches will hinder the development of a strong stem.
- Remove basal sprouts and vigorous epicormic sprouts.

Crown Reduction

- Use crown reduction pruning only when absolutely necessary. Make the pruning cut at a lateral branch that is at least one-third the diameter of the stem to be removed.
- If it is necessary to remove more than half of the foliage from a branch, remove the entire branch.

Glossary

Branch Axil: the angle formed where a branch joins another branch or stem of a woody plant.

Branch Bark Ridge: a ridge of bark that forms in a branch crotch and partially around the stem resulting from the growth of the stem and branch tissues against one another.

Branch Collar: a "shoulder" or bulge formed at the base of a branch by the annual production of overlapping layers of branch and stem tissues.

Crown Raising: a method of pruning to provide clearance for pedestrians, vehicles, buildings, lines of sight, and vistas by removing lower branches.

Crown Reduction Pruning: a method of pruning used to reduce the height of a tree. Branches are cut back to laterals that are at least one-third the diameter of the limb being removed.

Crown Thinning: a method of pruning to increase light penetration and air movement through the crown of a tree by selective removal of branches.

Callus: see woundwood.

Decurrent: a major tree form resulting from weak apical control. Trees with this form have several to many lateral branches that compete with the central stem for dominance resulting in a spherical or globose crown. Most hardwood trees have decurrent forms.

Epicormic Sprout: a shoot that arises from latent or adventitious buds; also know as water sprouts that occur for on stems and branches and suckers that are produced from the base of trees. In older wood, epicormic shoots often result from severe defoliation or radical pruning.

Excurrent: a major tree form resulting from strong apical control. Trees with this form have a strong central stem and pyramidal shape. Lateral branches rarely compete for dominance. Most conifers and a few hardwoods, such as sweetgum and tuliptree, have excurrent forms.

Flush Cuts: pruning cuts that originate inside the branch bark ridge or the branch collar, causing unnecessary injury to stem tissues.

Included Bark: bark enclosed between

branches with narrow angles of attachment, forming a wedge between the branches.

Pollarding: the annual removal of all of the previous year's growth, resulting in a flush of slender shoots and branches each spring.
Stub Cuts: pruning cuts made too far outside the branch bark ridge or branch collar, that leave branch tissue attached to the stem.

Tipping: a poor maintenance practice used to control the size of tree crowns; involves the cutting of branches at right angles leaving long stubs.

Topping: a poor maintenance practice often used to control the size of trees; involves the indiscriminate cutting of branches and stems at right angles leaving long stubs. Synonyms include rounding-over, heading-back, dehorning, capping and hat-racking. Topping is often improperly referred to as pollarding.

Topiary: the pruning and training of a plant into a desired geometric or animal shape.

Woundwood: lignified, differentiated tissues produced on woody plants as a response to wounding (also known as callus tissue).

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"How to Prune Trees" was written to help people properly prune the trees they care about. If you doubt your ability to safely prune large trees, please hire a professional arborist. Information in this publication can be used to interview and hire a competent arborist.

Treescaping*

Treescaping is the management of roadside trees to build a canopy of large healthy trees over the rural road. Treescaping can be visualized as the thinning of the carrots in the garden, only on a larger scale. Some carrots are pulled so the remaining plants can grow bigger. Similarly the road crew often needs to remove some trees so the remaining ones can develop large, healthy crowns. Treescaping is best carried out after hazard trees have been pruned or removed.

Treescaping is accomplished in stages by selecting the best trees to retain and cutting the competing trees. A good rule to follow when treescaping is to select “leave” trees (the trees not to be cut).

Cut only the two trees that compete most with the selected “leave” tree. It may take two or three years of treescaping to get the roadside into shape. The “leave trees are gradually “released” and will develop larger, healthier crowns. At the same time, overstory shade is maintained which suppresses the growth of stump sprouts and other cut vegetation.

Road crews often look at trees as problems or liabilities. However, roadside trees have a myriad of benefits such as living snow fences, stream bank and roadside soil stabilization, visual screens and dust and sound barriers. All possible benefits should be considered when selecting leave trees.

Treescaping will eventually build a canopy of large healthy trees over rural roads, making them safer and more attractive. Over time, treescaping will save money because the trees that are least likely to become hazard trees are retained.

Tree Selection

Treescaping retains and releases the best trees to improve the appearance and safety of the roadside. Characteristics of “best” trees vary depending on the types of trees growing along the road. Generally, tree selection based on the longevity, spacing, and salt tolerance.

Longevity. Short-lived species such as pin cherry and gray birch are poor choices to retain as roadside trees. It makes little sense to retain a tree that will die of natural cause in a few years. Shrubby species like willows and mountain as are also poor choices.

Spacing. Spacing of residual trees when treescaping will vary by species and size. Select a “leave” tree about every 20 feet if trees are less than 6 inches in diameter. For long-lived species like sugar maples, mature trees will probably be 40 to 50 feet apart.

Salt tolerance. Road salt is a fact of life on paved rural roads. Therefore, it is essential to retain trees that are tolerant of roadside salt on these roads. The following table indicates the relative tolerance of trees to roadside salt.

Tolerant-, Paper Birch, Apple, White Oak, Poplars, Butternut, Black Locust

Moderately Tolerant- Spruce, Elm, Hickory, Yellow Birch, Balsam Fir

Intolerant- Sugar Maple, White Pine, Red Oak, Larch, Black Cherry, Red Pine, Red Maple, Hemlock, Cedar, Hornbeam, Scotch Pine, Beech

Tree Protection

To protect existing trees, particularly large or mature specimens, a road crew has only to be considerate of the trees and their roots when plowing and digging ditches. The wing plow and an inconsiderate backhoe or grader operator are probably responsible for the demise of as many trees as most storms. A tree's root system extends beyond the crown of the tree, so care should be exercised when performing road maintenance.

Site Assessment

Managing trees and other roadside vegetation is part of a town's ongoing road maintenance responsibilities. Just as towns must assess the condition of road surfaces to make decisions about paving, road commissioners and tree wardens need to "size up" the condition of roadside trees and vegetation.

The following is a suggested checklist for assessing roadside vegetation management needs on a road or segment.

- Note the name of the road or road segment, posted speed and other restrictions such as school bus stops or intersections.
- Note power line and telephone line locations.
- Identify and mark for removal hazard trees within the right-of-way.
- Note hazard trees that are out the right-of-way but may fall onto the roadway. Consult with landowners before removing outside the right-of-way.
- Identify overhanding limbs that may fall in the roadway.
- Check roadside ditches for fallen branches and limbs that will impede the flow of water or may clog culverts.
- Identify and mark trees and brush that impede the vision of motorists entering the road from driveways or side roads.
- Identify trees which, if selectively removed, would open up scenic vistas.
- Make an initial judgment as to whether work can be performed by the town road crew or should be contracted out.

**From the Vermont Highway Vegetation Management Manual, written by Harry Chandler, Vermont Woodlands Association*

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TREES & UTILITIES:

Cooperative Management Strategies for Success

Nicholas Polanin, Somerset County Agricultural Agent & Mark Vodak, Ph.D., Extension Specialist in Forestry

Trees and utilities are two equally important resources for urban and suburban development. However, they can occupy or intrude upon available space overhead and underground, creating a highly competitive streetscape environment. Successful urban forest managers should initiate solutions to tree/wire conflicts that avoid being forced to decide which resource takes precedence — reliable and safe electrical service or an undisturbed community forest. For this reason and more, it is prudent for every community to take a close look at all the current policies and practices affecting their tree resource. Reactive management techniques such as pruning or removal can have dramatic negative effects on the aesthetic quality of the urban landscape. On the other hand, proactive management, including diverse tree selection, planting locations, and line engineering, can increase the longevity and beauty of the urban forest while helping to decrease overall management costs. Urban foresters and utilities need to work closely together to create, maintain, and sustain more compatible environments. Management issues and possible remedies are presented here.

