SECOND EDITION

VERMONT TREE SELECTION GUIDE

A list of suitable species for managed landscapes in residential and urban settings

PLANT LIVE GROW

Vermont Urban & Community Forestry Program

part of the **Vermont Department of Forests, Parks & Recreation**

in partnership with the **University of Vermont Extension**

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*This guide to trees, and everything we love about them, is dedicated to **David Raphael**, deep-rooted advocate for healthy and resilient trees in Vermont. A long-serving member of the Vermont Urban & Community Forestry Advisory Council, David offered perspective from the lens of a talented landscape designer, graphic designer, writer, and community planner. His contributions to this guide and the edits incorporated into this Second Edition remain invaluable and inspirational.*

Recognition is given to all the people who offered assistance to this project, especially Pamelia Smith, professor, and Elizabeth Clark, graduate, of Vermont Technical College, Charles Plonski of New England Nursery Sales and John Padua of Cobble Creek Nursery, who helped develop and update the tree list, to David Schneider, Warren Spinner, Jeff Young, Robert Moore, Tim Parsons, William Jewell, and David Raphael for their review, and to Sensible World for the design.

Last updated March 2022.

Guiding Principles for Tree Planting in Vermont

This guide is intended to support tree planting in managed landscapes according to the following guiding principles. Additional resources and guidance on where to find professionals and expert assistance are on **page 10.**

1. **PLANT FOR MULTIPLE BENEFITS.** Landscape design plans strive for specified aesthetics. Remember that individual tree species also contribute to specific wildlife habitat, raise property values, conserve energy, reduce stormwater runoff, and mitigate the effects of climate extremes.

2. **DIVERSIFY.** Extensive urban and residential tree planting on streets, in yards, or in public ways and spaces, should promote species diversity, not monocultures.

3. **PLAN FOR CHANGE.** Know that climate change, introduced tree pests, and other tree stressors will impact planted trees for decades to come. This Tree Selection Guide should be used with the knowledge that the species list of trees that thrive today in the urban landscape may change in the future.

4. **BUY LOCAL.** Plant locally grown species as much as possible. Native plants typical to Vermont forests and natural areas are especially encouraged where natural forestland or undeveloped landscapes abuts a managed landscape.

5. **PLANT ORNAMENTALS WITH PURPOSE.** Utilize ornamental (non-native) tree species as featured specimens or viable street trees where native species are not suitable. Ornamental or naturalized species are not suitable in areas adjacent to, or part of, native forests and natural landscapes.

6. **MIMIC LOCAL LANDSCAPES.** Planting locations within Vermont exhibit a range of microclimates, topography, and soil types. Native or restorative tree planting ideally reflects species that are already present and part of the ecological patterns and habitats of a local landscape.

7. **RESPECT THE NATIVE FOREST.** Planting plans and site development should accommodate and protect the integrity of local forest and its inherent diversity. Do not introduce aggressive and quick growing plant species that can spread and change native forest composition.

Essex Junction, VT

Introduction

Are you getting ready to plant a tree or maybe several trees? Whether you are planning to plant on your own lawn, in a community park, along a street, or in a tree pit, careful tree selection is essential to the tree's long-term success. We have all heard time and time again to plant "the right tree in the right place". This Tree Selection Guide for Vermont was developed just for this purpose- to help you match trees to sites and achieve lasting shade.

This guide is intended to support new tree plantings in the managed landscapes that make up our urban and community forests. A managed landscape is one in which trees are treated and maintained as individual trees and includes:

- downtowns
- village centers
- residential neighborhoods
- educational and business campuses
- private yards.

This guide is **not** intended for riparian tree plantings, ecological restoration in or adjacent to natural forests, rural roadside reforestation, or landscape plantings around solar developments. A resource list for these types of tree plantings can be found on page 10.

To use this guide, you should first consider four questions that will help you critically evaluate the planting purpose, the site, future needs, and desires. Begin by reviewing the 'Questions to Consider when Planting Trees' (at right), then fill in the 'Tree Selection Worksheet' on page 13. The completed worksheet can then be compared to the tree list and lead you to selecting the right tree(s) for the right place(s).

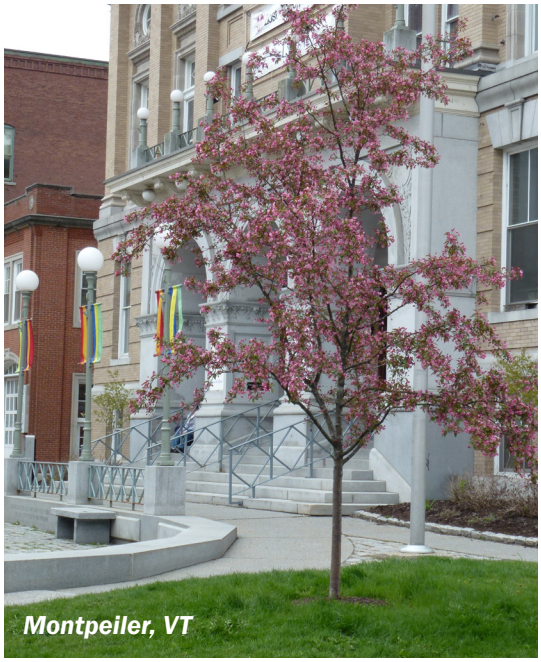
In addition to this printed version of the tree guide, we offer an online searchable database that provides the flexibility to filter the tree guide's information for easier tree selection. The searchable database can be accessed from our website, vtcommunityforestry.org.

RIGHT TREE, RIGHT PLACE

When we plant trees, they are often located in sites that are much less suitable than native forests for tree growth. Trees within managed landscapes are often exposed to human-caused stresses such as air pollution, elevated temperatures, compacted soils, and confined spaces. Because healthy community trees are the foundation of healthy community forests, proper selection of tree species and planting site is crucial. Careful planning should ensure that the "right tree" is established in the "right place".

Questions to Consider when Planning to Plant Trees:

- What is the purpose and use of the planting?
- What are the site conditions above and below ground?
- What type of maintenance will be required?
- What is the best tree species for long-term success?



Montpeiler, VT

PURPOSE OF PLANTING

Tree species and varieties vary tremendously in the services and benefits they can provide. To achieve desired outcomes, it is necessary to identify the purpose(s) of the planting. For example, specific tree species and varieties can be chosen for one or more of the following outcomes:

Economic Advantages

- Increase property values
- Encourage patronage to downtown retail and tourism
- Reduce energy costs

Social Benefits

- Instill community pride
- Provide a quiet, peaceful environment
- Offer outdoor recreation such as bird watching

Aesthetics

- Provide color, flowers, or fruit
- Compliment a building or beautify a street, park, home, campus, or neighborhood

Environmental Improvement

- Reduce soil erosion and manage stormwater
- Improve air and water quality
- Offer shade in the summer and reduce winds in the winter
- Provide wildlife habitat and food
- Reduce noise and create buffers
- Increase plant diversity
- Mitigate the impacts of climate change

Despite the numerous advantages that trees provide, there are also potential problems that must be considered. Trees can contribute to:

- Litter with messy fruit, branches, or large leaves
- Damage to pavement and utilities
- Costs for establishment, maintenance, and removal
- Unintended spread of invasive species

These trees create visual screens, calm traffic, create a gateway, and provide shade and fall color to a street in St. Albans, Vermont.

Site Conditions

BELOW GROUND CONDITIONS

Roughly 80 percent of urban tree health problems originate from conditions below ground. A tree is supported both structurally and nutritionally by its roots. Any limitations placed on them will result, directly or indirectly, in future health problems.

Understanding a site's limitations and potentials is necessary for successful plantings and involves analyzing above and below ground conditions.

Soil texture, defined by the soil's relative amounts of sand, silt, and clay, influences moisture holding capacity, drainage rate, and nutrient availability. Clay soils retain moisture and nutrients but are prone to compaction. Sandy soils drain well and resist compaction, but can be nutrient poor and moisture deficient. Soil texture can be approximately evaluated by rubbing moistened soil between your fingers. Sandy soils feel gritty, clay soils feel smooth, and loam soils are a combination of both gritty and smooth.

