Tree and Shrub Planting Guide

TOWN OF
SOUTH HADLEY
MASSACHUSETTS

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Overview

Plants in the built environment are critical to community health and well-being. Research demonstrates that plants improve our physical and mental health, clean air and water, provide cooling, reduce building energy needs, increase real estate value, and encourage social interactions. Many of these "ecosystem services" communities would otherwise have to pay for, likely at great expense. Additionally, plants contribute to beauty and sense of place, improving our quality of life, while supporting pollinators, birds, and other animals that are key parts of the ecosystem.

However, some plants provide *fewer* of these functions than others. Turfgrass, non-native plants, and invasive species can use up more resources and harm ecosystems; their maintenance (e.g., by mowing or hedging with gas-powered equipment) can also create pollution. **This guide shares information about selecting trees and shrubs to maximize the benefits described here; the guide works towards the creation of cohesive neighborhoods and other developed areas in South Hadley that support socialization and protect the ecological integrity of the natural landscape.**

For continued learning about ecological landscaping and gardening with native plants, see the **Resources** section.

Benefits of Plants in the Built Environment

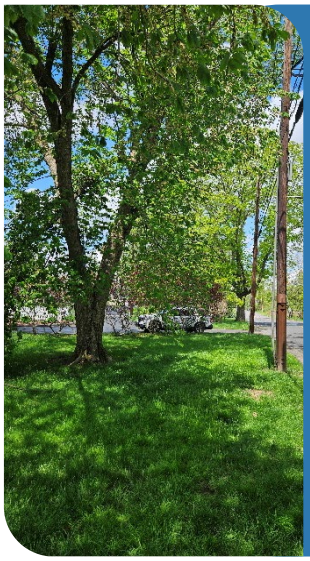
Plants mitigate climate change and reduce building energy needs. Urban parks and forests can reduce the energy demand of nearby buildings by 10%. Urban trees can help mitigate climate change by storing carbon in tree tissue and sequestering atmospheric carbon. Trees can contribute 7-15% to property value.

Trees can improve pedestrian safety. Pedestrian casualty decreases as tree density and canopy increase in the built environment. Trees reduce vehicle speeds by appearing to narrow the road's width. Without trees, the open space gives drivers the illusion that they have more control, which prompts them to drive faster.

Plants decrease air and water pollution. Trees remove pollutants from the air, filtering up to a ⅓ of fine pollutants within 300 yards of a tree. Airborne pollutants deposit on tree leaves, which directly removes pollutants from the air. Trees indirectly improve air quality by lowering energy use and associated emissions. Trees absorb rainfall (15-27% of annual rainfall), reducing the amount of stormwater runoff that could otherwise impact water quality of rivers and other waterbodies. Trees and other vegetation filter pollutants out of runoff. Trees cool runoff and prevent temperature shocks to

Plants support healthy communities. Being near green space reduces aggression and anxiety, improves mood, reduces mental fatigue, and encourages people to exercise more and interact with their neighbors. Green spaces help facilitate social interactions and community building. Studies show stronger social networks near trees and garden spaces.

Plants improve physical & mental health. Lowered heart rate and blood pressure are detected in people within minutes of their exposure to natural surroundings. Reductions in cortisol take a bit longer to decrease (approx. 20-30 minutes). Walks in parks cause people to dwell less on anxious thoughts and feel calmer; walks also reduce blood flow to areas of the brain associated with ruminating on negative thoughts.



Plants cool neighborhoods. Trees lower surface and air temperature by providing shade and cooling through evapotranspiration (i.e., absorbing water through roots and evaporating it through leaves). Increasing tree cover can result in fewer deaths in urban areas. Heat stress is the leading cause of weather-related deaths, and can exacerbate underlying illnesses. Heat vulnerability is increasing with climate change; heat-related mortality for people 65+ increased by 85% between 2000–2004

Sources utilized in this section:
(Hyperlinks directing to external organizations are subject to change.)

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Sustainable Design Standards for Landscapes

The following design standards apply to all types of developments in the built environment.

1. **Retain existing trees to the maximum extent practicable.** Trees provide many services to communities, such as shade, stormwater interception, and air pollution mitigation. Preserve existing native species or non-native tree species that are not likely to become invasive. Explore alternative locations and configurations of new buildings, roads, utility trenches, and other infrastructure to avoid tree removals.

2. **Protect existing vegetation during construction.** Prior to site work, install tree protection fencing ideally at the tree crown's drip line. This area is referred to as the *Critical Root Zone* (CRZ) and contains roots critical to the tree's survival, though tree roots do spread beyond the canopy. Within the fenced area, stockpiling materials and use of heavy equipment should be avoided. Avoid utility trenching within the critical root zone; if this is not possible, explore options for hand trenching and air spading to avoid cutting large roots. Fence or flag other vegetated areas (e.g., shrubs, meadows, perennial beds) to limit damage. Compaction of soil by storing materials or using heavy machinery is difficult to reverse.

3. **Follow the 10-20-30 rule for tree diversity for new plantings**. Plantings must be comprised of no more than 10% of any one species, 20% of any one genus, or 30% of any one plant family. This is required for new developments, and a best practice for any type of site.

4. **Plantings must be comprised of at least 70% native species**, preferably native to New England but also native to other nearby North American eco-regions as appropriate due to climate change (i.e., "climate smart plant choices"). "Native" plants are those historically found growing without human intervention in Massachusetts.

What is a "Species"?
A "species" is a distinct type of plant. A plant's scientific name includes two parts: the first part is the genus, and the second is the species. "Genus" describes a group of plant species with similar traits (e.g., for purple coneflower, whose scientific name is *Echinacea purpurea*, *Echinacea* is the genus, and adding *purpurea* describes the species. "Family" is a higher level of classification: plants in this group of plant genera (the plural form of "genus") share certain characteristics. *Echinacea* are part of the *Asteraceae*, or aster, family, which also includes black-eyed Susans (*Rudbeckia hirta*), and, as you

5. **No invasive species on the Commonwealth's Massachusetts Prohibited Plant List (located here) can be bought, sold, or planted into any landscaped area.** It is recommended that developers and landowners/managers also avoid planting species listed on MIPAG's "Likely Invasive" and "Potentially Invasive" lists (located here).

6. **Ensure alignment between existing site conditions and the plants' growing requirements (i.e., right plant, right place).** To maximize the success of the planting selection, analyze existing conditions to determine sun exposure, soil type, soil moisture, and other types of environmental conditions (e.g., exposure to excess heat and polluted runoff). The worksheet included in this guide can help you through this process. Match existing site conditions with the plant's ideal growing conditions.