All trees require the proper setback.

Poor choices in species selection and location make for unnecessary maintenance challenges.

Electrical Service vs Trees: Perils of Ignoring the Interface:

Today's consumer demands highly reliable and uninterrupted electrical service. Repeated studies have also shown the needs and benefits for "greening" of communities using traditional and ornamental tree plantings. When the electrical delivery wires pass near or through the canopy of these trees, unmanaged branch growth can create potentially hazardous conditions. These hazards may result in a loss of electrical service from the natural growth characteristics of the tree, from storm or wind damage, and may also result in substantial damage to the tree and electrical distribution equipment. To reduce the risk of severe electrical injury, avoid climbing into trees

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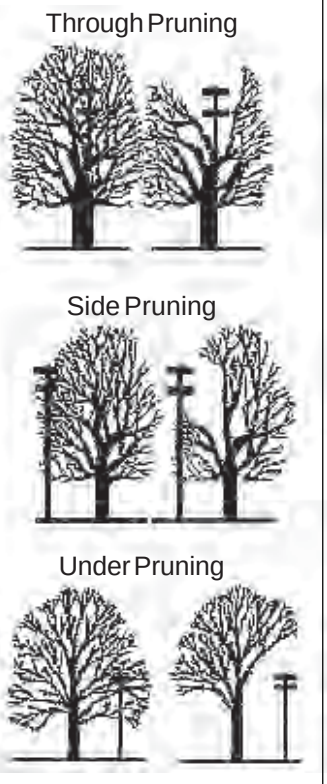
Directional pruning can train the canopy to grow away from or over conductors.

that have wires passing through them. If a fallen tree or limb has brought down a wire, stay clear of the area, as high voltage electricity can be conducted to the ground.

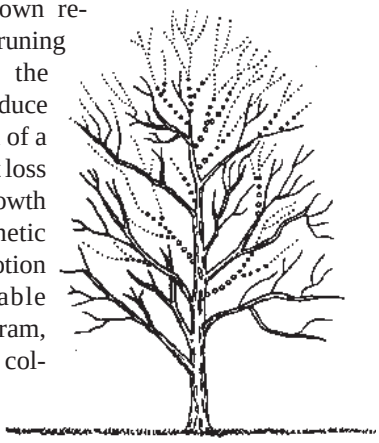
Pruning Techniques and Management:

Pruning techniques, timing, and frequency are all part of managing both tree health and electrical service reliability. Improper tree pruning practices such as topping or rounding over, which are the indiscriminate removal of branches at or to a pre-determined height, may give short term clearance from electrical conductors. Unfortunately, trees often respond to these practices by sprouting weakly attached and superfluous growth that is open to infection, prone to storm damage, and may deplete the tree of its nutritional reserves. Improper pruning practices also increase the frequency of additional line clearance pruning, and may result in a more hazardous condition than originally encountered.



It has been shown that directional pruning (see diagram right), which is the selective removal of conflicting or extending branches that will physically realign the tree's branching pattern as it continues to grow, is a more desirable form of pruning, and allows for "healthier" tree re-growth. Properly implemented, directional pruning addresses the entire canopy, providing for reliable electrical delivery and safety with the removal of interfering (or potentially interfering) growth. The removal of lower limbs, or shelves, typically under the utility line path, will greatly assist the tree's crown in redevelopment over the wires. Over time, this would create a more aesthetically pleasing and naturally shaped tree with fewer holes within the contour of the canopy.

Current national pruning standards strictly define topping as an unethical practice for the proper care of trees. The more appropriate crown reduction and lateral pruning techniques (seen to the right) can properly reduce the height and spread of a tree's canopy without loss of the tree's natural growth characteristics, aesthetic quality, or the promotion of highly undesirable growth. In the diagram, the dotted and lighted colored branches are removed to reduce the height of the tree while retaining its natural form. Using these two pruning methods properly, interfering trees and tree limbs can be reduced in height and spread, giving necessary line clearance with less impact to the tree's natural appearance.



Crown reduction pruning, done correctly as depicted here, can be aesthetically pleasing.

Electrical Line Clearance & Safe Working Distances:

Federal safety standards regulate safe working distances from electrified lines. Sufficient clearance between vegetation and these wires must be maintained to give the trees adequate room for their natural movement in air currents without contacting these lines. Only qualified line-clearance personnel and their equipment may intrude on the mandated safe working distance of ten feet from electrified conductors. Once that clearance between conductors and tree limbs is achieved, it allows for the safe completion of necessary tree-care operations performed by non-utility or non-line clearance certified personnel. Pruning frequency

and extent in and around utility right-of-ways is a direct function of: (1) tree species, (2) tree health; (3) physical configuration or growth habit of the tree; (4) location of the tree in relation to the conductor; (5) type of electrical construction; (6) line voltage; and (7) geographic area.

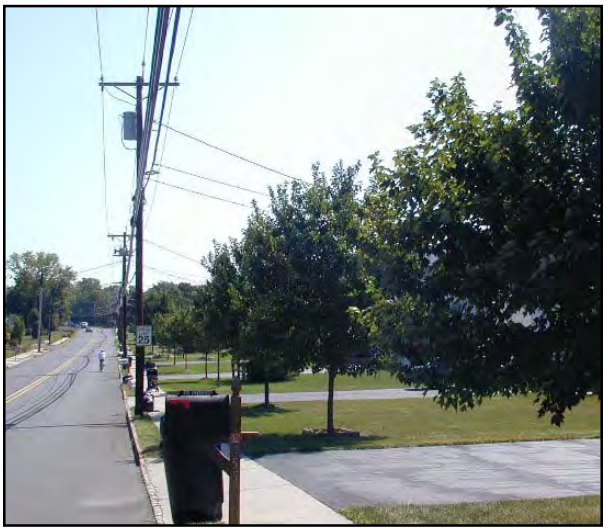
Properly located & maintained, trees and wires can co-exist.

Prevention - Planning for Success:

Even the most informed and conscientious pruning for electrical line clearance can result in a displeasing or otherwise unacceptable tree, which may result in the removal of the tree. Urban forestry professionals and agencies need to work more closely with the local utility provider in the selection of appropriate replacement species and site location. Municipal Tree Replacement Programs utilize smaller tree species and cultivars to replace the larger, deteriorating trees that were removed. Furthermore, utility engineers need to consider the local or existing tree resource, allowing for trees and potential planting sites when designing and building electrical delivery systems throughout their service area. This would not only minimize future branch/wire conflicts, but would create an extremely beneficial working relationship between the community and the local utility.

A formula for failure: Misplaced trees = loss of aesthetics + increased maintenance concerns.

Community trees and overhead wires need to be properly located in order to minimize the competitive nature of the traditional tree lined street. Urban foresters and planners need to address proper planting locations, being aware of and planning for growth rates and habits, expected maturity size for an urban/suburban setting, and canopy dimensions for proper off-set or side-set from overhead utilities. For example, a wide canopied tree may need to be located inside the sidewalk, unless its mature size and shape will restrict branches away from the wire path.



The right tree in the right place can make a world of difference for years to come.

Multi-stemmed trees such as a zelkova or honey locust can be planted directly underneath utility wires, while oaks and other single stemmed trees should be sited on the opposite side of the street. These trees will still have to be trimmed when they grow into the wire zone. Once pruned, however, their natural growth characteristics can present a more aesthetically pleasing appearance than that of a single leader tree growing directly underneath utility wires. In general, avoiding the monoculture mistakes of the past and utilizing the full extent of the technical and managerial expertise, species choice, location options, and partnerships available to create and maintain a healthy and sustainable urban forest.

Best compromise possible? Good utility pruning for the wrong tree in the wrong place.