Soil structure is determined by the arrangement of soil particles (sand, silt, and clay) and their associated pore spaces. Land development and use often degrades soil by increasing compaction, adding pollutants, excavating and removing topsoil, and fostering runoff and erosion. Accordingly, an initial soil assessment and use of best management practices for soil conservation is necessary for a successful community forestry program. The dominant soil constraint in urban areas is soil compaction, which destroys the soil structure by reducing pore spaces needed for air, water, and roots. Depending upon the degree of compaction, plant health and survival can be severely reduced. Although plant species vary in tolerance, no plant is immune to the negative impacts of severely compacted soils. The addition of soil amendments, selecting more tolerant species, and tillage or aeration are some options. The measurement of the soil's bulk density - the weight of the dry soil per unit volume - is an alternative useful measurement; as bulk density increases, compaction increases.

Drainage is the soil's ability to intercept and remove surface or groundwater and is influenced by soil texture and structure. Clay soils are easily compacted and often lack pore spaces to allow water to drain freely, limiting the availability of oxygen to the roots. Sandy soils with large pores hold little water and are often too dry for many trees. Soil compaction and obstacles such as bedrock and other impermeable objects beneath the soil can also inhibit drainage. To determine your site's drainage, observe the site, especially after a rain event. Is the water draining or is it standing on the surface? A day or so after a rain event, dig into the soil: is it wet or dry? If you want a more accurate drainage rate (fast, moderate, slow), dig a hole one foot deep and fill it with water. Fast drains more than 6 inches in an hour; moderate drains 1 – 6 inches per hour, and slow less than 6 inches per hour. The addition of organic matter or choosing drought tolerant species is recommended for dry soils; managing rain water and choosing species that can tolerate intermittent flooding is recommended for wet soils.

Soil pH and plant nutrients are important determinants of a site's suitability for plant growth. The successful growth of most plants requires 10 to 14 essential nutrients in an appropriate balance. Although plants may tolerate extreme conditions, symptoms of nutrient deficiencies or toxicities affect the quality of the foliage, rate of growth, and susceptibility to pests and diseases. The availability of these elements is affected by soil pH and organic matter content. Most plants prefer soils within a pH range of 5.5-7.0. Soils in Vermont tend to be acidic, although areas surrounded by sidewalks, foundations, and roads tend to have higher alkalinity, with pH above 7.5 due to limestone-based components. Soil fertility, pH, and organic matter can be evaluated using standard soil tests and is recommended before planting. Soil testing is available through the University of Vermont's Soil Testing Lab for a nominal charge per

Site Conditions

sample. Materials and instructions needed for sampling soils can be obtained at University of Vermont Extension offices located across the state.

For more information, contact:

UVM Agricultural and Environmental Testing Lab
Jeffords Hall, Room 262; 63 Carrigan Dr.
Burlington, VT 05405
phone: 802-656-3030; **email:** Agtesting@uvm.edu
website: uvm.edu/pss/ag_testing/

Road salt is frequently used to de-ice roads and sidewalks during winter months. The use of salt, most commonly sodium chloride (NaCl), can reduce water absorption, nutrient uptake, root growth, and long-term plant growth. Therefore, locations that will receive frequent salting should be noted and salt tolerant plants should be planted. Salt damage to soils is usually most severe within 25 feet of a road or parking lot. Planting tolerant species further away from or above the grade of the roadway can help reduce problems associated with de-icing salts. Pay close attention to the typical speed of the traffic moving adjacent to the planting site. Faster moving traffic increases the area of salt spray and may require you to plant further from the road. Plants in these areas near roads are also often exposed to air pollutants, such as ozone, that can also cause stress. If high salts are a problem at the site, extensive watering to leach the salts out of the soil can help as long as the soil is well-drained.

Soil volume is the measure of soil available for root growth. Inadequate rooting space will limit water availability, nutrient uptake, and oxygen exchange necessary for successful plant growth. Common barriers to rooting space include sidewalks, roads, underground obstacles, and containers (planting containers should always be removed prior to planting).

Heavily compacted soils can limit available soil volume and be an obstacle for expanding tree roots. Although some species may be more tolerant of this, it advised to include only uncompacted soils in your determination of available rooting space or usable soil volume. When determining available soil volume, take into account that tree roots grow near the surface, primarily in the top 2 to 3 feet of soil. For this reason soil below 3 feet should not be considered in soil volume calculations.

In this guide we list the recommended soil volume for each species. These recommendations are under ideal circumstances, and in many cases you will be forced to plant in much tighter areas. Compensating for this by planting in longer, narrow strips is generally acceptable; however be certain the root system can spread far enough in all directions to keep the tree windfirm when fully grown.

Where soil volumes are restricted, select smaller species, those known to have limited root systems, or those that are especially heat and drought tolerant. The use of engineered soils, such as Structural Soil© or Silva Cells, can be incorporated to increase soil volume available for tree roots and meet load-bearing requirements for structurally sound pavement installation.

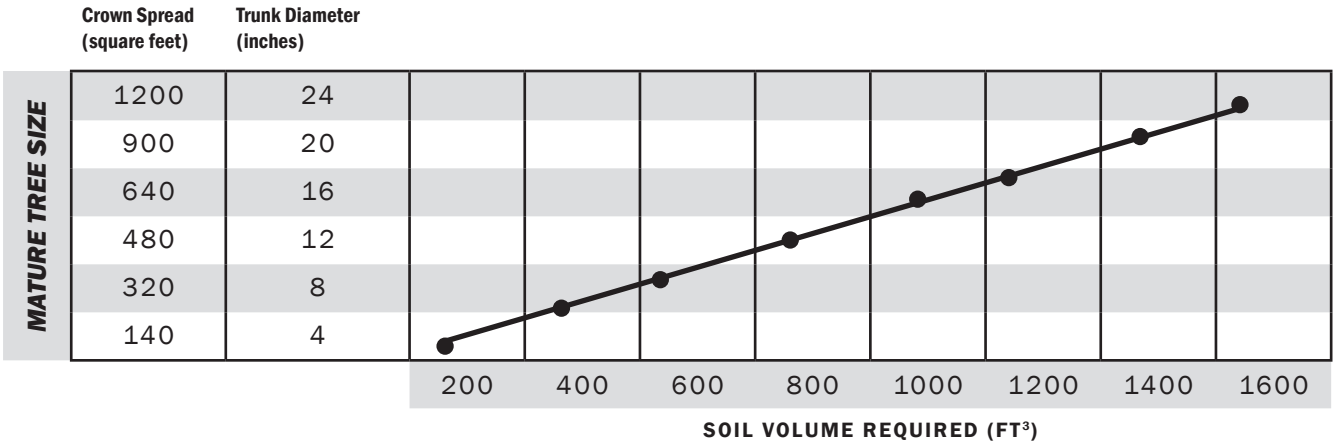


Figure 1. Soil volume & ultimate tree size relationship. James Urban, Urban Trees + Soils, Annapolis, MD

Site Conditions

ABOVE GROUND CONDITIONS

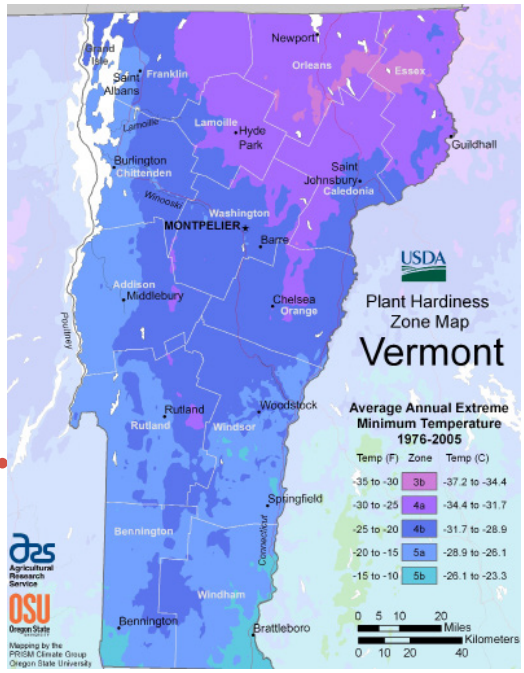
Just as trees require a healthy root system, they need a healthy stem and crown. The ability of a tree's crown to capture sunlight and manufacture food for the tree dictates the overall success of that tree, as long as the roots are able to support the crown with water and nutrients. Once you have identified all potential limitations below ground, look at the above ground conditions to make sure that nothing will prevent your trees from developing full, healthy crowns.