7. **Avoid conflicts with above and below ground infrastructure.** Examine locations of buildings and other structures, above ground utilities (e.g., overhead wires), and underground utilities. Consider the size of the plant at maturity to make sure that the plant won't damage buildings or utilities. Planting some tree species too close to sidewalks and other pavements can impact the tree's health and cause damage to the pavement.

Is This Species Native?

The Native Plant Trust's GoBotany website (https://gobotany.nativeplanttrust.org/simple/) can help with identifying if plants are native; search for an individual species, and check the "Native to North America" and "Distribution" characteristics.

What are invasive plants?

Invasive plant species are "non-native species that have spread into native or minimally managed plant systems in Massachusetts" (MIPAG). "These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems" (MIPAG). Not all non-native species are considered invasive. The Massachusetts Invasive Plant Advisory Group (MIPAG) identifies non-native species that are invasive, likely invasive, or potentially invasive. The Massachusetts Department of Agricultural Resources (MDAR) holds hearings to determine if species that MIPAG lists as "invasive" should be added to MDAR's list of noxious weeds. **This list prohibits the importation, propagation, purchase and sale of plants on it in the**

What are Climate-Smart Plant Choices?

UMass Amherst and the Northeast Regional Invasive Species and Climate Change Management Network (NE RISCC) created a Climate-Smart Gardening Guide (see fact sheet on page 39; the guide is available free online here) with commercially available native and near-native plants that are anticipated to grow in the Northeast as the impacts of climate

8. **Utilize groundcover plants to fill in mulched areas.** In landscaped areas where shrubs and other plants are spaced apart from one another with mulch in-between, add groundcover species to fill these mulched spaces over time. This can reduce the need for annual mulch applications and herbicide treatment of weeds. Groundcovers form a "living mulch" that shades the soil, builds soil fertility, reduces stormwater runoff, and increases habitat.

9. **Vegetation in built environments will always require some maintenance. Create a maintenance plan with the person or team that will be maintaining the landscape long-term.** Trees will need watering through establishment (at least the first two years). Stakes and tree ties should be removed after the first season; in many cases, these are forgotten and left on the tree, girdling and killing it. Trees also need pruning every 5 to 7 years to remove broken, diseased, and dead branches, along with branches that cross each other. Some land managers perform yearly inspections. Trees should be protected from mowing equipment: it is not uncommon to see riding mower damage at the base of tree trunks, which can cause permanent damage. One way to keep mowers away from tree trunks is to install mulch rings. Groundcovers can be planted within the rings to reduce the need for annual mulch applications. Many shrubs will not need maintenance; there are some visual benefits to cutting back particular species annually.

10. **Consider the use of massing plants to cover ground, reduce turf area, and define spaces**. Shrubs, grasses, and perennials can be planted in groups to cover ground area, outcompete weeds, and provide many of the functions explained in the Overview section. When massing plants, keep in mind necessary sightlines that must be preserved for safety (e.g., at road intersections) and perception of safety (e.g., to make sure pedestrians feel comfortable). Also keep in mind overall biodiversity within the planting (see the 10-20-30 rule). The following pages share examples of massing plants.

11. **Inspect vegetation prior to planting**. If possible, select trees and shrubs at the nursery for your site. Inspect the trunk to make sure there is no damage. For trees, make sure there is a leader and that it is not broken. Make sure that the root flare is visible and not buried. Look at the roots to see if they have begun to circle the pot or girdle the tree trunk.

Example: Massing Plants

CONVENTIONAL: In this landscaped area, shrubs are sheared several times throughout the summer to maintain their shape. This requires time and energy, and mulch is applied annually. This shrub species is also a state-listed invasive plant. The mulch is eroding due to its slope and exposure to rain.

ALTERNATIVE: Here, the woody shrub smooth sumac (*Rhus aromatica*) is planted as a dense mass to fill an area between the sidewalk and the street. The shrub will need annual cutting back to prevent growth into the sidewalk. The soil surface is protected and stabilized.

ALTERNATIVE: Masses of ornamental grasses are interspersed with woody shrubs to add color, texture, and biodiversity. Sightlines over the tops of the vegetation are preserved. Grasses are cut back annually.

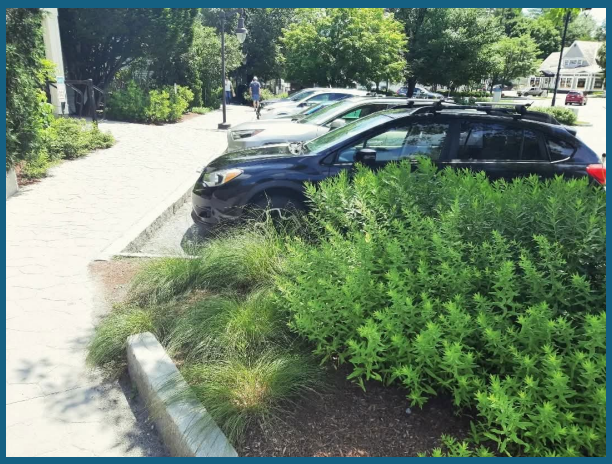
ALTERNATIVE: Multiple perennial species are intermixed here. Though this can require more skill and time to maintain, the visual effect is striking and the planting is more diverse. Note the repetition of species such as the blue-hued grass (blue fescue)

Example: Covering Ground

CONVENTIONAL: In this commercial parking lot median, wide expanses of mulch require weeding and annual mulch applications. The mulch surface produces stormwater runoff and provides minimal cooling. Understory plants (in this case ornamental grasses and daylilies) are spaced too far apart to shade the ground and outcompete weeds.

ALTERNATIVE: Here, wide medians in the parking lot provide more space for healthier tree root system development. Perennial flowers and grasses planted underneath cover ground.