Conclusion:

These management solutions for overhead competition are best applied in older, established communities where underground utility locations are greatly restricted, since new communities and subdivisions are increasing the use of underground service delivery systems, greatly reducing overhead conflicts. Underground service delivery systems, however, also present utility service/tree location issues that are equally important for managers to address. Utilizing any of the practices discussed above in cooperation and consultation with your local utility will provide for a safer, healthier, and long lived urban tree resource, minimizing potential maintenance problems and electrical outages. There are many resources that can assist in the selection and care of trees in and around utility right-of-ways. Most importantly, communication, coordination and cooperation between utilities and urban forest managers results in better understanding and a more productive working relationship that improves the quality and reliability of these important resources.

Directional Pruning Line Drawing: Long Island Power Authority

Crown Reduction Line Drawing: International Society of Arboriculture

All other photos by Nick Polanin

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RUTGERS COOPERATIVE RESEARCH & EXTENSION
N.J. AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

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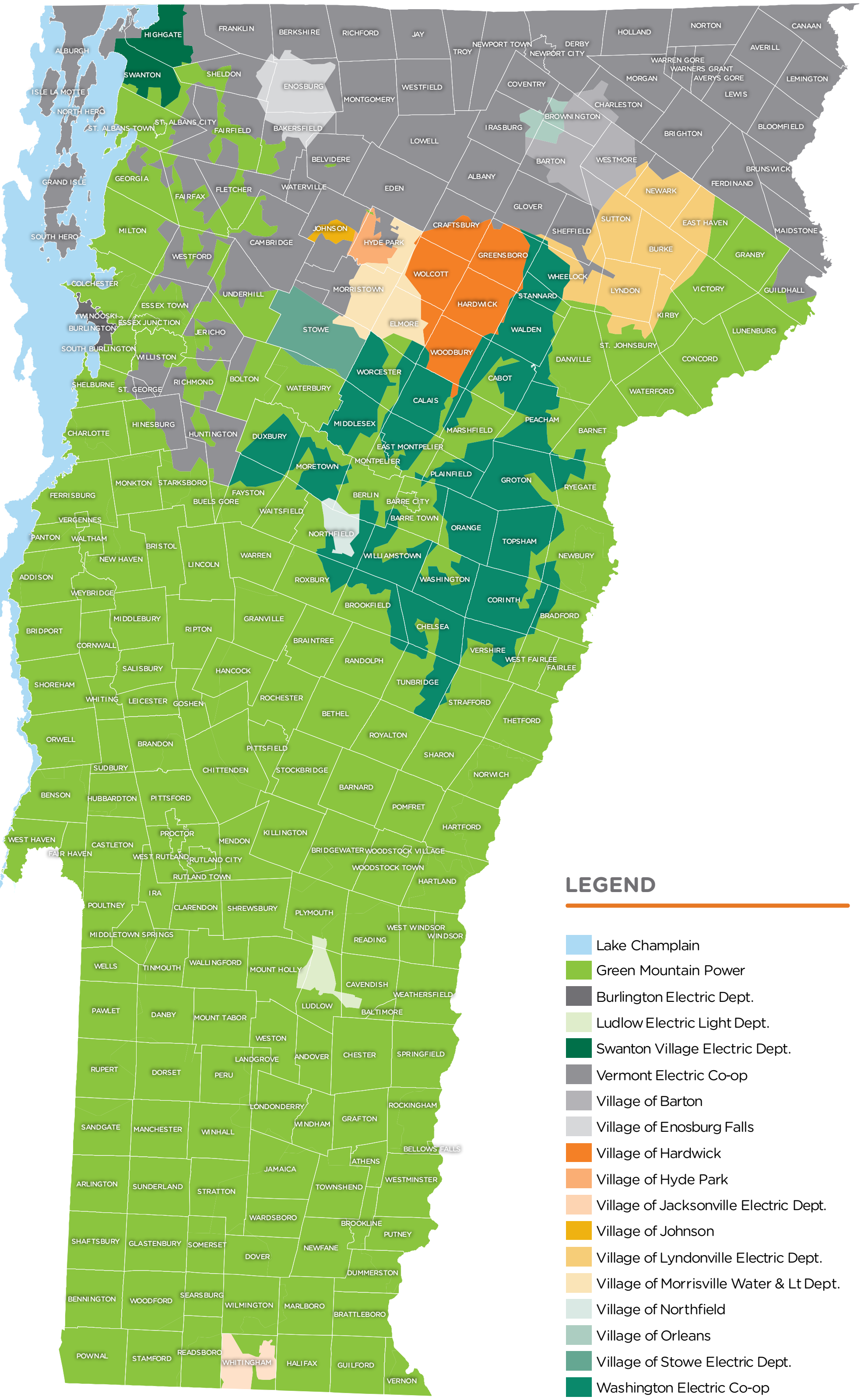


LEGEND

- Lake Champlain
- Green Mountain Power
- Burlington Electric Dept.
- Ludlow Electric Light Dept.
- Swanton Village Electric Dept.
- Vermont Electric Co-op
- Village of Barton
- Village of Enosburg Falls
- Village of Hardwick
- Village of Hyde Park
- Village of Jacksonville Electric Dept.
- Village of Johnson
- Village of Lyndonville Electric Dept.
- Village of Morrisville Water & Lt Dept.
- Village of Northfield
- Village of Orleans
- Village of Stowe Electric Dept.
- Washington Electric Co-op

What is Dig Safe?

A safe digging project must always start with a call to Dig Safe.

We are a not-for-profit clearinghouse that dispatches participating utility companies to mark where their underground lines are buried. This is free service, paid for by participating member utilities.

Why should I call Dig Safe?

Damaging an underground facility is dangerous – for you, and for the people around you. A broken pipe or cable also causes outages, expensive repairs and legal problems. This is why state law requires a call to 811, even for property owners digging on private land.

When should I call Dig Safe?

Even small, shallow jobs are a risk if you don't know where utilities are buried. Call Dig Safe any time you dig, for any type of project.

- *Landscaping*
- *Retaining Wall*
- *Dog Fence*
- *Basketball Hoop*
- *Root Removal*
- *Fencing*
- *Clothesline*
- *Swing Set*
- *Planting*
- *Patio*
- *Walkway*
- *Irrigation*
- *Mailbox*
- *Driveway*

How far in advance do I call?

Law requires at least 72 business hours notice in Massachusetts, Maine, New Hampshire and Rhode Island; 48 business hours in Vermont – excluding weekends and holidays.

You must also "pre-mark" the area where you plan to dig before calling, using white stakes, paint or flags. This helps the locating technician reduce excess markings where you don't need them.

Who marks the lines?

Utility companies (NOT Dig Safe) mark their own lines. Dig Safe is the communication network that notifies these companies to respond for a mark-out. Some utility members use contract locating companies to mark their lines. Member companies are not responsible to mark privately owned facilities.

What information do I need?

This is what we'll ask for when you call.

- *Where is the physical address where the work will take place?*
- *Is this property bounded by any other streets?*
- *What are the two cross streets that the property is in between?*
- *What type of work are you doing?*
- *Where on your property will the work take place?*
- *Is the area pre-marked? (Before calling, mark out the area where you plan to work using white stakes, paint or flags.)*
- *Is there any other information that will help the utility companies find where you are working?*
- *If not yourself, who is doing the digging?*

811 DigSafe
MA ME NH RI VT

Call 811
digsafe.com

What happens after I call?

The participating utility companies will respond within 72 business hours (48 business hours in Vermont) to mark the location of their underground facilities. You do not need to be home, unless you have specific questions, need to restrain pets, or give the locating technicians access to your property.

Underground utilities are marked out with paint, stakes or flags, using a national color coding system.

The Color Coding System

Color coded paint or flags are used to identify the type of underground facilities.

RED	*Electric Power Lines, Cables, Conduit and Lighting Cables*
YELLOW	*Gas, Oil, Steam, Petroleum or Gaseous Materials*
ORANGE	*Communication, Alarm or Signal Lines, Cables or Conduit*
BLUE	*Potable Water*
GREEN	*Sewers and Drain Lines*
PURPLE	*Non-Potable Water: Reclaimed Water, Irrigatiion and Slurry Lines*
PINK	*Temporary Survey Markings*

How can I get more information?