Exposure is important as plants differ in their adaptations to temperature and ability to withstand cold. Plant Hardiness Zones have been developed by the USDA to assist in selecting plants adapted to the climate of a particular region. Plant rating for hardiness zone is based on a plant's ability to survive over winter at a specified average minimum winter temperature. The lower the temperature, the lower the zone number. Vermont's USDA hardiness zones range from 5b – 3a. Furthermore, it is important to consider that microclimates exist within communities and are influenced by gray infrastructure, different exposure to light (natural or artificial), wind exposure, precipitation patterns, and temperature extremes.

Overhead space is the available space above the ground to accommodate plant growth. Planting plans should recognize the size and shape of the tree throughout its life, and allow enough overhead space for the mature crown size. Problems and costs caused by trees planted too close to buildings, power lines, streetlights, and traffic signs can be avoided by selecting species with traits that will fit the space and will minimize underground and above ground space disruptions and safety concerns. To avoid overhead utility conflicts, select small trees with a maximum mature height of 25 feet for locations under overhead power lines, medium trees with a maximum height of 45 feet for locations 20 – 40 feet away, and larger trees for locations greater than 40 feet away. Other street tree standards include planting trees at least 5 feet from water mains, gas boxes, and inlets or manholes, 10 feet from fire hydrants, and 15 feet from street lights.

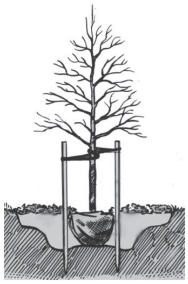
Hardiness Zone Map

Zone 3a -40° F to -35° F | ***Zone 3b*** -35° F to -30° F
Zone 4a -30° F to -25° F | ***Zone 4b*** -25° F to -20° F
Zone 5a -20 F to -15° F | ***Zone 5b*** -15° F to -10° F



Legal concerns Always check on ownership or easement locations as well as historical or landmark status that may prohibit you from planting in a certain area. If planting along residential roads, familiarize yourself with the Vermont Tree Warden Statutes, other local tree ordinances or policies, and know the extent of the public-right-of-way. Contact your town planning office and/or public works department for local right-of-way boundaries. Along state roads, refer to the Agency of Transportation's Street Tree Policy and contact the VTrans permitting office for further guidance on planting trees within the State's right-of-way. Check local ordinances that may prohibit the planting of certain species, such as those listed on the Vermont Agency of Agriculture, Food & Markets Quarantine for Noxious Weeds (Noxious Weeds Rule) or on the unofficial invasive plant Watch List that is curated by the Vermont Invasive Exotic Plant Committee.

TREE PLANTING



Purchasing a tree is a long term investment. How well this investment grows depends on the type of tree selected, the planting location, and the care given. Here are 10 steps to successful tree planting.

1. Move the tree properly. Young trees are not 2 x 4's; avoid carrying trees solely by their trunks unless they are bare root trees. Wrap canopy in burlap or cloth to prevent wind damage during transport.

2. Remove trunk and branch dressing and packaging. Leave root packaging in place. Ensure string or other materials are removed from crown.

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 - the anchoring roots - 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 the roots 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. Place the tree in the hole. If the tree has a heavy root ball, roll or slide it into the hole.

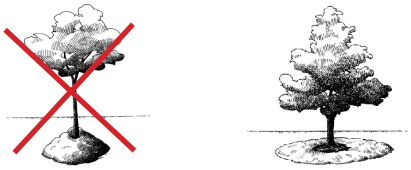
7. Remove root packaging. **B&B trees**: Cut, peel back, and remove as much of the wire basket and burlap as possible. **TIP:** Cut the bottom of the wire basket off before placing it in the hole; then you can easily cut up the sides of the basket and peel it away.

Container trees: lay the root ball in the hole and carefuly remove the container from the roots. Break up any pot-bound, circling roots.

8. Backfill with the same soil. Make sure the trunk is straight by levering the root ball with a shovel. Do not use excessive force. 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, as this could prevent the roots from leaving the planting hole and could encourage circling roots.

9. Irrigate. Water the root ball and entire planting area; deep, very slow infiltration is best.

10. Mulch. Put a 2-4 inch layer of organic mulch over the planting area. Pull mulch away from the trunk so none touches the bark. Replenish mulch to maintain this depth, only as needed. There should never be more than 4 inches of mulch over the roots; too much can prevent the roots from accessing necessary oxygen.



Water is critical during the first three years after planting. Too little or too much can kill a tree. 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 needed. As a general guide, ten gallons of water should slowly be applied once or twice a week if rainfall is insufficient.

Tips:

- Water where the roots are. The first year they are right around the root ball. Expand the watering area as the tree and roots grow.
- Watering devices such as Treegators© or a five gallon bucket with tiny holes (1/8 inch) to release water slowly, soaking the soil while minimizing surface runoff.
- Use less frequent but more thorough watering sessions, rather than frequent shallow watering.

TREE MAINTENANCE

Maintenance needs and arboriculture practices for planted trees depend on their function, site condition, species, and age compositions. Some trees will require intensive maintenance; considering the available capacity and maintenance needs will aid in effective tree species selection. The advantages and disadvantages of tree species should be weighed against each other in the selection process. Regardless of species selected, all plantings require maintenance during the early stages of establishment, most importantly watering. Investing in tree care and maintenance, especially in the establishment years, will result in healthy long-lived trees.

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

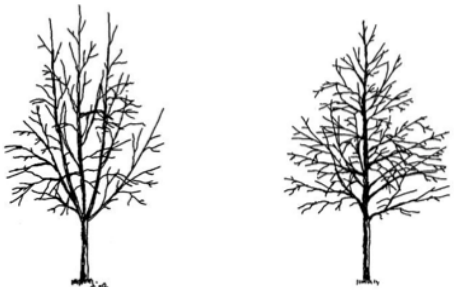
Safety: Remove branches that could fall and cause injury or interfere with utility lines, roads, and infrastructure.

Health: Remove diseased or insect-infected wood, improve structure, or reduce likelihood of damage during storms.

Fruit Production: Increase light and air circulation.

Appearance: Control plant size and form, enhance views.

*Pruning is a specialized skill. If you are uncertain about the task, hire a Certified Arborist. Find an arborist at: treesaregood.org/findanarborist



Before *After*

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 long-term commitment. Here are some steps to guide you as your tree grows:

Pruning 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.

Pruning as the tree grows

- Thin the crown. Remove rubbing branches and continue to promote one central leader. Reduce or remove competing leaders. Never remove more than 25% of the crown in a given growing season.
- Raise the crown to provide clearance for sidewalks, vehicles, and buildings. Check local ordinances for minimum branch height mandates.
- Reduce the height and spread of the crown as necessary. Bring the branch back to a lateral branch no less than 1/3 the size of the stem removed.

TREE SPECIES SELECTION

Based on the purpose, site conditions, and maintenance requirements, develop a set of criteria that will be used to select the most suitable plants. Certain criteria should hold more weight than others. Choose plants based on their ability to withstand environment conditions, prevention of infrastructure conflicts, and for the long-term sustainability of the urban forest. Rarely will you find the perfect tree that will fit an entire list of selected criteria, yet understanding the purpose and criteria of the planting can avoid many unforeseen pitfalls. Green infrastructure is the only infrastructure that will increase in value over time if the “right tree” is put in the “right place”.

SPECIES DIVERSITY

Maintaining a high level of species diversity in our urban ecosystems is important. Besides providing the aesthetic appeal of a variety of shapes and sizes along streets or in town greens and parks, increasing tree species diversity can also help safeguard against species-specific insect or disease outbreaks. Simply selecting the right tree for every site should in itself create diversity, yet we often rely far too heavily on one seemingly ideal species.

This guide represents our best efforts and information in the early 21st century. We recognize that our climate and forests are in flux and that there are many unknown impacts of climate change, including migration of species and increased stressors on trees. Similarly, it is important to note that cultivated varieties of trees – those that are grown from stem cuttings or grafting and not from seed – are constantly developed and that our tree species list is not comprehensive of all options.