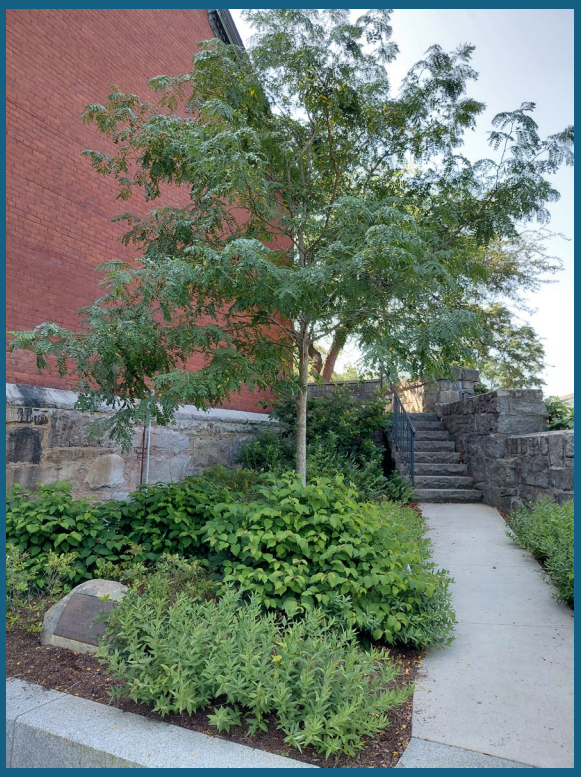
ALTERNATIVE: The combination of understory plants provides interesting textures and colors for people visiting this site.



ALTERNATIVE: Plants are chosen strategically to not block sightlines of drivers. Combining plants that reach a maximum of 2 to 3 feet in height with shade trees creates open sightlines between the tops of the perennials and where the tree canopy begins.

Example: Diversifying Plantings

CONVENTIONAL: Burning bush, a state-listed invasive plant that can cause ecological harm, is the only shrub species filling this long parking lot median. Massing this plant does cover ground, but makes the planting less resilient should the species struggle.



ALTERNATIVE: Here, a deciduous tree is underplanted with a row of eastern bluestar (*Amsonia*, foreground), shrub dogwood (*Cornus*/*Swida*, middle), and the shrub/small tree witch hazel (background). Species are massed in identifiable rows, and the planting is more diverse.

How to Use the Worksheet and List

This guide includes a process for identifying plant species for your site, and recommendations for specific tree and shrub species.

I. **STEP 1: Fill out the Tree and Shrub Selection Worksheet.** This will help you identify your site conditions and important, desired characteristics.

II. **STEP 2:** Browse through the **Recommended Plant List** and identify species that meet your criteria. A **quick reference guide for tree height** is also provided.

III. **STEP 3:** Read through the **Planting Guidelines** to learn about best management practices.

Tree and Shrub Selection Worksheet

Site Location & Description

_____

_____

Desired Tree or Shrub Size

Mature Height: _____ **Mature Spread:** _____

Site Factors

Soil Moisture: ☐ Wet (poor drainage)
☐ Moist
☐ Well Drained (good drainage)

Sun Exposure: ☐ Full Sun (6+ hours)
☐ Part Sun (direct sun for less than 6 hours, or filtered sunlight for much of the day)
☐ Full Shade (little direct sunlight)

Other Conditions

☐ **Salt tolerance** (When a plant is located near a roadway that is treated in the winter with salt; or when the plant is in an area that receives stormwater runoff from treated roadways)
☐ **Excess Heat** (Areas with full sun exposure and/or where the plant is subject to reflected and radiated heat loads from pavements, cars, and buildings. Areas near roads and parking lots and against buildings tend to be hotter than areas in a vegetated landscape.)
☐ **Drought Prone** (Areas that may have full sun exposure combined with quickly-draining, sandy soils)

Desired Characteristics

☐ **Striking Fall Foliage**
☐ **Evergreen**
☐ **Fits Under Powerlines**
☐ **Stormwater Tolerant** (Plants that can typically handle temporary flooded conditions as well as periods of drought. Species tend to be salt and pollution tolerant, and have root systems that support infiltrating soils.)
☐ **Pollinator Powerhouse** (Plants that serve a diversity of pollinator species and/or specialist pollinators that rely on that particular species for survival.)

Recommended Plant List

All plants on this list are suitable for **Hardiness Zones 6a** (-10 to -5 °F) **and 6b** (-5 to 0 °F); all land within South Hadley is currently mapped as one of these zones. (For more information, visit https://planthardiness.ars.usda.gov/). Note that hardiness zones will change as the climate shifts.

A note on cultivars: A cultivar is a type of species that has been selected for particular, desired traits. Cultivars are indicated with apostrophes (e.g., 'Glenmore'). When buying a plant that is a cultivar, check plant characteristics on the plant tag to ensure that they align with your site conditions and desired characteristics. Some tree cultivars are dwarf specimens, and may only grow to a few feet tall. Some cultivars may not support pollinators and other types of wildlife compared to the straight species of the plant; if supporting wildlife is a primary goal, use cultivars with caution.

A note on pests: The Asian long-horned beetle (*Anoplophora glabripennis*) is particularly drawn to maple trees and will bore into other species as well. Spongy moth (*Lymantria dispar*) feeds on many types of trees and shrubs but particularly prefers oaks. Some communities avoid planting maple and oak trees to avoid losses. Hemlock trees have not been included on the list below due to their susceptibility to the hemlock woolly adelgid (*Adelges tsugae*); ash trees have not been included due to their susceptibility to the emerald ash borer (*Agrilus planipennis*).

Table Key

Bolded species are native to Massachusetts.

Sun: FS = Full Sun; PS = Part Sun; S = Full Shade

Soil Moisture: WD = Well Drained; M = Moist; W = Wet

Other Conditions:
Ⓓ = Drought Tolerant
Ⓗ = Excessive Heat Tolerant
= Salt Tolerant

Desired Characteristics:
= Notable Fall Foliage
= Suitable for Stormwater Management Facilities (e.g., rain gardens, swales)
Ŧ = Suitable under Powerlines
= Evergreen
= Pollinator Powerhouse

Tree Species

Scientific Name	Common name	Mature Height	Mature Spread	Sun	Soil Moisture	Other Conditions	Desired Characteristics
Abies concolor	White Fir	50’	25’	FS	WD, M	Ⓓ	
Large, evergreen, pyramidal-shaped tree; easily transplanted; prefers a deep, well-drained soil with adequate moisture; can tolerate more heat and drought than other firs; native to the mountains of the North American west; not for use as a street tree, but excellent as a landscape specimen; provides cover for birds and other wildlife.							
Abies fraseri	Fraser Fir	40’	25’	FS	WD, M		
Medium, evergreen, pyramidal-shaped tree; prefers cooler conditions; dislikes alkaline soils; native to the southeast U.S.; food source for mammals and provides cover for birds and other wildlife.							