We're happy to talk to you about our free safety service. Give us a call at 811 Monday through Friday, between 6:00 am and 6:00 pm. Or click to digsafe.com for everything you need to know.

811 DigSafe MA·ME·NH·RI·VT

Call 811 or 1-888-DIG-SAFE (888-344-7233)
or visit www.digsafe.com

DATE OF LAST REVISION 9/12

811 DigSafe MA·ME·NH·RI·VT

Don't dig yourself into trouble. Call Dig Safe® before you dig.

It's Smart. It's Free. It's the Law.

from the

TREE CITY USA® BULLETIN

When a Storm Strikes

Never is danger greater to a tree than during the inevitable trial by storm. The weight of ice or snow and the fury of wind test the strength of limbs, trunk, and roots. The homeowner, helpless at the moment, can only watch and hope that the tree survives. Survival or loss – the key can be the care you give your tree before and after a storm. Knowing ahead of time what to do when a storm strikes can prevent or minimize your financial loss.

The Morning After...

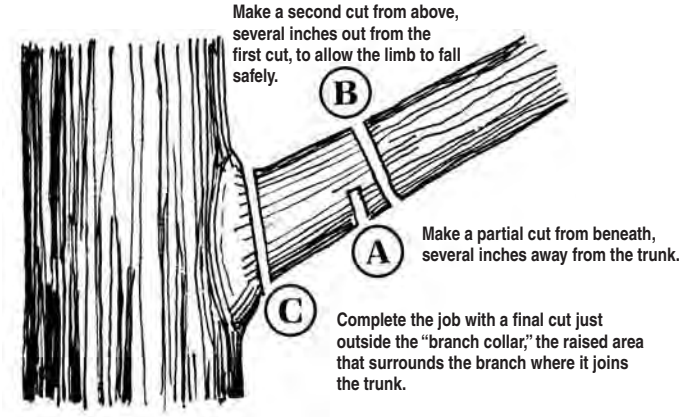
Although your trees may look mortally damaged after a storm, trees have an amazing ability to recover from damage. With proper pruning and care, all but the most severely damaged have a good chance to regain their original health and beauty. Here are some things to do following a major storm in your community:

1. Assess the Damage

Don't be too quick to declare a tree beyond hope. If damage is relatively slight, or if most of the tree's basic structure is still intact despite the loss of many smaller limbs, the tree stands a good chance of making it. On the other hand, if the trunk is split or if most of the tree's leafy crown is down, the tree may be beyond help.

2. Get Professional Help

If large limbs are hanging, if utility wires or structures are involved, or if high climbing is required, don't try to make repairs yourself. Secure the services of a certified arborist, a tree professional who can recommend needed repairs. They are generally listed in classified telephone directories under "Tree Service." Above all, don't hire just anybody who shows up on your doorstep with a chainsaw offering to remove or repair your trees. They are often interested in little more than removing your money.



Tree First Aid After a Storm

1. **Take safety precautions**. Be on the alert for downed power lines and "widow makers," dangerous hanging branches ready to fall. And, unless you really know how to use one, leave chainsaw work to the professionals.
2. **Remove broken branches** that are still attached to the tree. Branches should be pruned at the point where they join larger ones, following the steps shown at left.
3. **Don't top your trees!** Never cut the main branches back to stubs. Ugly, weakly attached limbs will often grow back higher than the original branches and be more likely to break off in a future storm.

An Ounce of Prevention

Follow these keys to preventing tree damage in future storms:

- ✔ Where early ice storms are a problem, avoid planting species that hold their leaves late into the fall.
- ✔ Keep trees healthy and vigorous by watering, fertilizing, and protecting the soil from compaction.
- ✔ Annually prune dead or weakened limbs, and occasionally thin excess branches from the crown. The goal is to produce a well-shaped tree with the center of gravity squarely over the trunk and a crown that lets wind pass through it rather than catching it like a sail.
- ✔ Avoid planting brittle species such as elms, willows, box elder, poplars, or silver maple in locations where breakage can endanger life or property.
- ✔ When planting, try to visualize the tree when mature, and avoid placing it too close to buildings or power lines.

This is taken from *Tree City USA Bulletin No.2,* "When a Storm Strikes." For a copy of the complete Bulletin, write to: **Arbor Day Foundation, 100 Arbor Avenue, Nebraska City NE 68410**

Published by
Arbor Day Foundation®
100 Arbor Avenue • Nebraska City, NE 68410

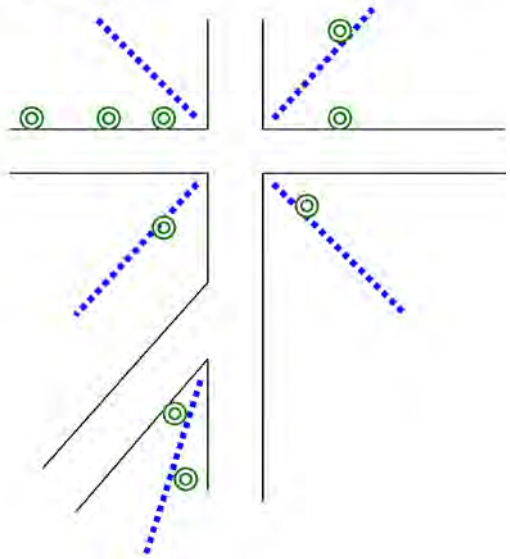
Urban Forest Strike Team

July 2008

Trees & Sites at Intersections

When UFST crews are assigned assessment tasks for specific street segments or for entire streets, use the following guide to determine whether a tree or site is tallied at an intersection.

1. **Bisect the angle of the intersecting streets**
2. **Assign trees to the appropriate street based on side of the line.**



North Carolina & Virginia U&CF Programs
SGSF's & USDA Forest Service, Region 8

Urban Forest Strike Team

July 2008

FEMA Hazard Tree and Limb Removal Criteria
(FEMA 325 Debris Mgt Guide)
Whole Tree Removal

All of these must be met:
1. Was damage caused by the disaster?
2. Is it an immediate threat to lives, public health and safety, or improved property?
3. Is it greater than 6" DBH?

At least one of these must be met:
1. 50% or greater of the crown is lost, damaged, or destroyed
2. Split trunk or broken branches exposing heartwood
3. Fallen or has been uprooted within public-use area
4. >30 degree lean angle

Hazard Limb Removal

Hazard limb is:
1. located on improved property
2. >2" diameter at point of breakage
3. attached to the tree
4. threatening public-use area

FEMA Debris Removal Criteria
(FEMA 325 Debris Mgt Guide)
Eligible Debris Removal
1. Generated by the declared disaster
2. Located within designated disaster area
3. Located on improved property or ROW
4. It is the legal responsibility of the applicant

North Carolina & Virginia U&CF Programs
SGSF's & USDA Forest Service, Region 8

Urban Forest Strike Team

July 2008

Street: _____ Team: _____

From Address: _____ To Address: _____

Standing Hazards Affecting ROW			Ground Debris in ROW +50 feet	
Diameter	Removal	Pruning	Cubic Yards	Location
6-12"				0-100'
13-18"				101-200'
19-24"				201-300'
25-30"				301-400'
31-36"				401-500'
37-43"				501-600'
>43"				>600'
Sum			1 dot=10 yd³	Sum

Plot: ____ Date: _____

[Instructions on back] Notes: _____

North Carolina & Virginia U&CF Programs
SGSF's & USDA Forest Service, Region 8

Storm Damage Assessment Protocol Pocket Field Guide

Whole Tree Volume Table for Deciduous Southern Tree Species

DBH (in.)	Volume (yd^3)
6	1
8	2
10	3
12	5
14	7
16	10
18	14
20	19
22	25
24	31
26	40
28	48
30	59
32	68
36	94
40	125
44	161
48	204
52	253

Volume accounts for 75% air space per FEMA 325, Public Assistance Debris Management Guide, p. 23

Ground Debris Estimation

yd^3

24 = 15 person passenger van
20 = 4 door full size SUV
15 = Dodge Magnum S.W.
9 = Std 6'x6'X7' dumpster
5 = Port-o-john
1 = Dog house

North Carolina & Virginia U&CF Programs
SGSF's & USDA Forest Service, Region 8

Urban Forest Strike Team Region 8
North Carolina & Virginia U&CF (v1.1 August 2007)

Instructions:

Use this 'dot' tally card for ***hurricane*** debris estimation only.