It is important to recognize that species diversity is not only a function of how many species are present, but also depends on the proportion of each species relative to others and their overall spatial and age-class distribution. In other words, planting a single tree of one species for every hundred trees of another species scarcely improves diversity. Similarly, diversity is only improved significantly if all species are growing together, intermingled over an entire area as opposed to having each species in a separate area. Maintaining a predetermined level of diversity, such as specifying that no one genus should comprise more than 10 percent of the community tree population, is a good way to help prevent some of these situations from occurring.

PEST AWARENESS

The invasive emerald ash borer has already killed millions of ash trees (genus *Fraxinus*) across North America. For decades, ash trees were a popular urban tree choice known for their tolerance to tough growing conditions. While they were planted widespread throughout Vermont communities, we no longer recommend planting ash trees. Other invasive pest species of concern include Asian long-horned beetle, hemlock woolly adelgid, oak wilt, and spotted lanternfly. **For more information on Vermont invasive tree pests or to report a suspect invasive pest, visit VTinvasives.org**

POTENTIALLY INVASIVE TREES

We have been planting non-native trees in the landscape for hundreds of years and have enjoyed the diversity and beauty they bring. However, we are now more aware of several that have aggressive growth habits that result in their invasion into wild, unmanaged areas such as wetlands and woodlands. Once established, these invasive exotic trees can significantly disrupt habitats. Thus, we all need to be aware of these few species and avoid or use caution when planting.

For the Second Edition of this publication (2022), we have removed any species that are listed under the Noxious Weeds Rule, on the Watch List curated by the Vermont Invasive Exotic Plant Committee, or are showing potential to be invasive in Vermont. This designation is based on understanding the behavior of these plants in places with similar growing conditions, as well as places that have the climate Vermont is predicted to have in the future.

Invasive tree species excluded from this publication are:

- Amur Maple (*Acer ginnala*)
- Norway Maple (*Acer platanoides*)
- Tree-of-Heaven (*Ailanthus altissima*)
- Goldenrain Tree (*Koelreuteria paniculata*)
- Amur Corktree (*Phellodendron amurense*)
- Callery Pear (*Pyrus calleryana*)
- Black locust (*Robinia pseudoacacia*)
- Japanese Tree Lilac (*Syringa reticulata)*

Resources for More Information

SEARCHABLE DATABASES

- **Vermont Tree Selection Guide:** vtcommunityforestry.org
- **University of Connecticut Plant Database**: plantdatabase.uconn.edu/
- **Arbor Day Foundation Tree Guide**: arborday.org/trees/treeguide/

RELEVANT INFORMATION ABOUT TREE SPECIES & PLANTINGS (VT)

- **VT Forests, Parks, & Recreation's Forestry Resources:** fpr.vermont.gov/forests
- **VT Fish & Wildlife's Endangered and Threatened Plants List and Rare and Uncommon Native Vascular Plants list**: vtfishandwildlife.com/conserve/endangered-and-threatened-species
- **Vermont Noxious Weeds Quarantine List and Invasive Exotic Plant Watch List:** vtinvasives.org/gallery-of-terrestrial-plants
- **Vermont Invasives**: vtinvasives.org
- **VT Department of Environmental Conservation's riparian planting guide**: dec.vermont.gov/watershed/wetlands/protect/restore
- **UVM Extension Watershed Forestry Resources**: uvm.edu/seagrant/watershed-forestry-partnership/watershed-forestry-resource-library

FINDING PROFESSIONALS AND EXPERTS IN VERMONT

- **International Society of Arboriculture's Find an Arborist tool**: treesaregood.org
- **Vermont Nursery & Landscape Association**: vnlavt.org
- **Vermont Chapter of the American Society of Landscape Architects**: vtasla.org

URBAN FORESTRY & ARBORICULTURAL RESOURCES

- **Vermont Urban & Community Forestry Program**: vtcommunityforestry.org
- **USDA Forest Service, Urban & Community Forestry Program**: fs.usda.gov/managing-land/urban-forests/ucf
- **Vibrant Cities Lab:** vibrantcitieslab.com

Key to Tree Species List

Form Indicates the natural shape of the tree.

 Spreading  Columnar  Round

 Upright oval  Pyramidal  Vase

Tolerances Indicates the species' ability to withstand drought, poor drainage, alkaline soil, salt, air pollution, and shade.

 Intolerant  Moderate  Tolerant

Mature Height The total height of a species' typical at maturity.

Crown Spread The total width of a typical species' crown at maturity.

Soil Volume Lists the recommended soil volume for the species/cultivar assuming a square area that is 3 feet deep (e.g. 25' corresponds to a volume of 25'x25'x3'). Rooting space is calculated by taking half of a tree's mature crown spread.

Planting Area

Small: Indicates planting sites with limited soil volume, such as narrow greenbelts and pits less than 6 feet wide. Depths should be 3 feet. Planting should not occur in less than 4 by 4 foot spaces.

Medium: Indicates planting sites with an intermediate amount of soil volume. Greenbelts greater than 6 feet wide, but still limited in the amount of below ground growing space.

Large: Indicates planting sites that have large amounts of soil volume, such as parks and open space.

Hardiness The lowest zone rating for each species.

3a -35° to -40°
3b -30° to -35°
4a -25° to -30°
4b -20° to -25°
5a -15° to -20°
5b -10° to -15°

Limitations Problems you might encounter with a specific tree planted in Vermont.

1. Weak wood and/or branch structure, making it susceptible to breakage during ice or snow accumulation and strong winds.
2. Fruit and/or leaves can be a litter issue.
3. Sensitive to insect/disease pests.
4. Limited availability, making it difficult to locate at local nurseries.
5. Prone to excessive sucker growth from roots or lower trunk and may require regular pruning.
6. Fall dig hazard, indicating that trees should be planted only during the spring.

Features Indicates which species and cultivars have the following features:

 **Flower:** Indicates which species have notable flowers.

 **Fruit:** Indicates which species have notable fruits.

 **Fall Foliage:** Indicates which species have notable fall foliage.

 **Winter Interest:** Indicates which species have notable winter interest (bark, branch structure).

 **Native to Vermont:** Indicates which species are inherent and original to Vermont.

 **Under Power Lines:** Indicates which species can be planted underneath power lines (<25 ft. in height).

 **Evergreen:** Indicates which species have evergreen leaves or needles.

 **Wildlife:** Refers to whether a species' fruit has wildlife value.

Key to Scientific Names in Tree Species List

Common Name	Scientific Name
Apple	*Malus*
Baldcypress	*Taxodium*
Beech	*Fagus*
Birch	*Betula*
Black gum, Tupelo	*Nyssa*
Buckeye, horeschestnut	*Aesculus*
Catalpa	*Catalpa*
Cedar	*Thuja*
Cherry	*Prunus*
Dawn Redwood	*Metasequoia*
Dogwood	*Cornus*
Elm	*Ulmus*
Filbert, Hazel	*Corylus*
Fir	*Abies*
Hackberry	*Celtis*
Hawthorn	*Crataegus*
Hemlock	*Tsuga*
Hickory	*Carya*

Common Name	Scientific Name
Honeylocust	*Gleditsia*
Katsura	*Cercidiphyllum*
Kentucky Coffeetree	*Gymnocladus*
Linden	*Tilia*
Maple	*Acer*
Musclewood, Ironwood	*Carpinus*
Oak	*Quercus*
Pagoda Tree	*Styphnolobium*
Pine	*Pinus*
Redbud	*Cercis*
Shadbush, Serviceberry	*Amelanchier*
Silverbell	*Halesia*
Spruce	*Picea*
Sycamore, Planetree	*Platanus*
Tuliptree	*Liriodendron*
Walnut	*Juglans*
Witchhazel	*Hamamelis*
Yellowwood	*Cladrastis*

BUYING 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 young 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 the Vermont Nursery and Landscape Association: vnlavt.org

☐ Select the appropriate stock for your planting needs: Bare root, container, or balled and burlapped (B&B).

☐ Inspect the roots and the root collar and ensure there are no girdling/circling roots.