Acer rubrum	Red Maple	75’	40’	FS PS	WD, M	Ⓓ	

Medium to large, deciduous, pyramidal to oval-shaped tree; fast-growing; showy early spring red flowers; tolerant of many conditions; prefers moist and acidic soil; can tolerate flooding; appropriate as a street tree where it will not grow into powerlines; early nectar source for bees; flowers attract many pollinators and seeds are eaten by birds and small mammals.

Acer saccharinum	Silver Maple	70’	50’	FS PS	WD, M	Ⓓ	

Large, deciduous, oval/rounded tree; fast growing; yellowish green fall foliage; easily grown and tolerant of many soils; works well as a shade tree; shallow rooted and thus not ideal next to pavements; early nectar source for bees; seeds are eaten by birds and small mammals.

Aesculus x arnoldiana	Arnold Buckeye	75’	25’	FS PS	WD, M	Ⓓ Ⓗ	

Large, deciduous, rounded tree; showy flowers with chestnut-like fruit in fall; avoid very dry sites; cross between species found in the southeast U.S.

Aesculus flava	Yellow buckeye	75’	35’	FS PS	WD M		

Large, deciduous, rounded tree; interesting leaf shape; showy light yellow flowers in spring; produces nuts; hummingbirds, bees, butterflies, and other pollinators visit the flowers; squirrels eat the nuts; native just outside of Massachusetts; climate-smart plant choice.

Amelanchier laevis	Service-berry	25’	10’	FS	WD M W		

Small, deciduous tree with rounded form; can be found as a single trunk or multi-stemmed plant; white flowers in early spring; yellow-orange fall color; host plant for particular butterfly species; flowers attract bees and fruits are consumed by birds and mammals.

Amelanchier x grandiflora	Apple service-berry	25’	25’	FS PS	WD M W		

Small, deciduous tree with rounded form; can be found as a single trunk or multi-stemmed plant; white flowers in early spring; yellow-orange-dark red fall color; fruit is consumed by birds and mammals.

Betula alleghaniensis	Yellow birch	75’	60’	FS PS	WD M		

Large, deciduous tree with rounded form; yellow fall foliage; best in cool, moist areas; host plant for particular moths and butterflies; birds eat the seeds and use hollows as nesting sites; squirrels line nests with exfoliating bark.

Betula nigra	River birch	50’	35’	FS PS	WD M		

Large, deciduous tree with rounded form (though some cultivars are considerably shorter); interesting bark; more heat tolerant than other birches; host plant for particular moths and butterflies; birds eat the seeds.

Carpinus caroliniana	American hornbeam	30’	25’	PS S	M		

Medium, deciduous tree with a spreading form; prefers fertile, acidic, moist soil; host plant for particular butterflies; seeds are consumed by birds, foxes, and squirrels.

Carya glabra	Pignut hickory	65’	40’	FS PS	WD M	Ⓓ Ⓗ	

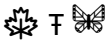
Large, deciduous tree with oval form; yellow fall foliage; interesting bark texture; host plant for particular butterflies and moths; mammals eat the nuts.

Carya ovata	Shagbark hickory	80’	35’	FS PS	WD M	Ⓓ Ⓗ	

Large, deciduous tree with oval form; yellow fall foliage; interesting bark texture; host plant for particular butterflies and moths; mammals eat the nuts.

Celtis occidentalis	Common Hackberry	55’	50’	FS PS S	WD M	Ⓓ Ⓗ 	

Medium, deciduous tree; yellow fall color; tolerant of a wide range of conditions; host plant for particular butterfly species; birds and small mammals eat the fruit.

Cercis canadensis	Eastern redbud	25’	25’	FS PS	WD M		

Medium, deciduous, rounded tree; native just south of New England; showy pink flowers in spring before leaf out; yellow-green fall foliage; host plant for many species; used by leafcutter bees.

Chionanthus virginicus	Fringetree	30’	20’	FS PS	WD M	Ⓗ	

Medium, deciduous tree; native just south of New England; showy white flowers in late spring; yellow fall foliage; birds and mammals eat the fruit.

Cornus kousa	Kousa dogwood	30’	25’	FS PS	WD		

Medium, deciduous, rounded tree; native to Asia; late spring flowers; scarlet fall foliage; squirrels and birds eat the fruit.

Cornus mas	Cornelian cherry dogwood	20’	20’	PS S	WD M		

Small, deciduous tree with rounded form; yellow flowers in early spring; yellow fall foliage to sometimes red-purple; squirrels and birds eat the fruit.

Cornus florida	Flowering dogwood	30’	30’	FS PS	M		

Small, deciduous tree with rounded form; prefers cool and acidic soil with organic matter; showy white bracts appear around the flowers in spring before leaf out; red to purple fall foliage; host plant for particular butterflies; birds and mammals eat the fruit; supports specialized bees.

Crataegus crus-galli	Cockspur hawthorn	25’	25’	FS PS	WD M	Ⓓ Ⓗ	

Small to medium, deciduous, dense and rounded tree; white flowers in spring; red fall foliage; has sharp thorns though some cultivars are thornless; host plant for particular butterflies; nectar source and nesting habitat.

Crataegus viridis	Hawthorn	25’	25’	FS	WD M	Ⓓ Ⓗ	

Small to medium, deciduous tree; rounded form; native to southeast U.S.; adaptable to many conditions; red berries in winter; white flowers in spring; reddish-purple fall color; has sharp thorns through some cultivars are thornless; host for particular butterflies; nectar source and nesting habitat.

Ginkgo biloba	Ginkgo	50’	30’	FS	WD M	Ⓓ Ⓗ 	

Large, deciduous tree; oval form; native to eastern China; striking yellow fall foliage.

Gleditsia triacanthos var. inermis	Honey locust	50’	50’	FS	WD M	Ⓓ 	

Medium, deciduous tree with rounded form; native just south of New England; striking yellow fall foliage; casts light shade; if var. inermis is not selected, tree will likely have large thorns; host plant for moths and butterflies; seeds are consumed by small mammals and birds; nectar source.

Gymnocladus dioicus	Kentucky coffee tree	70’	50’	FS	WD M	Ⓓ Ⓗ	

Large, deciduous tree with rounded form; native just south of New England; prefers moist and rich soil but adaptable to many conditions; yellowish fall foliage; interesting bark texture; male tree will not produce seeds pods, which some find messy; female tree has showy flowers; larval host for particular moth species

Halesia carolina	Carolina silverbell	35’	25’	FS PS	WD M	Ⓓ	

Medium, deciduous tree with irregular to rounded form; native to mid-Atlantic and southeast U.S.; showy white flowers in spring; yellow-green fall foliage; prefers acidic soils; support hummingbirds and is a host plant for several butterflies and moths.