For debris estimation, a "plot" is a ***randomly*** selected street segment within the disaster area being sampled. Street segments are typically one block from cross street to cross street (or end of street/cul-de-sac). If maps are provided, plots will be designated on the map with plot numbers and length in feet. Plots are variable length.

Step 1

At the top of each card, fill in…

- street name,
- team (initials, code)
- beginning address of the plot,
- ending address of the plot,

at the bottom of each card…

- plot number (from map),
- date,

Step 2

Tally trees and debris using a 'dot' tally method where each 'dot' equals 1 tree (removals and pruning), and each 'dot' equals 10 cubic yards of additional debris (on the ground).

Walking from either end of the plot, use the risk factors provided and record…

- standing trees that are public hazards,
  - as a removal (whole tree hazard)
  - as a pruning (limb hazard)
- at 100' intervals, record an estimate of woody debris that is on the ground.

North Carolina & Virginia U&CF Programs
SGSF's & USDA Forest Service, Region 8

Tree Emergency Plan Worksheet

1. Early Warning System/Weather Forecasting Service — Use an early warning procedure to enhance mitigation: communicate with the National Weather Service, a consulting meteorological firm, a designated television weather channel, or the local police department. With a procedure in place, you should have at least three hours of lead time before most tree damaging weather strikes.

Staff Lead: _____

Contact Name:_____
Address:_____
Phone:_____
Mobile:_____
FAX:_____
Email:_____**Web Site**_____

Description of services provided:

2. Local Emergency Manager – Lead contact for a community and responsible for emergency planning and response activities.

Name: _____ **Phone:** _____
Mobile:_____

Role(s):

3. Public Relations Coordinator — This is the individual responsible for primary public relations, media contacts, citizen information and communications about the natural disaster. (Must have full knowledge of damage, community issues and capabilities, and be able to make decisions.)

Name: _____ **Phone:** _____
Mobile:_____

Alternate(s):
Name: _____ **Phone:** _____
Mobile:_____

4. Disaster Planning and Response Team Members: Your team should include: mayor, selected department heads including specialists in public relations and purchasing, public works specialists (streets, wood utilization and disposal, fleet manager), utilities, parks department, other local government heads, meteorologist, local emergency managers. Include creative people on your team that can think beyond barriers that may be up. Get media involved in planning so they understand what your cleanup priorities are after a storm. Someone involved with public tree management should be part of the community emergency management team. It is critical to include individuals who can make fiscal and administrative decisions because this team will most likely serve in the storm operations command center.

Name:	Role/Responsibility:
1.	**Mayor/Manager**
2.	**Fire Chief**
3.	**Director of Public Works/ Road Foreman**
4.	**Utility Representative**
5.	**Public Relations Representative**
6.	**City Council/Selectboard Chair**
7.	**County Emergency Management**
8.	**Police Chief**
9.	**Director of Parks**
10.	**Tree Warden**
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

5. Available Disaster Response Staff and Crews: Identify and list all municipal staff and crews available for disaster response work. Consider forestry and parks departments, public works, engineering, streets and sanitation, etc. Where possible, establish teams that can be responsible for specific disaster response activities (primary route clearing, assistance to utility crews, manage debris staging sites, distribute equipment, etc.)

Staff Name:	Role/Responsibility:
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	
21.	

6. Emergency Call Out Procedure — phone contact tree for staff.

Name: ________________________**Will Contact — Name:** ________________________
Phone: ________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________**Will Contact — Name:** ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________**Will Contact — Name:** ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________**Will Contact — Name:** ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

Name: ________________________
Phone:________________________
Mobile:________________________

7. Primary transportation and evacuation corridors and routes for emergency vehicles. Identify and map for reference. Have map available and accessible, and review and update annually.

8. Critical power transmission corridor restoration sites (medical treatment centers). Identify and map for reference. Have map available and accessible, and review and update annually.

9. Identify who is responsible for decision making and priority response setting for multiple life threatening situations.

Name:_____ Phone:
Pager:_____ Mobile:_____

10. Tree Damage Clean-up Priorities — List areas that need attention after life threatening situations are abated. Share this information with key staff the will be answering phone calls from residents, businesses, etc. Create a work order form for use when receiving calls.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11. Procedure for Debris Staging and Removal — Identify several areas for staging and processing debris. Establish a contract or agreement securing each site. Choose a processing site that is large, flat, well-drained and accessible to roads that can support truck weights of at least 9 tons per axle. Identify ways to protect significant trees or cultural resources during processing. Potential sites include undeveloped park, industrial, cemetery, fairgrounds, agency and state land. Large parking lots (even paved lots) work well. Remember to consider noise implications near residential areas. Identify multiple sites. Annually reconfirm access and availability to these sites. Make sure the site is large enough for safety considerations (flying debris from tub grinders), if possible, identify sites that can be secured (fencing).

Site 1 – Location: _____

Contact Name/Role:

Phone: Mobile:

Site 2 – Location: _____

Contact Name/Role:

Phone: Mobile:

Site 3 – Location: _____

Contact Name/Role:

Phone: Mobile:

12. Debris and Brush Removal from Private Property — Identify how you will address this issue. A major storm makes it difficult for private property owners to remove brush and debris. Make a decision at the municipal level allowing for debris collection. Determine if your city has adequate equipment and staff available to accomplish this often enormous task. It is critical that you provide guidelines for residents. Specify the types, amounts and piling arrangement of the materials that you will accept. Cities can also assist private homeowners who must contract with private companies for trimming and removal by preparing a list of companies that are licensed, professionally trained and insured.

Person Responsible: _____
Phone: _____ **Mobile:**_____

Minor Storm Policy:

Major Storm Policy:

Listing of available tree care companies:

13. Identify Wood Utilization Options – Develop a list of companies and resources that can process the wood material generated from storm damage. When possible, establish a contract for utilization services.

Wood Utilization Contract: **Company/Organization:**

Phone: Mobile:
Utilization Service Contract: Yes / No
Description of Service:

Wood Utilization Contract: **Company/Organization:**

Phone: Mobile:
Utilization Service Contract: Yes / No
Description of Service:

14. Equipment Listing (available in-house) — Develop a list of public works and parks department equipment and vehicles available for tree clean up work. Keep it current. Include wood chippers, aerial bucket trucks, refuse packers, loaders, supervisory vehicles, chain saws, barricade and lighting equipment, hand saws and pole pruners on the list.

Person Responsible: _____
Phone:_____ **Mobile:**_____

Equipment Available	Quantity	Department/Contact
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

15. Additional Equipment and Assistance Sources — In an emergency, your city administrator may authorize the lease or rental of additional equipment for storm clean-up work. Make a list of potential vendors and keep it current. For certain equipment and assistance needs, it is critical to establish an emergency contract. Guaranteed access to large tub grinders and multiple additional tree trimming crews would be services to guarantee via an emergency contract. The city administrator may also authorize tree contractors to supplement city crews. Assemble a list of licensed and insured potential tree service contractors. Your neighbor cities may be unaffected by a storm that strikes your city. Establish a system to contact neighbor cities that could send staff and equipment to assist you in cleaning up your city.

Person Responsible: _____
Phone:_____ **Mobile:**_____

Equipment Available	Quantity	Department/Contact
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Emergency Contract:

Organization: Contact Name:
Phone: Mobile:

Emergency Contract:

Organization: Contact Name:
Phone: Mobile:

Emergency Contract:

Organization: Contact Name:
Phone: Mobile:

16. Staff, Crew Organization and Equipment Needs – In an emergency, staff members may need to lead crews from other departments or of private contractors. Determine staff who can function in this manner.