☐ Inspect the trunk for signs of damage or weakness in the bark.

☐ Inspect the crown for an obvious central leader and strong branch attachments to the trunk.

Tree Selection Worksheet

Complete the following worksheet to help identify appropriate trees for the site.

Tree Site & Space

Site location/Description: _____

Desired mature height: _____ Desired mature spread: _____

Desired Tree Characteristics

Form

☐ Spreading ☐ Columnar ☐ Round

☐ Upright Oval ☐ Pyramidal ☐ Vase

Hardiness Zone

☐ 5b (-10° to -15°) ☐ 5a (-15° to -20°) ☐ 4b (-20° to -25°) ☐ 4a (-25° to -30°) ☐ 3b (-30° to -35°) ☐ 3a (-35° to -40°)

Does Well In

☐ Drought ☐ Poor Drainage ☐ Alkaline Soil ☐ Salt ☐ Shade ☐ Air Pollution

Features of Interest

☐ Flowers ☐ Fruits ☐ Wildlife ☐ Fall Foliage ☐ Winter Interest

☐ Native to VT ☐ Evergreen ☐ Fits Under Power Lines

Available Soil Volume

☐ **Small**

Planting sites with limited soil volume, such as narrow greenbelts and pits less than 6 feet wide. Depths should be at least 3 feet. Planting should not occur in less than 4 by 4 foot spaces.

☐ **Medium**

Planting sites with an intermediate amount of soil volume. Greenbelts greater than 6 feet wide, but still limited in the amount of below ground growing space.

☐ **Large**

Planting sites that have large soil volume, such as parks and open space.