Hamamelis vernalis	Ozark witch hazel	10’	10’	FS	WD M	Ⓓ	

Small, deciduous tree/large shrub; native to the southeast U.S.; yellow fall color; yellow flowers in early spring; attracts pollinators and supplies food for nesting birds and small mammals.

Hamamelis virginiana	Witch hazel	20’	15’	FS PS	WD M		

Medium, deciduous tree/large shrub; spreading, open form; yellow fall color; yellow flowers in late fall/early winter; prefers moist, cool, acidic soil; moths pollinate the flowers; seeds are eaten by turkeys; small mammals and birds consume the fruit.

Ilex opaca	American holly	50’	20’	FS PS	WD M		

Medium/large, evergreen tree with pyramidal form; prefers cool, acidic soils and sites protected from wind; provides nectar for bees and butterflies and is a host plant for particular butterfly species; birds and small mammals eat the fruit; there are many cultivars available with different mature sizes.

Juniperus virginiana	Eastern red cedar	40’	20’	FS	WD M W	Ⓓ Ⓗ	

Medium, evergreen, pyramidal tree; blue berry-like cones; tolerant of many conditions; host plant for cedar apple rust (avoid planting near apple/crabapple and quince); provides winter cover for wildlife; supports butterflies, moths, songbirds, and small mammals.

Liquidambar styraciflua	American sweetgum	60’	40’	FS	M W	Ⓓ Ⓗ	

Large, deciduous tree with oval form; works well as a street tree where space allows; red fall foliage; may require a sheltered location; spiny fruits may be messy; supports particular moths and songbirds.

Liriodendron tulipifera	Tulip tree	90’	50’	FS	M		

Large, deciduous tree with oval form; tulip-like flowers in the upper branches; yellow fall color; prefers moist and rich soil; requires plenty of space to grow; host plant for multiple butterflies; hummingbirds, bees, butterflies, and birds feed on flower nectar; small mammals eat the flowers.

Malus x varieties	Flowering crabapple	20’	15’	FS	WD M	Ⓓ	

Small, deciduous tree; white to pink to red flowers in spring; yellow to red fall foliage; prefers acidic soils; host plant for butterflies and moths; available in many varieties and cultivars with different levels of heat, drought, and salt tolerance, though this plant generally performs well in developed settings; most species are native to Eurasia but there are species native to the North American eastern coast (*M. coronaria* and *M. angustifolia);* will host tent caterpillars.

Magnolia stellata	Star magnolia	20’	15’	FS	M	Ⓗ	

Small, deciduous tree/large shrub with rounded, open form; native to Japan; white flowers in early spring; prefers rich, moist soil; heat tolerant in moist soils; butterflies pollinate the flowers; birds and small mammals consume seeds.

Magnolia grandiflora	Southern magnolia	70’	40’	FS PS	WD M	Ⓗ	

Large, evergreen tree with pyramidal to oval form; native to the southeast U.S.; showy white flowers; provides winter cover for wildlife; birds and small mammals eat the seeds; potential climate-smart plant choice.

Magnolia virginiana	Sweetbay magnolia	30’	30’	FS PS	WD M		
Small to medium, semi-evergreen tree with open, irregular form; evergreen in the southeastern U.S. and somewhat evergreen in Massachusetts; white flowers in summer; prefers acidic soils and locations protected from winter winds; provides winter cover for wildlife and is a larval host plant for particular butterflies; birds and small mammals eat the seeds.							
Metasequoia glyptostroboides	Dawn redwood	100’	50’	FS	WD M	Ⓓ	
Large, deciduous conifer with conical form; native to China; leaf texture is airy; interesting bark texture; fast grower; provides winter cover for wildlife.							
Nyssa sylvatica	Black tupelo	50’	35’	FS	WD M	Ⓓ	
Large, deciduous tree; pyramidal form; striking red fall foliage; prefers deep and acidic soils; important food source for fall bird migration; nectar source for bees; berries consumed by birds and mammals.							
Ostrya virginiana	Hop hornbeam	40’	35’	FS PS S	WD M	Ⓓ	
Large, deciduous tree; rounded form; prefers slightly acidic, moist, cool soil; very sensitive to salt; yellowish to brown fall foliage; interesting bark; host plant for butterflies and moths; nuts consumed by birds and small mammals.							
Oxydendrum arboreum	Sourwood	30’	15’	FS PS	WD M	Ⓓ	
Medium, deciduous tree; prefers acidic soils; showy white flowers in summer; red to purple fall foliage; larval host for moths; supports bees; native to the southeastern U.S.; climate-smart plant choice.							
Pinus strobus	Eastern white pine	80’	40’		WD M	Ⓓ	
Large, evergreen tree; prefers acidic soils; prone to breakage and thus best suited out in the landscape, away from buildings and areas of frequent use; supports particular moth species; seeds and bark consumed by mammals and birds; provides cover for wildlife.							
Platanus x acerifolia	London planetree	90’	70’	FS	WD M	Ⓓ	
Large, deciduous tree with rounded form; interesting bark texture; yellow-brown fall foliage; adaptable to tough sites; supports some pollinators, birds, and small mammals.							
Platanus occidentalis	Sycamore	90’	70’	FS	WD M	Ⓓ	
Large, deciduous tree with rounded form; interesting bark texture; yellow-brown fall foliage; fruit can be considered messy; seeds are consumed by songbirds.							
Prunus serotina	Black cherry	55’	30’	FS	WD M	Ⓓ Ⓗ	
Large, deciduous tree; white flowers in spring; yellow to orange fall foliage; host plant for many butterflies; fruits are eaten by songbirds and small mammals; will host tent caterpillars and fruits can stain hardscape.							
Prunus virginiana	Choke-cherry	25’	20’	FS PS	WD M	Ⓓ Ⓗ	
Medium, deciduous tree with rounded form; showy white flowers in spring; yellow to orange to red fall foliage; host plant for many butterflies; fruits are eaten by birds and mammals; will host tent caterpillars and fruits can stain hardscape.							
Quercus alba	White oak	60’	60’	FS PS	WD M	Ⓓ	
Large, deciduous tree with rounded form; slow-grower; prefers acidic soils; purple-red fall foliage; produces acorns; host plant that supports many butterfly and moth species; acorns are consumed by birds and mammals.							
Quercus bicolor	Swamp white oak	60’	60’	FS PS	WD M	Ⓓ	

Large, deciduous tree with rounded form; yellow to red fall color; produces acorns; host plant that supports many butterfly and moth species; acorns are consumed by birds and mammals.