Name	Crew#	Equipment Needed

17. Individual(s) Responsible for Record Keeping — This person does documentation and cost accounting during and after disasters. Note – define a specific accounting code for each storm event. If you define a specific code for each storm event, it will allow for effective accounting.

Name: Phone:
Mobile:

Storm Accounting Code:

18. Individual(s) Responsible for Damage Assessment and Damage Survey Reports — This person is familiar with FEMA and Division of Emergency Management procedures and prepares the reports needed for public assistance.

Name: Phone:
Mobile:

19. Disaster Budget (identify potential activities to anticipate costs)

Personnel Regular Time:

Overtime:

Equipment Owned:

Equipment Contracted:

Contracted Work:

Operational Supplies:

Disposal/Recycling:

Administrative Costs (Overhead):

20. Funding Information from Past Storms — review costs from past storms to anticipate costs for future storms and establish funding needs.

Storm: _____ **Date**: _____

Activity	**Cost**
Personnel Regular Time	
Overtime	
Equipment Owned	
Equipment Contracted	
Contracted Work	
Operational Supplies	
Disposal/Recycling	
Administrative Costs (Overhead)	
TOTAL	

21. Individual(s) and/or Organization(s) responsible for community regreening efforts: Develop a list of contacts for use in efforts to regreen the community after storm events.

Name/Organization: Phone:
Mobile:

Organization Role:

22. Community urban forestry comprehensive management plan —

Comprehensive forest management is your best defense against storms. Well planted and cared for trees stand up to weather better than neglected trees. Develop or modify a forest management plan to include information related to disaster preparedness. Identify critical activities such as hazard tree removal, tree pruning cycles, annual tree care needs, etc.

Name: Completed:

23. Community tree risk management plan — A tree risk management plan will provide the community with a systematic approach to accurately identify moderate to high risk trees, an initiate the timely removal or corrective treatment of hazardous trees. Communities that carry out tree risk management strategies will likely see reductions in damage after storms. Go to: http://www.na.fs.fed.us/spfo/pubs/uf/utrmm/index.htm

Name: Completed:

24. Storm Damage Assessment – If a storm is significant enough to receive a formal disaster declaration, state and/or federal funding may be available. To assist communities in the process of applying for reimbursement for storm associated costs, it is important to be able to quickly develop an estimate of damage. Consider using the Storm Damage Assessment Protocol as a tool prior to a storm. This protocol allows a community to provide an assessment of damage in a simple, credible and efficient manner. Go to: http://www.itreetools.org/applications.html

Name: Completed:

26. Contacts for additional assistance in natural disaster planning, response and recovery:

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(Worksheet Prepared by: Lisa Burban (USDA Forest Service), Jim Hermann (Minneapolis Park and Recreation Board), and Katie Himanga (Heartwood Forestry) – Updated May, 2006. Worksheet available on-line at: http://www.na.fs.fed.us/urban/inforesources - under "Urban Forest Management")

What will happen if Emerald Ash Borer is found in my community?

Quick facts for town officials

The emerald ash borer (EAB) is a major threat to Vermont's trees. Once this insect is introduced, untreated ash trees start dying within a few years. Because it is easily moved long distances by humans, EAB can appear anywhere at any time. EAB has been detected in neighboring states and is expected to spread into Vermont soon. This pest is regulated by state and federal agencies, so its spread is monitored and its appearance in a new location triggers a number of actions.

EAB infestations in Vermont will be subject to regulatory action. Quarantines will be put in place by state and federal agencies to regulate the movement of any potentially infested material—firewood, and ash nursery stock, logs, brush, and chips. State quarantines typically follow county boundaries and federal quarantines typically follow state boundaries. Regulated material may be moved within the quarantine zone, but cannot be moved outside the zone unless it meets standards as published in the federal EAB regulation. Depending on specific circumstances, early or isolated infestations may also be subject to additional measures, such as establishing trap trees in an attempt to define the infestation and cutting trees with high levels of EAB larvae to slow the insect spread. As more infestations are found and the infested areas begin to coalesce into a larger area, quarantine areas will expand. Control tactics will change somewhat and there will be more emphasis on long-term management across a wider landscape.

What will happen when EAB is confirmed in my town?

1. The Vermont Invasive Forest Pest Action Plan's modified Incident Command System (ICS) structure will be employed to meet response needs, including survey, regulation, outreach, and management activities. The advantage of using the ICS structure is that it establishes a common set of objectives and strategies, allowing for a team effort between all agencies and organizations.

2. Your town will be notified, and the State will issue a media advisory. News media may contact you. State staff will not call a press conference, but if you do, they will attend if invited.

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3. If the extent of the infestation is unknown, a delimiting survey will be conducted to define the infested area and help clarify management alternatives. This surveying can take several months.

4. Affected landowners, resource managers, stakeholders, local governments and planning commissions, agency staff and partner groups with associated responsibilities, and technical advisors will be notified, and input will be sought regarding management actions and impacts.

5. Your county, and possibly adjacent counties, will be quarantined to restrict movement of regulated ash material and all hardwood firewood, limiting further spread of EAB. A quarantine is a system of rules intended to help prevent the spread of EAB by slowing its movement, tracking regulated ash material from origin to final destination, and that uses compliance agreements to monitor the proper disposition of regulated materials. State agencies will notify and work with affected businesses in the quarantine area to ensure regulated materials meet movement conditions as set forth in the federal EAB regulation. USDA APHIS will work with businesses on the movement of regulated materials outside of Vermont.

6. State agencies can provide additional education & assistance for municipal officials and staff, residents, & businesses, and will direct you to the right resources to get your questions answered.

7. Your municipality will need to budget for management activities. At this time, there is no state or federal funding for the treatment or removal of individual trees.

8. You are strongly encouraged to prepare for the arrival of EAB! Actions taken now can reduce this insect's impact and save your community money.

For assistance with Forest Pest Planning please contact:

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Learn more:

www.vtinvasives.org/
community-preparedness

Last updated March 19, 2013

Vermont Forest Pest Planning:
Is your community prepared?

Three highly invasive forest pests-the emerald ash borer (EAB), Asian longhorned beetle (ALB) and hemlock woolly adelgid (HWA), threaten Vermont's woodlands, urban forests and the goods and services these provide. Maples, ash, hemlocks and other host species that could be attacked by these pests make up nearly two-thirds of the trees in Vermont. While the hemlock woolly adelgid was detected in Windham County in 2007, the other two pests have yet to arrive in Vermont.

EAB is an insect that was introduced to the U.S. from Asia in 2002 and attacks all species of ash native to North America. It has led to the death of millions of ash trees from Michigan to New York. There are more than 100 million ash trees in Vermont's woodlands, downtowns and roadsides. Unless treated with insecticides, most trees infested by EAB will die within 2 to 4 years. Experience in Michigan and other states has shown that once EAB is detected in an area, more detections follow quickly and loss of ash trees increases rapidly over a few short years. If we can slow the spread of EAB and ash mortality, we can buy time for research to provide us with more options for managing EAB.

The following resources will help you work through the process of planning for a pest infestation:

- **Vermont Forest Pest Planning Worksheet**— assists in assessing your community's level of preparedness and prioritizing action steps.
- **Financial Resources**- up to $500 is available to high risk communities in Vermont to incentivize the development of a plan.
- **Vermont Forest Pest Planning: Community Resource Toolbox**—provides links and background information on all aspects of preparedness and response.
- **Vermont Forest Pest Planning: Communications Toolkit**—contains example press releases, and other educational materials for educating your community.