Note: *On the tree species list, the smallest adequate soil volume is listed.*

TREE SPECIES LIST

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
Abies balsamea var. phanerolepis	—	Canaan Fir		3b	75	25	15	L							4	
Specimen tree, also known as the West Virginia balsam fir. Has been used in Christmas tree production and has fragrant needles. Does best in full sun or light shade and in moist soils. Does not tolerate urban pollution.																
Abies concolor	—	White Fir		4a	50	25	15	L							6	
Specimen tree. Most tolerant fir and good replacement for disease sensitive Colorado blue spruce.																
Abies fraseri	—	Fraser Fir		4a	40	25	15	L							6	
Specimen or accent tree. Avoid hot and dry conditions, and high pH.																
Acer campestre	—	Hedge Maple		5	30	30	15	S								
Possibly a zone 4. Extremely adaptable and tolerates severe pruning. Prune early for structure and may need to be limbed up for clearance. Slow grower.																
Acer x freemanii	'Armstrong'	Freeman Maple		4a	60	20	20	M							1,6	
Fastigiate/columnar form. Cross between a red and silver maple. Fast grower, early structural pruning needed.																
A. x freemanii	Autumn Blaze® 'Jeffersred'	Freeman Maple		4a	50	40	20	M							1,6	
Cross between a red and silver maple. Fast grower, early structural pruning needed, concern over branch breakage as it ages. Excellent orange to red fall color.																
A. x freemanii	'Sienna Glen'	Freeman Maple		4a	40	40	20	M							1,6	
Cross between a red and silver maple. Strong central leader for species, early structural pruning needed. Deep orange to red fall color.																
Acer griseum	'Ginzam' Gingerbread™	Paperbark Maple		5	25	25	13	S							4,6	
Specimen tree. Potentially zone 4 in protected sites. Trifoliate leaves and beautiful peeling bark. Finer bark and faster growth than species. Limited availability.																
Acer miyabei	'Morton' State Street™	Miyabe Maple		4	40	40	20	S							4	
Specimen tree. More cold hardy alternative to A. Campestre. Corky bark.																
Acer rubrum	—	Red Maple		3	75	40	20	M							1,6	
Fast grower and easy to transplant. Chlorosis can occur in alkaline soils. Somewhat weak wood, prune for structure. Thin bark can easily be damaged. Fall color and intensity varies.																
A. rubrum	'Autumn Flame'	Red Maple		3b	50	30	20	M							1,6	
Excellent and early red fall color that last longer than species. Notable for its round form when young.																
A. rubrum	Autumn Radiance®	Red Maple		4a	50	40	20	M							1,6	
Vibrant red foliage early in the fall. Quite adaptable but prefers acidic soils and may develop chlorosis in alkaline soils.																
A. rubrum	'Bowhall'	Red Maple		4	50	15	20	M							1,6	
Upright form with broad columnar head. Yellow to red fall color.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
A. rubrum	Northwood®	Red Maple		3b	50	35	20	M							1,6	
Selected for tolerance to harsh winter conditions. Orange to red fall color. Branches ascend 45 degrees upward.																
A. rubrum	Redpointe®	Red Maple		4a	45	30	20	L							1,6	
Cross between a red (75%) and silver (25%) maple. Early structural pruning needed. Excellent fall red color and heat tolerance.																
A. rubrum	Red Sunset®	Red Maple		4b	50	40	20	M							1,6	
Dependable orange to red fall color.																
A. rubrum	Scarlet Jewell™	Red Maple		3b	70	30	20	M							1,6	
Early deep red foliage. Somewhat resistant to frost cracking.																
Acer saccharinum	—	Silver Maple		3	70	50	35	L							1,5	
Fast grower, with fairly weak wood. Shallow rooting system can damage sidewalks, pipes, and other infrastructure. Useful for wet areas. Transplants well.																
Acer saccharum	—	Sugar Maple		3	75	50	25	M								
Does not perform well in tight, compacted situations.																
A. saccharum	'Bonfire'	Sugar Maple		3	65	50	25	M								
Does not perform well in tight, compacted situations. Orange to red fall color.																
A. saccharum	Fall Fiesta®	Sugar Maple		3	75	50	25	M								
Does not perform well in tight, compacted situations. Fast grower. Yellow, orange and red fall color.																
A. saccharum	Green Mountain®	Sugar Maple		3	70	45	25	M								
Dark green summer foliage. Variable. Performs better than species in dry, tight conditions.																
A. saccharum	'Legacy'	Sugar Maple		3	50	35	25	M								
Red to orange fall color, dark, lustrous summer leaves. Performs better than species in dry, tight conditions.																
Acer triflorum	—	Three-flower Maple		4	30	30	15	M							4	
Specimen tree.																
Aesculus x arnoldiana	'Autumn Splendor'	Arnold Buckeye (YELLOW/GOLD)		4	75	25	20	M							4,6	
Natural hybridized buckeye first discovered at the Arnold Arboretum in Cambridge, MA. Showy spring flowers. Relatively pest-free and urban tolerant.																
Aesculus x carnea	'Briotii'	Ruby Red Horsechestnut (RED)		5a	40	40	20	M							2,6	
Specimen tree. Sometimes listed as zone 4.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
Aesculus glabra	—	Ohio Buckeye (YELLOW)		3	60	40	20	L							2,3 4,6	
Reserve for large/wild natural settings. Not recommended for streets or small residential areas. Messy and prone to various disease and insect damage.																
Aesculus hippocastanum	'Baumanii'	Horsechestnut (WHITE)		4a	75	70	35	L							1,3,6	
Double white flowers and fruitless. Prune in spring, avoid extremely dry condition. Leaf scorch, leaf blotch and powdery mildew can be a problem.																
There are many serviceberry (Amelanchier) varieties and cultivars available; consult a professional for what does best in your area and for your site. Below are a few tried and true options.																
Amelanchier laevis	'Cumulus'	Cumulus Serviceberry (WHITE)		4a	10	8	10	S								
Relatively low maintenance. Disease resistent. Often available in tree or multi-stemmed shrub form.																
Amelanchier x grandiflora	'Autumn Brilliance'	Apple Serviceberry (WHITE)		4a	25	25	13	S							3	
Not reliable under high stress conditions. Red fall color.																
A. x grandiflora	'Robin Hill'	Serviceberry (PINK)		4	25	18	10	S							1	
Produces very little fruit. Red fall foliage. Thrives in moist soils and direct sunlight. Adaptable and tolerant of urban conditions. Often available multi-stemmed.																
Betula alleghaniensis		Yellow Birch		3b	75	60	30	M							1,6	
When young the bark is curly and golden-yellow, turning to grey-brown in maturity. Largest species of birch in North America. Notable yellow fall foliage. Prefers cool, moist soils and does not do well in hot, dry areas.																
Betula nigra	'Little King' Fow Valley®	River Birch		4a	15	15	10	S							1,6	
Exfoliating bark. Develops chlorosis in high pH. Leaf spot in wet years. Most adaptable birch. Small form.																
B. nigra	'Cully' Heritage®	River Birch		4a	50	35	18	S							1,6	
Exfoliating bark. Develops chlorosis in high pH. Leaf spot in wet years. Most adaptable birch.																
Betula papyrifera	—	Paper Birch		2	70	45	25	M							11	
Distinct white bark that exfoliates. Best suited for cooler climates. Transplants well. Not recommended for tough sites.																
Carpinus betulus	'Fastigiata'	European Hornbeam		5a	35	20	10	S							4,6	
Cultivar name misleading as plant develops oval shape. Tolerates heavy pruning. Urban tolerant. Good for screens, hedges, groupings, planter boxes, around buildings.																
Carpinus caroliniana	—	American Hornbeam		3a	30	25	13	S							4,6	
Slow to recover from transplanting. Tolerates pruning for hedge or screen.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
C. caroliniana	'JN Upright' Firespire™	American Hornbeam		3	30	15	10	S							4,6	
Slow to recover from transplanting. Orange to red fall color. Tolerates pruning for hedge or screen.																
Carya glabra	—	Pignut Hickory		4	65	40	20	L							2,4,6	
Golden yellow fall color. Difficult to transplant. Limited availability.																
Carya ovata	—	Shagbark Hickory		4	80	35	28	L							2,4,6	
Yellow to brown fall color. Difficult to transplant. Beautiful 'shaggy' bark. Limited availability.																
Catalpa speciosa	—	Northern Catalpa (WHITE)		4a	60	40	20	L							1,2,4	
Coarse large leaves. Appropriate for large landscapes. Not recommended for streets or smaller residential areas. Very adaptable.																
Celtis occidentalis	—	Common Hackberry		3a	60	50	25	M							1,6	
Good tolerance to tough conditions. Interesting bark. Affected by several pests that do not kill the tree, but can make it unattractive.																
C. occidentalis	'Prairie Pride'	Common Hackberry		3	55	50	25	M							1,6	
Good tolerance to tough conditions. Interesting bark. Affected by several pests that do not kill the tree, but can make it unattractive. Lighter fruit crop and does not develop witches broom.																
C. occidentalis x C. laevigata	'Magnifica'	Magnifica Sugar Hackberry		5	50	40	25	M							1,6	
Cross between sugar and common hackberry. Less hardy, but withstands drought, salt and compacted soil better.																
Cercidphyllum japonicum	—	Katsuratree		4b	60	35	18	M							1,6	
Difficult to transplant, water is needed during establishment. Bark is light gray and flaky to slightly shaggy.																
Cercis canadensis	—	Eastern Redbud (PINK)		4	25	25	13	S							1	
Avoid wet soils. Suffers when stressed. Does best in a protected location. Recommend ensuring northern provenance or northern seed source.																
C. canadensis	'Alba'	Eastern Redbud (WHITE)		4b	25	25	13	S							1	
Avoid wet soils. Suffers when stressed.																
C. canadensis	'Northern Strain'	Eastern Redbud (ROSE)		4	25	25	13	S							1	
Avoid wet soils. Suffers when stressed. More cold hardy species.																
Cladrastis kentukea	—	Yellowwood (WHITE)		4a	50	55	25	L							1,6	
Structural pruning is necessary for poor branch attachment. Prune in summer to avoid bleeding.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
Cornus kousa	—	Kousa Dogwood (WHITE)		4b	30	25	15	S							2,5	
Slow-growing specimen tree. Has an upright form when young that develops into a horizontal-branching, wide-spreading tree at maturity. Relatively tolerant of a variety of growing conditions and pest-free, though intolerant of waterlogged sites. Flowers in late spring, has notable scarlet fall foliage.																
Cornus mas	'Golden Glory'	Corneliancherry Dogwood (YELLOW)		4b	20	20	10	S							2,5	
Can be pruned to raise crown for more tree like form and expose exfoliating bark. Relatively adaptable, but may slow to reestablish. Heavy bloomer, but may be less cold hardy.																
C. mas	'Redstone'	Corneliancherry Dogwood (YELLOW)		4b	25	20	10	S							2,5	
Can pruned to raise crown for more tree like form and expose exfoliating bark. Relatively adaptable, but may slow to reestablish. Heavy fruit set.																
Corylus colurna	—	Turkish Filbert		4	50	30	15	S							2	
Tolerant of tough conditions, but will require watering for establishment.																
Crataegus crus-galli var. inermis	'Cruzam' Crusader™	Thornless Cockspur Hawthorn (WHITE)		4a	25	25	13	S							3,6	
Thornless cultivar.																
Crateagus phaenopyrum	Washington Lustre®	Washington Hawthorn (WHITE)		4a	25	25	13	S							3,6	
Adaptable and tolerant of many conditions. Pruning lower limbs may be necessary if planted as street tree. Good vigor and fewer thorns.																
Crataegus viridis	'Winter King'	Winter King Hawthorn (WHITE)		4a	25	25	13	S							3,6	
Adaptable and tolerant of many conditions. Pruning lower limbs may be necessary if planted as street tree. Thorns. Good fall color and showy winter/fall fruit.																
Fagus sylvatica		European Beech		4a	50	40	20	L							6	
More tolerant of urban soil conditions than American Beech - avoid wet soils. Many cultivars exist with options for size, leaf color, and form.																
Ginkgo biloba	'Autumn Gold'	Ginkgo		4	50	30	15	S							6	
Adaptable and tolerant. Golden yellow fall color. Fruitless. Prune in spring. Symmetrical, broad and rounded crown.																
G. biloba	'Magyar'	Ginkgo		4	50	25	13	S							6	
Adaptable and tolerant. Yellow fall color. Fruitless. Prune in spring. Upright, ascending branching.																
G. biloba	Princeton Sentry®	Ginkgo		4	60	25	13	S							6	
Adaptable and tolerant. Yellow fall color. Fruitless. Prune in spring. Upright habit that tapers to a point.																
Gleditsia triacanthos var. inermis	'Halka'	Honey Locust		4a	40	40	20	M							3,6	
Adaptable and tolerant. Prune in fall. Fruitless. Round head with less dropping branches.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
G. triacanthos var. inermis	'Imperial'	Honey Locust		4a	30	35	18	M							3,6	
Adaptable and tolerant. Prune in fall. Seedless. Essentially fruitless. Most compact and formal form.																
G. triacanthos var. inermis	'Shademaster'	Honey Locust		4a	45	35	18	M							3,6	
Adaptable and tolerant. Prune in the fall. Essentially fruitless. Upright, symmetrical habit.																
G. triacanthos var. inermis	'Skyline'	Honey Locust		4a	45	35	18	M							3,6	
Adaptable and tolerant. Prune in the fall. Essentially fruitless. Ascending branches. Bright golden yellow fall color. One of the most cold hardy.																
G. triacanthos var. inermis	'Sunburst'	Honey Locust		5	35	30	15	M							3,6	
Adaptable and tolerant. Prune in the fall. Fruitless. Golden leaves on new growth changing to bright green. More susceptible to canker disease.																
Gymnocladus dioicus	—	Kentucky Coffeetree		3b	70	50	25	L							2	
Adaptable and tolerant to urban conditions. Good for large areas, can be messy.																
G.dioicus	Expresso™	Kentucky Coffeetree		3b	50	40	20	M								
Male form, so this tree does not produce seedpods. Very adaptable, tolerant, and hardy. A relatively low maintenance tree.																
Halesia carolina	—	Carolina Silverbell (WHITE)		4	35	25	13	S							6	
Difficult to transplant. Chlorotic in high pH soils.																
Hamamelis virginana	—	Whitchhazel (YELLOW)		3	25	20	10	S								
Prefers a moist soil. Moderate tolerance. Attractive yellow fall color. Flowers in the fall.																
Hydrangea paniculata	—	Panicle Hydrangea (VARIETY OF COLORS)		3	20	20	10	S								
Very adaptable, hardy, urban tolerant plant. Commonly found in shrub form but can be trained to grow as a small single-trunked tree. Over 70 cultivars with many different flower colors available.																
Juglans nigra	—	Black Walnut		4	75	60	30	L							2,6	
Tolerates drier soils, but prefers moist soils. Open crown. Difficult to transplant; best transplanted as a container tree. Valuable lumber tree.																
Juniperus virginiana	—	Eastern Red Cedar		4	50	20	10	S							6	
Tolerant of tough conditions. Good as specimen, in groupings, hedges or screens.																
Larix decidua	—	European/ Common Larch		2	75	30	20	L							6	
Needs moisture, well-drained and sunny conditions. Deciduous conifer with yellow fall color. More tolerant of cultivation than native Eastern Larch.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
Larix laricina	—	Eastern Larch		1	80	30	20	L							5	
Also known as tamarack. Deciduous conifer with yellow fall color. Does not tolerate heat. Not well suited to cultivation.																
Liquidambar styraciflua	'Moraine'	American Sweetgum		5	60	35	18	M							2,6	
Slow to reestablish. Not tolerant of urban conditions and does best in a protected location. Prune during winter. Most vigorous on wet sites. Red fall color.																
Liriodendron tulipfera	—	Tuliptree (GREEN-YELLOW)		5	90	50	25	L							6	
Reserve for large areas. Prune in winter. Large tulip-like flower. Develops scorch in poor, tight growing conditions. Yellow fall color. On VT's Rare & Uncommon Native Plant List.																
Maackia amurensis	—	Amur Maackia (WHITE)		4a	25	25	13	S								
Adaptable. Summer white flowers. Attractive bronze colored bark.																
Magnolia acuminata	—	Cucumbertree Magnolia (GREEN-YELLOW)		4a	80	60	30	L							6	
Slow to reestablish and not tolerant of tough conditions. Reserve for large areas. Prune after flowering. Thin barked, easily damaged.																
Magnolia x loebneri	'Merrill'	Loebner Magnolia (WHITE)		5	25	25	15	S							4,6	
Fast-growing specimen tree with large white flowers. Often multi-stemmed and has a dense branching habit. More resistant to frost than other magnolias.																
M. x loebneri	'Leonard Messel'	Loebner Magnolia (PINK)		5	20	18	10	S							4,6	
Specimen tree with notable fragrant, star-like pink flowers. Often multi-stemmed. More resistant to frost than other magnolias.																
Magnolia stellata	—	Star Magnolia (WHITE)		4a	25	15	8	S							1,6	
Avoid extreme sites and areas that heat up early in the spring to protect flower buds.																
M. stellata	'Centennial'	Star Magnolia (WHITE)		4a	25	15	8	S							1,6	
Avoid extreme sites and areas that heat up early in the spring to protect flower buds. Slight pink on the flower, good upright form.																
M. stellata	'Royal Star'	Star Magnolia (WHITE)		4a	10	15	8	S							1,6	
Avoid extreme sites and areas that heat up early in the spring to protect flower buds. Pink buds, white flowers. Densely branched.																
There are many crabapple (Malus) varieties and cultivars available; consult a professional for what does best in your area and for your site. Below are a few tried and true options.																
Malus sargentii	—	Sargent Crabapple (WHITE)		4	15	12	6	S							2,3	
Tolerant, small, dense tree. Relatively resistant to most crabapple diseases and insect problems.																
Malus spp.	'Donald Wyman'	Crabapple (RED-PINK)		4	20	25	13	S							2	
Spreading form, dark green foliage. Fruit persistent in winter.																