Quercus palustris	Pin oak	70’	50’	FS	WD M	Ⓓ	

Large, deciduous tree with pyramidal form; prefers acidic soils; red to bronze fall foliage; produces acorns; host plant that supports many butterfly and moth species; acorns are consumed by birds and mammals.

Quercus rubra	Northern red oak	75’	60’	FS PS	WD M	Ⓓ	

Large, deciduous tree with rounded form; prefers acidic soils; host plant that supports many butterfly and moth species; acorns are consumed by birds and mammals.

Rhododendron maxima	Rosebay rhodo-dendron	8-30’		PS	WD M		

Small to medium, evergreen shrub/tree; pink flowers in early summer; prefers cool, moist soil that is not exposed to winter winds or intense sun; provides cover habitat and flowers attract hummingbirds, bees, and butterflies.

Taxodium distichum	Bald cypress	50-70’	30’	FS	M W	Ⓓ Ⓗ	

Large deciduous, coniferous tree with pyramidal form; interesting bark; native to the southeastern U.S.; prefers acidic soils; wild turkey, squirrels, and songbirds eat the seeds, and branches provide nesting sites for birds of prey; climate-smart plant choice.

Thuja occidentalis	White cedar	30-60’	15’	FS	WD M	Ⓓ Ⓗ	

Medium, evergreen tree with dense, pyramidal form; prefers moist, loamy soils but is adaptable; many cultivars are available with different forms and sizes; provides cover and nesting locations for birds and small mammals, browsed by deer and other mammals; seeds are a preferred food source for the pine siskin songbird.

Tilia americana	American linden, basswood	55’	35’	FS PS	M	Ⓗ	

Large, deciduous tree with oval/pyramidal form; prefers deep, rich soils; green-yellow fall foliage; appropriate as a street tree where space allows; white flowers in summer attract bees; cavities in trunk are used by woodpeckers and small mammals.

Tilia cordata	Littleleaf linden	50’	30’	FS PS	WD M	Ⓗ	

Large, deciduous tree with oval form; yellow-green fall foliage; native to Europe; appropriate as a street tree where space allows; bees are drawn to the flowers.

Quick Reference Guide: Tree Species

As noted previously, cultivars of these species may have lower typical heights.

Small (under 20')

Scientific Name	Common Name
Cornus mas	Cornelian cherry
Hamamelis vernalis	Ozark witch hazel
Hamamelis virginiana	Witch hazel
Malus x varieties	Flowering crabapple
Magnolia stellata	Star magnolia

Medium (20-50')

Scientific Name	Common Name
Abies fraseri	Fraser fir
Amelanchier laevis	Serviceberry
Amelanchier x grandiflora	Apple serviceberry
Carpinus caroliniana	American hornbeam
Cercis canadensis	Eastern redbud
Chionanthus virginicus	Fringetree
Cornus kousa	Kousa dogwood
Cornus florida	Flowering dogwood
Crataegus crus-galli	Cockspur hawthorn
Halesia carolina	Carolina silverbell
Ilex opaca	American holly
Juniperus virginiana	Eastern red cedar
Magnolia virginiana	Sweetbay magnolia
Ostrya virginiana	Hop hornbeam
Oxydendrum arboreum	Sourwood
Prunus virginiana	Chokecherry
Rhododendron maxima	Rosebay rhododendron

Large (>50')

Scientific Name	Common Name
Abies concolor	White fir
Acer rubrum	Red maple
Acer saccharinum	Silver maple
Aesculus flava	Yellow buckeye
Betula alleghaniensis	Yellow birch
Betula nigra	River birch
Carya glabra	Pignut hickory
Carya ovata	Shagbark hickory
Celtis occidentalis	Common hackberry
Ginkgo biloba	Ginkgo
Gleditsia triacanthos var. inermis	Honey locust
Gymnocladus dioicus	Kentucky coffee tree
Liquidambar styraciflua	American sweetgum
Liriodendron tulipifera	Tulip tree
Magnolia grandiflora	Southern magnolia
Metasequoia glyptostroboides	Dawn redwood
Nyssa sylvatica	Black tupelo
Pinus strobus	Eastern white pine

Dwarf Tree Cultivars

Some cultivars of trees on the "medium" list grow less than or up to twenty feet in height and may be appropriate to plant where vertical space is limited. Examples include *Malus* 'Snowdrift' and *Malus* 'Adirondack' (flowering crabapple), *Cercis canadensis* 'Tennessee Pink' (eastern redbud), and *Halesia carolina* 'Meehanii.' See note on page 13 for

Platanus x acerifolia	**London planetree**
Platanus occidentalis	**Sycamore**
Prunus serotina	**Black cherry**
Quercus alba	**White oak**
Quercus bicolor	**Swamp white oak**
Quercus palustris	**Pin oak**
Quercus rubra	**Northern red oak**
Taxodium distichum	**Bald cypress**
Thuja occidentalis	**White cedar**
Tilia americana	**American linden**
Tilia cordata	**Littleleaf linden**

with branching and leaves extending from the ground to the top of the plant. While this can make them ideal for privacy screening, if planted at intersections or in masses along the street, this can block drivers' views of other vehicles or pedestrians. Drivers' eye height is typically between 3.5 feet and 9 feet. Planting shrubs with a maximum height of 3.5', and/or selecting shrubs that are openly branching in form (e.g., *Aronia,* chokeberry) may be a better choice along the road edge. These shrub plantings can be combined with trees that typically do not have branches close to the ground or can be

Shrub Species

Scientific Name	Common Name	Mature Height	Mature Spread	Sun	Soil Moisture	Other Conditions	Desired Characteristics
Amelanchier obovalis	Coastal serviceberry	3-5'	3-5'	FS PS	WD M	Ⓓ Ⓗ	
Deciduous, compact, vase-like shrub native to the Atlantic coastal plain; showy white flowers in early spring; yellow to orange fall foliage; supports native bees, butterflies, and birds; climate-smart plant choice.							
Aronia arbutifolia	Red chokeberry	6-8'	3-4'	FS PS	WD M	Ⓓ Ⓗ	
Deciduous, vase-shaped, openly branching shrub; flood and drought tolerant; white flowers in early spring; red leaves and small berries in fall; supports pollinators, birds, and small mammals.							
Aronia melanocarpa	Black chokeberry	3-6'	3-6'	FS PS	WD M	Ⓓ Ⓗ	
Deciduous, vase-shaped, openly branching shrub; flood and drought tolerant; white flowers in early spring; scarlet leaves and small purple-black berries in fall; supports pollinators, birds, and small mammals.							
Ceanothus americanus	New Jersey tea	3-4'	3-5'	FS PS	WD M	ⒹⒽ	
Deciduous, compact, dense, rounded shrub; fragrant white flowers in late spring; young twigs have a yellow hue and stand out in winter; deep roots help with drought tolerance; caterpillars eat the leaves (e.g., of the spring azure butterfly).							
Cephalanthus occidentalis	Buttonbush	5-12'	4-8'	FS PS	WD M	Ⓓ	
Deciduous shrub with glossy green leaves; flood and drought tolerant; great for restoration as it stabilizes soil and has a deep root system; unique white flowers in early spring; supports pollinators and birds; in wetlands, used by particular bird species for nesting.							