A Forest Pest Preparedness & Response Plan *is a document that outlines a municipality's objectives and the approaches it will use to meet anticipated costs, public concerns, and environmental impacts; explore opportunities for wood disposal; and initiate steps to mitigate impact.*

We expect EAB to arrive in Vermont within a few years. If there are ash trees in your community we expect most, if not all, will die when EAB shows up. Prepared or unprepared, your community will have to deal with a large number of hazardous trees within a short time frame. A proactive response plan will be invaluable in addressing the threat by allowing you to:

- Modify budgets to accommodate increased tree-related costs and spread the costs/losses over a longer period of time.
- Provide/arrange for debris disposal space.
- Inform citizens about forest pests & dealing with private trees
- Determine public policy for designating trees to be preserved and replacing trees that are lost.
- Ease costs by: forming partnerships, brokering group or volume prices, prearranging contracts, and seeking grants.

It's better to look ahead and prepare than look back with regret.

Vermont Forest Pest Planning: *Process*

1. **Form a local Forest Pest Planning Team**—Team members will help develop and implement the plan, keep abreast of information and communicate with residents.

2. **Brief the decision-makers**—Meet with your community's leadership and bring them up to speed on the issue. State staff can provide technical support with the latest information and strategies. Resources for briefing decision makers are available in the Vermont Forest Pest Planning: Communications Toolkit.

3. **Develop a timeline and who is responsible for writing the plan**—$500 is available to high risk communities in Vermont to incentivize development of a plan. If you don't hire a consultant then decide whether one person will write it or whether team members will be tasked with researching and drafting certain sections. What is the timeline and process for developing, reviewing and adopting your preparedness plan?

4. **Conduct a rapid assessment of your community 's level of preparedness and prioritize what action steps need to be taken to prepare your community**—This assessment will help your community identify the policies, protocols, resources (equipment, labor and funding) and other actions needed to efficiently and effectively respond to a pest infestation. Use the Vermont Forest Pest Planning Worksheet.

5. **Formalize the information and action steps into a forest pest preparedness plan** and have it officially adopted by the Selectboard, Conservation Commission and/or other appropriate town committees.

6. **Implement your preparedness plan**.

For assistance with please contact:

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Pest Alert

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Emerald Ash Borer

A beetle from Asia, *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), was identified in July 2002 as the cause of widespread ash (*Fraxinus* spp.) tree decline and mortality in southeastern Michigan and Windsor, Ontario, Canada. Larval feeding in the tissue between the bark and sapwood disrupts transport of nutrients and water in a tree, eventually causing branches and the entire tree to die. Tens of millions of ash trees in forest, rural, and urban areas have already been killed or are heavily infested by this pest.

A. planipennis has been found throughout Michigan, across much of Ohio, and in parts of Indiana, Illinois, Maryland, Missouri, Pennsylvania, Virginia, West Virginia and Wisconsin. Infestations have also been found in more areas of Ontario and in the province of Quebec. The insect is likely to be found in additional areas as detection surveys continue. Evidence suggests that *A. planipennis* is generally established in an area for several years before it is detected.

The broad distribution of this pest in the United States and Canada is primarily due to people inadvertently transporting infested ash nursery stock, unprocessed logs, firewood, and other ash commodities. Federal and state quarantines in infested states now regulate transport of these products.

Identification

Adult beetles are generally larger and brighter green (Fig. 1) than the native North American *Agrilus* species. Adults are slender, elongate, and 7.5 to 13.5 mm long. Males are smaller than females and have fine hairs, which the females lack, on the ventral side of the thorax. Adults are usually bronze, golden, or reddish green overall, with darker, metallic emerald green wing covers. The dorsal side of the abdomen is metallic purplish red and can be seen when the wings are spread (Fig. 2). The prothorax, the segment behind the head and to which the first pair of legs is attached, is slightly wider than the head and the same width as the base of the wing covers.

Figure 1. Adult emerald ash borer.

Larvae reach a length of 26 to 32 mm, are white to cream-colored, and dorso-ventrally flattened (Fig. 3). The brown head is mostly retracted into the prothorax, and only the mouthparts are visible. The abdomen has 10 segments, and the last segment has a pair of brown, pincer-like appendages.

Figure 2. Purplish red abdomen on adult beetle.

Biology

A. planipennis generally has a 1-year life cycle. In the upper Midwest, adult beetles begin emerging in May or early June. Beetle activity peaks between mid June and early July, and continues into August. Beetles probably live for about 3 weeks, although some have survived for more than 6 weeks in the laboratory. Beetles generally are most active during the day, particularly when it is warm and sunny. Most beetles appear to remain in protected locations in bark crevices or on foliage during rain or high winds.

Throughout their lives beetles feed on ash foliage, usually leaving small, irregularly shaped patches along the leaf margins. At least a few days of feeding are needed before beetles mate, and an additional 1 to 2 weeks of feeding may be needed before females begin laying eggs. Females can mate multiple times. Each female probably lays 30-60 eggs during an average lifespan, but a long-lived female may lay more than 200 eggs. Eggs are deposited individually in bark crevices or under bark flaps on the trunk or branches, and soon darken to a reddish brown. Eggs hatch in 7 to 10 days.

Figure 3. Second, third, and fourth stage larvae.

After hatching, first instar larvae chew through the bark and into the phloem and cambial region. Larvae feed on phloem for several weeks, creating serpentine (S-shaped) galleries packed with fine sawdust-like frass. As a larva grows, its gallery becomes progressively wider (Fig. 4). Beetle galleries often etch the outer sapwood. The length of the gallery generally ranges from 10 to 50 cm. Feeding is usually completed in autumn.

Prepupal larvae overwinter in shallow chambers, roughly 1 cm deep, excavated in the outer sapwood or in the bark on thick-barked trees. Pupation begins in

Figure 4. Gallery of an emerald ash borer larva.

Figure 5. D-shaped hole where an adult beetle emerged.

Figure 6. Jagged holes left by woodpeckers feeding on larvae.

Figure 7. Ash tree killed by emerald ash borer. Note the serpentine galleries.

Figure 8. Epicormic branching on a heavily infested ash tree.

late April or May. Newly eclosed adults often remain in the pupal chamber or bark for 1 to 2 weeks before emerging head-first through a D-shaped exit hole that is 3 to 4 mm in diameter (Fig. 5).

Studies in Michigan indicate 2 years may be required for *A. planipennis* to develop in newly infested ash trees that are relatively healthy. In these trees, many *A. planipennis* overwinter as early instars, feed a second summer, overwinter as prepupae, and emerge the following summer. In trees stressed by physical injury, high *A. planipennis* densities, or other problems, all or nearly all larvae develop in a single year. Whether a 2-year life cycle will occur in warmer southern states is not yet known.

Distribution and Hosts

A. planipennis is native to Asia and is found in China and Korea. It is also reported in Japan, Mongolia, the Russian Far East, and Taiwan. In China, high populations of *A. planipennis* occur primarily in *Fraxinus chinensis* and *F. rhynchophylla*, usually when those trees are stressed by drought or injury. Other Asian hosts (*F. mandshurica* var. *japonica*, *Ulmus davidiana* var. *japonica*, *Juglans mandshurica* var. *sieboldiana*, and *Pterocarya rhoifolia*) may be colonized by this or a related species.

In North America *A. planipennis* has attacked only ash trees. Host preference of *A. planipennis* or resistance among North American ash species may vary. Green ash (*F. pennsylvanica*) and black ash (*F. nigra*), for example, appear to be highly preferred, while white ash (*F. americana*) and blue ash (*F. quadrangulata*) are less preferred. At this time all species and varieties of native ash in North America appear to be at risk from this pest.

Signs and Symptoms

It is difficult to detect *A. planipennis* in newly infested trees because they exhibit few, if any, external symptoms. Jagged holes excavated by woodpeckers feeding on late instar or prepupal larvae may be the first sign that a tree is infested (Fig. 6). D-shaped exit holes left by emerging adult beetles may be seen on branches or the trunk, especially on trees with smooth bark (Fig 5). Bark may split vertically over larval feeding galleries. When the bark is removed from infested trees, the distinct, frass-filled larval galleries that etch the outer sapwood and phloem are readily visible (Fig. 4 and Fig. 7). An elliptical area of discolored sapwood, usually a result of secondary infection by fungal pathogens, sometimes surrounds galleries.