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M. spp.	'Hargozam' Harvest Gold®	Crabapple (WHITE)		4	30	20	10	S							2	
Flowers one week later than most crabs. Gold fruit that persist through winter. Moderately columnar to vase-shaped. Resistant to Japanese beetle. Disease resistant.																
M. spp.	'Purple Prince'	Crabapple (ROSE-RED)		4	20	20	10	S							2	
A prolific bloomer and fast grower. Foliage emerges as purple-bronze in the spring before turning to green. Disease resistant.																
M. spp.	Red Jewel™	Crabapple (WHITE)		4	15	12	10	S							2	
Rounded habit with horizontal branches. Dark green foliage.																
Metasequoia glyptostroboides	—	Dawn Redwood		5	100	50	25	L							4	
Performs best in moist, deep, well-drained, slightly acidic soils. Avoid frost pockets which may affect fall foliage. Several cultivars are available.																
Nyssa sylvatica	—	Black Tupelo		4b	50	35	18	M							4,6	
Difficult to transplant. Fall pruning. Great summer foliage and brilliant red fall color. Not for the most tough urban sites, but could make a nice street tree. Recommend ensuring northern provenance or northern seed source.																
Ostrya virginiana	—	Hophornbeam		3b	45	30	15	S							4,6	
Slow to reestablish. Performs best in cool, moist, well-drained slightly acidic soils.																
Parrota persica	—	Persian Ironwood		5	40	30	15	M							5	
A specimen plant with interesting, exfoliating bark. Often available in shrub form. Low maintenance and no notable insect problems.																
Picea abies	—	Norway Spruce		2	60	30	15	L							2,3	
Reserve for large areas. Performs best in well-drained, sandy soils. Prune in spring.																
Picea glauca	—	White Spruce		2	60	20	10	L							3	
Adaptable and tolerant. Reserve for large areas. Prune in spring.																
Picea omorika	—	Serbian Spruce		4	60	25	30	M								
Noted for excellent foliage. One of the most adaptable spruces.																
Pinus strobus	—	Eastern White Pine		3	80	40	20	L							1,3	
Easily transplanted and grown. Prefers moist, well-drained, acidic soils. Susceptible to white pine blister rust. Choose certified rust resistant plants. Also susceptible to white pine weevil. Prone to breakage from strong winds, ice and heavy snow.																
Platanus x acerifolia	'Bloodgood'	London Planetree		5	85	70	35	L							2,3	
Adaptable and tolerant. Attractive bark. Cold injury in harsh winters. Tolerates severe pruning. Drops twigs and leaves.																

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P. acerifolia	'Morton Thornhill' Exclamation™	London Planetree		5	60	45	23	L							2,3	
Adaptable and tolerant. Attractive bark. Cold injury in harsh winters. Tolerates severe pruning. Drops twigs and leaves.																
Platanus occidentalis	—	Sycamore		4b	100	80	40	L							2,3	
Prefers deep, rich, moist soils. Cold injury in harsh winters. Attractive bark. Drops twigs and leaves. Recommend ensuring northern provenance or northern seed source.																
Prunus maackii	—	Amur Chokecherry (WHITE)		2b	35	35	28	S							3,4,6	
Attractive bark. Dense round canopy. Prune to maintain tree shape. Limited availability.																
Prunus sargentii	'Columnaris'	Sargent Cherry (PINK)		5a	35	15	8	S							6	
Good yellow, orange to red fall color - develops early. Attractive bark. With age, becomes vase shaped. Short-lived.																
Prunus sargentii x P. subhirtella	'Accolade'	Accolade Flowering Cherry (PINK)		5a	35	20	10	S							6	
Good yellow, orange to red fall color - develops early. Attractive bark. Short-lived. Open habit.																
Quercus alba	—	White Oak		3b	60	60	30	L							2,6	
Attractive bark. Growth is slow, transplant at a small size. Reserve for large areas.																
Quercus bicolor	—	Swamp White Oak		4a	60	60	30	M							2,6	
Attractive bark. Easier to transplant than Q. alba. Likes acid soils. Yellow to red fall color.																
Quercus imbricaria	—	Shingle Oak		4	60	60	30	M							2,6	
Adaptable. Reserve for large areas. Transplants easier than most oaks.																
Quercus macrocarpa	—	Bur Oak		3a	80	90	45	L							2,6	
Adaptable. Reserve for large areas. Difficult to transplant. More tolerant of urban conditions than most oaks.																
Quercus muehlenbergii	—	Chinkapin Oak		4	50	55	28	M							2,6	
Adaptable. Slow grower and difficult to transplant. Red, yellow to brown fall color.																
Quercus palustris	—	Pin Oak		4a	70	50	25	M							2,6	
Adaptable. Moderate tolerance, but very intolerant of high pH soils. Strongly pyramidal habit.																
Quercus robur	'Fastigiata'	English Oak		5a	50	15	25	M							2,6	
Adaptable and tolerant. Twig dieback in harsh winters.																