Clethra alnifolia	Summersweet	4-8’	4-8’	FS PS	WD, M		

Deciduous, dense shrub; flood tolerant; prefers low pH (acidic) soil but will tolerate neutral soil as well; glossy green leaves turn yellow in the fall; mid-summer flowers are showy and fragrant; heavily used by pollinators and serves as cover for birds; can form dense thickets, forming edges/borders and replacing areas of lawn; has shorter dwarf cultivars.

Comptonia peregrina	Sweetfern	2-5’	4-8’	FS PS	WD	Ⓓ Ⓗ	

Deciduous shrub; can spread quickly to fill a space as a massing; foliage has an interesting texture and is aromatic when crushed; stabilizes slopes; host of 49 species of lepidoptera.

Cornus/Swida amomum	Silky dogwood	6-12’	6’12’	FS PS FS	WD M	Ⓓ	

Deciduous, spreading shrub; fast-grower; tolerates a wide range of soil conditions; produces white flowers in spring and dark blue berries in fall; fall color is yellow; will form thickets; great for restoration as it stabilizes soil and has a robust root system; provides food and nectar for insects and animals.

Cornus/Swida drummondii	Roughleaf dogwood	6-20’	6-15’	FS PS S	WD M W		

Deciduous, spreading shrub; fast-grower; showy small white flowers in spring; purplish-red fall foliage; songbirds and small mammals eat the fruit and birds will nest within; will form thickets and thus best in a more naturalized setting; butterflies are drawn to the flowers; native to the midwest U.S.; climate-smart plant choice.

Cornus/Swida racemosa	Gray dogwood	4-15’	10-15’	FS PS	WD, M	Ⓓ	

Deciduous, spreading shrub; fast-grower; tolerates poor and droughty soil; produces showy white flowers in spring and white fruits; fall color is yellow to orange to red; will form thickets; flowers provide nectar for pollinators; serves as larval host for the Spring Azure butterfly; birds eat the fruit.

Cornus/Swida sanguinea	Blood-twig dogwood	5-8’	5-6’	FS PS	WD M	Ⓓ	

Deciduous, rounded shrub native to northern Eurasia; fast-grower; tolerates poor and droughty soil; stems have bright red/yellow/orange bark, providing winter interest (prune back every three years to rejuvenate); has white flowers that turn into dark blue fruits; fall color is yellow or red, depending on the soil conditions and cultivar; nectar used by insects that use similar native species.

Cornus/Swida sericea	Red-twig dogwood	6-9’	7-10’	FS PS	WD, M, W	Ⓓ Ⓗ	

Deciduous, spreading shrub; fast-grower; tolerates a wide range of soil conditions; produces white flowers in spring; stems have bright red bark, providing winter interest; fall color is yellow; will form thickets; great for restoration as it stabilizes soil and has a dense root system; cutting down older stems will help preserve bright stem color; provides food and nectar for insects and animals.

Corylus americana	American hazelnut	5-9’	4-6’	FS PS	WD M	Ⓓ	

Deciduous shrub with tiered growth habit; orange to yellow fall foliage; nuts are consumed by foxes, birds, and other wildlife; supports many pollinators.

Dasiphora fruticosa	Shrubby cinquefoil	2-4’	3-5’	FS PS	WD	Ⓓ	

Deciduous, low, mounding shrub; highly drought tolerant; prefers cooler areas; white to yellow flowers that attract pollinators; long bloom period.

Diervilla lonicera	Bush honeysuckle	3-4’	3-4’	FS PS	WD	Ⓓ	

Deciduous, low shrub; very drought-tolerant; suckers to spread (suitable to plant in mass as a lawn replacement); glossy green leaves; yellow flowers; yellow to purple fall foliage; flowers attract bumble bees, hummingbirds, and butterflies.

Hydrangea arborescens	Smooth hydrangea	3-6’	3-5’	PS	M		

Deciduous shrub; spreads by suckering and thus works well as a massing; needs a shady location and some moisture in the soil; showy white flowers in spring that are a pollinator magnet; many cultivars are available; native to U.S. mid-Atlantic and southeast; climate-smart plant choice.

Hydrangea quercifolia	Oakleaf hydrangea	4-8’	4-8’	PS S	M	Ⓗ	

Deciduous shrub; interesting oak-like leaf shape; red to purple fall foliage; white flowers in summer; prefers fertile, moist soil; protect plant when young from winter winds; native to the U.S. southeast; potential climate-smart plant choice.

Hypericum kalmianum	Shrubby St. Johnswort	2-3’	2-3’	FS PS	WD	Ⓓ	

Deciduous, low, dense, mounding shrub; leaves are evergreen though can drop in the winter; covered in yellow flowers (best in sun) in summer that attract pollinators; native just outside of Massachusetts; climate-smart plant choice.

Ilex glabra	Inkberry holly	5-8’	5-8’	FS PS	WD M, W	Ⓗ	

Deciduous suckering shrub (can be used in a massed planting); glossy green evergreen leaves; tolerant of dry and wet soils; requires acidic soil; in shade, is more openly branching; there are shorter cultivars available; birds forage the berries; honeybees visit the flowers.

Ilex verticillata	Winterberry	3-12’	3-12’	FS PS	WD, M, W	Ⓗ	

Deciduous shrub that prefers wet, acidic soil in full sun but can tolerate dry soils; produces spectacular, bright red berries in fall that persist into the winter (note that you will need to plant at least one male plant for fruit); birds eat the fruit; bees and other insects visit the plant for nectar; it is also used a bird nesting site; there are many cultivars available in the trade.