As *A. planipennis* densities build, foliage wilts, branches die, and the tree canopy becomes increasingly thin. Many trees appear to lose about 30 to 50 percent of the canopy after only a few years of infestation. Trees may die after 3 to 4 years of heavy infestation (Fig. 7). Epicormic shoots may arise on the trunk or branches of the tree (Fig. 8), often at the margin of live and dead tissue. Dense root sprouting sometimes occurs after trees die.

A. planipennis larvae have developed in branches and trunks ranging from 2.5 cm (1 inch) to 140 cm (55 inches) in diameter. Although stressed trees are initially more attractive to *A. planipennis* than healthy trees are, in many areas all or nearly all ash trees greater than 3 cm in diameter have been attacked.

Resources

For more information on the emerald ash borer and related topics...

- Visit the following Web sites:
  - Multi-agency Emerald Ash Borer Web Site: www.emeraldashborer.info
  - USDA Forest Service: www.na.fs.fed.us/fhp/eab/
  - USDA Animal and Plant Health Inspection Service: www.aphis.usda.gov/plant_health/
- Contact your state Department of Agriculture, State Forester, or Cooperative Extension Office.

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Best Management Practices for Roadside Invasive Plants

SOIL DISTURBANCE & STABILIZATION

1. **Minimize soil disturbance.** Monitor recent work sites for the emergence of invasive plants for a minimum of 2 years after project completion.
2. **Stabilize disturbed soil as soon as possible.**
   - Use clean mulch, hay, rip-rap, or gravel
   - Seed with native species where possible
3. **Avoid using fill from invaded sites.** When in doubt about the quality of fill, monitor work sites for the emergence of invasive plants for a minimum of 2 years.

MOVEMENT & MAINTENANCE OF EQUIPMENT

1. **When equipment needs to be moved, plan work flow so that equipment is moved from unaffected sites to affected sites.** This is especially important during ditch cleaning and shoulder scraping.
2. **Staging areas should be free of invasive plants**
3. **All equipment and tools should be cleaned of visible dirt and plant material before leaving affected project sites.** Cleaning methods can include portable wash stations, high pressure air, brush, broom, or other hand tools.
4. **If equipment will be used in infested areas, remove above-ground invasive plant materials** such as purple loosestrife, phragmites, and Japanese knotweed prior to the start of work.

MOWING

1. **Avoid mowing areas infested with purple loosestrife, phragmites, and Japanese knotweed,** as these can sprout from stem and root fragments. Stake roadside populations with "Do Not Mow".
2. **If mowing is necessary, mow these areas BEFORE seed maturation** (approximately August 1st).
3. **Clean mowing equipment daily, and prior to transport.** This is particularly important if mowing is after seed maturation (August 1st)

HANDLING EXCAVATED MATERIAL & INVASIVE PLANT MATERIAL

1. **Destroy removed plant material.** Methods include:
   - Drying/Liquefying: *place on impervious surface and cover*
   - Brush piles: *not for plants with fruit or seed*
   - Burying: *minimum of 3 feet below grade*
   - Burning: *have a designated burn pile for invasive plants*
   - Herbicide: requires a *licensed applicator (VT Department of Agriculture)*
2. **Cover invasive plant material when transporting.**
3. **Excavated materials taken from infested areas should only be used onsite, unless all plant material has been destroyed.** Only use within exact limits of infestation.
4. **Stockpile unused excavated materials on impervious surface, or bury a minimum of 3 feet below grade** (5 feet for Japanese knotweed).
5. **Excavation should be avoided in areas containing purple loosestrife, phragmites, and Japanese knotweed.**
6. **Cover soil from infested areas when transporting.**

Adapted from New Hampshire Department of Transportation's Best Management Practices for Roadside Invasive Plants
http://www.nh.gov/dot/org/projectdevelopment/environment/units/technicalservices/documents/BMPsforRoadsideInvasivePlants.pdf

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The Nature Conservancy
Protecting nature. Preserving life.™

For more information, go to www.vtinvasives.org.

Glossary of Terms*

Anvil-Type Pruning Tool- Pruner with a straight sharp blade which cuts against a flat metal cutting surface.

Arborist- A professional who possesses the technical competence through experience and related training to provide for or supervise the management if trees and other woody plants in the residential, commercial and public landscape.

Branch- a secondary shoot or stem rising from one of the main trunks or leaders of a tree or woody plant.

Branch Collar- Trunk tissue that forms around the base of a branch between the main stem and the branch or a branch and a lateral. As a branch decreases in vigor or begins to die, the branch collar becomes more pronounced.

Branch Bark Ridge- Ridge of bark that forms at the junction of the branch and stem. An upturned branch bark ridge indicates a strong branch union. An inrolled branch bark ridge indicates a weak union.

Cambium- Dividing layers of cells that form sapwood (xylem) to the inside and bark (phloem) to the outside.

Canker- Area of dead bark and cambium anywhere on the tree's surface.

Canker rot- Fungal infection that causes an external canker and extensive internal decay.

Cavity- Hollow area in stem, branches or roots where the wood has decayed and is now missing.

Closure- The process of wound wood covering a tree injury.

Conk- Fruiting body of a fungus. Fruiting bodies on trees indicate advanced decay.

Crack- Separation of the wood, a fissure, or a deep split in the bard and wood of a tree. Cracks are the number one hazard defect because they indicate the tree is already failing.

Crotch- The angle formed at the attachment between a branch and another branch, leader or trunk of a woody plant.

Crown- The leaves and branches of a tree or shrub; the upper portion of a tree from the lowest branch on the trunk to the top.

Cut- The exposed wood area resulting from the removal of a branch or portion thereof.

Decay- Fungal and bacterial decomposition of woody tissues. The decay process reduces structural soundness and stability over a period of years.

Defect- Visible sign that a tree of part of a tree is failing or has the potential to fail. Any structural weakness or deformity in the tree's branches, stem or root system.

Defective tree- Tree with one or more defects.

Failure- Breakage of stems or branches or loss of mechanical support in the root system. Trees can fail due to defects or during severe storms.

Fracture –Cracking or breakage or wood in branches, stems or roots.

Fruiting bodies- Structure where fungal spores are produced. Examples are mushrooms, conks and shelf fungi, indicators of advanced decay.

Hazard tree- Any defective tree or tree part that poses a high risk upon failure to cause injury to people or damage to property.

Improper pruning- When removing branches, cutting into the branch collar, cutting flush to the stem, leaving long branch stubs or removing too many branches are one time.

Included bark- Layers of bark that have formed inside the tree at a branch union or fork between codominant stems. These ingrown layers of bark make a union weak.

Inrolled bark or wood- Bark or wood tissues that have turned inward and continue to grow inside the tree.

Inspection- Systematic method of examining trees for visible defects and assessing them for hazard potential.

Lateral- A branch or twig growing from a parent branch or stem.

Leader- A dominant upright stem, usually the main truck. There can be several leaders in one tree.

Lean- Describes a tree trunk that is now growing perpendicular to the ground. If the angle is greater than 45 degrees, it may be a hazard tree.

Limb- Same as branch, but is larger and more prominent.

Parent branch or Stem- The tree trunk; or a large limb from which lateral branches grow.

Pruning- Removal of plant parts.

Stub- An undesirable short length of a branch remaining after a break or incorrect pruning cut is made.

**From the Vermont Highway Vegetation Management Manual, written by Harry Chandler, Vermont Woodlands Association*

Contact Information

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Addison, Chittenden & Grand Isle Counties: Essex Junction Office - 802.879.6565

Lamoille, Orange & Washington Counties: Barre Office - 802.476.0170

Caledonia, Orleans & Essex Counties: St. Johnsbury Office - 802.751.0110

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