Scientific Name	Cultivar	Common Name [Flower Color]	Form	Hardiness Zone	Mature Height	Crown Spread	Soil Volume	Planting Area	Tolerances: Drought	Poor Drainage	Alkaline Soil	Salt	Air Pollution	Shade	Limitations	Features
Q. robur	'Pyramich' Skymaster®	English Oak		5a	50	25	13	M							2,6	
Adaptable and tolerant. Twig dieback in harsh winters. Mildew resistant. Tighter than 'Fasitgiata'.																
Quercus rubra	—	Northern Red Oak		3b	75	60	30	L							2	
Adaptable and tolerant expect for high pH. Transplants easily and grows fast for an oak.																
Quercus x.	'Nadler' Kindred Spirit®	Kindred Spirit Hybrid Oak		4a	30	10	10	S							2	
Adaptable and tolerant. Columnar hybrid that was bred for its resistance to powdery mildew. Red fall foliage. Can be used as a windbreak or privacy screen when planted in a row.																
Quercus x. warei	'Long' Regal Prince®	Regal Prince Hybrid Oak		4	50	20	15	S							2	
Adaptable, tolerant, and - for an oak - a fast grower. Upright, with nearly vertical branches and dense foliage. Yellow fall foliage. Can be used as a windbreak or privacy screen when planted in a row.																
Styphnolobium japonicum	'Princeton Upright'	Scholar-tree (WHITE)		5a	40	50	25	M							1,2	
Also known as Sophora japonica. Adaptable and tolerant once established after transplanting. Twig dieback in harsh winters. Summer flowers. More upright.																
S. japonicum	'Regent'	Scholar-tree (WHITE)		5a	50	45	23	M							1,2	
Also known as Sophora japonica. Adaptable and tolerant once established after transplanting. Twig dieback in harsh winters. Summer flowers, blooms earlier.																
Taxodium distichum	—	Baldcypress		5a	70	30	15	L							6	
Adaptable and tolerant expect for high pH. Can handle extensive flooding. A deciduous conifer.																
Thuja occidentalis	—	White Cedar		3	60	15	8	S							1,4	
Adaptable and tolerant, but prefers moist, rich soils. Tolerates pruning. Heavy snow can cause damage. Limited availability.																
T. occidentalis	'Nigra'	White Cedar		3	20	8	8	S							1	
Adaptable and tolerant, but prefers moist, rich soils. Tolerates pruning. Heavy snow can cause damage. Good dark green foliage.																
T. occidentalis	'Smaragd,' 'Emerald'	White Cedar		3	15	4	8	S							1	
Adaptable and tolerant, but prefers moist, rich soils. Tolerates pruning. Heavy snow can cause damage. Bright emerald green foliage.																
T. occidentalis	'Techny'	White Cedar		3	15	10	8	S							1	
Adaptable and tolerant, but prefers moist, rich soils. Tolerates pruning. Heavy snow can cause damage. Good dark green foliage. Slow grower.																

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Thuja x.	'Green Giant'	Hybrid White Cedar		5	60	20	10	S							1	
Fast-growing evergreen with dense, low-branching foliage. Tolerant of a range of growing conditions and diseases, except for salt and salt spray. Deer resistant. Can be planted in a row to serve as a windbreak or privacy screen and provides nesting sites for wildlife.																
Tilia americana	Legend®	American Linden , Basswood (YELLOW)		4	55	35	28	M							1,3,5	
Adaptable and tolerant. Prune for structure. Distinctly pyramidal with a central leader and better branching than species.																
T. americana	'Bailyard' Frontyard®	American Linden , Basswood (YELLOW)		4	75	40	20	M							1,3,5	
Adaptable and tolerant. Prune for structure. Symmetrical, pyramidal habit with denser branching.																
T. americana	'Redmond'	American Linden , Basswood (YELLOW)		4	60	30	15	M							1,3,5	
Adaptable and tolerant. Prune for structure. Uniform, pyramidal habit.																
Tilia cordata	'Glenleven'	Littleleaf Linden (YELLOW)		3	50	35	28	M							1,3,5	
Adaptable and tolerant. Prune for structure. Open habit. Quick grower.																
T. cordata	'Greenspire'	Littleleaf Linden (YELLOW)		3	45	30	15	M							3	
Adaptable and tolerant. Prune for structure. Uniform branching, straight trunk and dark green leaves.																
Tilia x euchlora	—	Crimean Linden (YELLOW-WHITE)		3	60	30	15	M							5	
Adaptable and tolerant. Graceful habit with branches touching ground.																
Tilia tomentosa	—	Sliver Linden (YELLOW)		4b	70	55	28	M							4,5,6	
Adaptable and tolerant. Most drought tolerant of the lindens. Silver underside of leaves. Limited availability.																
T. tomentosa	Green Mountain®	Silver Linden (YELLOW)		4b	60	40	20	M							5,6	
Adaptable and tolerant. Most drought tolerant of the lindens. Silver underside of leaves. Fast grower with dense crown.																
T. tomentosa	'Sashazam' Satin Shadow®	Silver Linden (YELLOW)		4b	50	40	20	M							4,5,6	
Adaptable and tolerant. Most drought tolerant of the lindens. Silver underside of leaves. Uniform, symmetrical growth. Dark green leaves with silver undersides. Limited availability.																
Tsuga canadensis	—	Eastern Hemlock		3	70	35	28	L							3,6	
Avoid hot, dry and windy locations. Tolerates shade and severe pruning. Host to invasive insect pest, hemlock wooly adelgid.																
Ulmus americana	'Jefferson'	American Elm		3b	50	50	25	S							3	
Adaptable and tolerant. Prune in the fall. Vase shape with arching limbs. Good DED resistance.																
U. americana	'New Harmony'	American Elm		4	50	50	25	S							3	
Adaptable and tolerant. Prune in the fall. Good form, DED tolerance is less than other cultivars. Primary host of Asian Longhorned Beetle.																

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U. americana	'Princeton'	American Elm		3b	60	40	20	S							3	
Adaptable and tolerant. Prune in the fall. Good form and DED resistance. Long-history, developed before DED.																
There are many elm (Ulmus) hybrid varieties and cultivars available; consult a professional for what does best in your area and for your site. Below are a few tried and true options.																
Ulmus x spp.	'Morton' Accolade®	wElm		4	70	50	25	S								
Adaptable and tolerant. Prune in the fall. American elm-like habit. Glossy dark green foliage. Golden yellow fall color. Good DED resistance.																
U. x spp.	'Frontier'	Elm		5	35	25	13	S								
Adaptable and tolerant. Prune in the fall. Dark green foliage, red fall color. Case shaped habit.																
U. x spp.	'New Horizon'	Elm		3b	50	25	13	S								
Adaptable and tolerant. Prune in the fall. Upright and full crown. Good DED resistance.																
U. x spp.	'Patriot'	Elm		5	70	50	25	S								
Adaptable and tolerant. Prune in the fall. Upright, stiffly vase-shaped. Narrower than most elms. Good DED resistance.																
Viburnum prunifolium	—	Blackhaw Viburnum (WHITE)		3	30	15	8	S								
Adaptable. Transplants well. Small tree. Often available in shrub or mult-stemmed form.																
Zelkova serrata	'Green Vase'	Japanese Zelkova		5a	70	50	25	S							1	
Adaptable. Attractive bark. Young trees susceptible to frost. Prune in the fall. Vase shape with upright branching. Bronze to red fall color.																
Z. serrata	'Musashino'	Japanese Zelkova		5a	45	15	8	S							1	
Adaptable. Attractive bark. Young trees susceptible to frost. Prune in the fall. Upright, tight, narrow crown. Yellow fall color.																
Z. serrata	Village Green™	Japanese Zelkova		5a	40	40	20	S							1	
Adaptable. Attractive bark. Young trees susceptible to frost. Prune in the fall. Straight trunk. Wide and dense canopy. Red fall color.																