Itea virginica	Virginia sweetspire	3-4’	4-6’	FS PS FS	WD, M	Ⓓ	

Deciduous, broad shrub with arching branches; spreads via suckering and is thus ideal to plant as a massing; great for restoration as it stabilizes soil and has a dense root system; prefers acidic to neutral soil; has white spring flowers and red fall foliage; provides cover habitat for wildlife and nectar for insects; climate-smart plant choice.

Leucothoe axillaris	Coastal doghobble	2-4’	3-5’	PS FS	M	Ⓗ	

Shade-tolerant shrub from the southeast U.S.; glossy green leaves turn red in fall and persist into the winter; white flowers in spring; prefers acidic soil; should be protected from winter winds; has a high flammability rating and should not be planted directly against buildings; potential climate-smart plant choice.

Lindera benzoin	Spicebush	6-12’	6-12’	PS	M		

Deciduous, openly branching shrub; yellow blooms in early spring before foliage appears; yellow fall color; spicebush swallowtail butterfly caterpillar feeds on its leaves.

Morella pensylvanica	Bayberry	5-10’	5-10’	FS PS	WD, M, W	Ⓓ Ⓗ	

Deciduous, dense, rounded shrub that spreads via suckering and thus works well when planted in a massing; tolerant of a wide range of soil conditions; glossy green leaves can be evergreen in warmer locations; gray-blue fruits persist into the winter; birds eat the berries in the winter and butterflies are also attracted to the plant.

Physocarpus opulifolius	Common ninebark	5-8’	4-6’	FS PS	WD	Ⓓ Ⓗ	

Deciduous upright shrub that tolerates many soil types; bark exfoliates and has an interesting appearance in winter; pink or white flowers attract bees; yellow to bronze fall foliage; takes up space in the landscape and is best planted as an accent plant; many cultivars are available with different foliage colors and sizes.

Prunus pumila var. depressa	Dwarf sand cherry	1-2’	2-4’	FS	WD	Ⓓ Ⓗ	

Low-growing, groundcover-like shrub; great restoration plant for stabilizing soils and covering ground; white flowers in spring; red to purple fall foliage; host plant and attracts bees, songbirds, and other wildlife.

Rhododendron arborescens	Smooth/sweet azalea	8-20’	8-20’	FS PS	WD M	Ⓗ	
Deciduous shrub; requires acidic soil; pink to yellow flowers in late spring; orange to purple fall foliage; attracts bees, butterflies, and hummingbirds; native to U.S. mid-Atlantic and southeast; climate-smart plant choice.							
Rhododendron atlanticum	Deciduous azalea	2-6’	2-5’	PS	WD M		T
Deciduous, compact shrub; white flowers in early spring that attract bees, butterflies, and hummingbirds; yellow fall color; native to U.S. mid-Atlantic and southeast; climate-smart plant choice. See also: *Rhododendron calendulaceum* and *Rhododendron prinophyllum*.							
Rhododendron catawbiense	Mountain rosebay	6-10’	8-10’	FS PS S	WD M		
Evergreen shrub; prefers acidic, well-drained soil and cooler locations; showy pink flowers in spring; can grow taller than 10’, thus avoid planting against buildings; butterflies visit flowers; native to the U.S. southeast.							
Rhus aromatica	Fragrant sumac	2-6’	6-10’	FS PS	WD M	Ⓓ Ⓗ	T
Deciduous shrub that spreads (ideal for massing); glossy green leaves; vibrant orange to red fall foliage; stabilizes slopes; lower-growing cultivars are available; supports native bees and other pollinators.							
Rhus copallinum	Flameleaf sumac	7-15’	7-20’	FS PS	WD, M	Ⓓ Ⓗ	
Deciduous shrub/small tree; spreads via suckering to form larger massing, which can present a maintenance challenge if that is not desired; tolerant of high pH (alkaline) soils; bright red and orange fall color and red fruits that persist into the winter; fruits are a winter food source for birds and mammals; supports bees and other pollinators; can work well as a screening plant at the back of a planting.							
Rosa palustris	Swamp rose	3-6’	3-6’	FS	W		T
Deciduous shrub that prefers wet soils; red fall foliage and fruit; thorny; prefers acidic soil; showy and fragrant pink flowers throughout summer; supports birds and provides nesting material for native bees.							
Rubus odoratus	Flowering raspberry	3-6’	6-12’	FS PS	M		T
Deciduous shrub with wider coarse leaves; rose-like purple flowers have a long bloom time in summer; pale yellow fall foliage; spreads by suckering and thus works well as a massing; supports many pollinators.							
Sambucus canadensis / nigra	Elderberry	5-12’	5-12’	FS PS	M	Ⓗ	T
Deciduous shrub that prefers moist soils and produces edible fruit; showy white flowers; yellow to golden fall foliage; berries are eaten by birds and mammals; flowers provide nectar for pollinators; many cultivars are available.							
Spiraea tomentosa	Steeplebush	2-4’	3-5’	FS	M		T
Deciduous, mounding shrub with showy pink flowers; prefers moist soils but is adaptable; supports birds, butterflies, and bees.							
Vaccinium corymbosum	High bush blueberry	6-12’	8-12’	FS PS	M, W		T
Deciduous shrub that requires acidic soil; prefers well-drained soil with moisture; openly branching growth habit; red fall foliage; white flowers in spring; fruit consumed by birds; pollinators utilize the flowers.							
Viburnum dentatum	Arrowwood viburnum	6-10’	6-10’	FS PS	M	Ⓓ	T
Deciduous shrub with white flowers in late spring; glossy green leaves; fall foliage can be attractive depending on soil conditions (prefers moist loams); supports pollinators; native to U.S. mid-Atlantic and southeast; climate-smart plant choice.							
Viburnum lentago	Nannyberry viburnum	14-16’	6-12’	FS	WD		T
Deciduous shrub/small tree with edible fruit; tolerates high pH (alkaline) soils; glossy green leaves and showy white flowers; red to purple fall foliage; habitat for small mammals and birds; supports butterflies.							
Xanthorhiza simplicissima	Yellowroot	1-3’	1-3’	PS	WD, M	Ⓓ	T

Low shrub that spreads to form masses; leaves have an interesting texture; red to purple fall foliage; native to the U.S. mid-Atlantic/southeast; supports bees and other pollinators; climate-smart plant choice.

Sources of information utilized in this section:
(Hyperlinks directing to external organizations are subject to change.)

- The Native Plant Trust's GoBotany Tool: https://gobotany.nativeplanttrust.org/
- University of Connecticut Plant Database: https://plantdatabase.uconn.edu/
- Vermont Urban & Community Forestry Program's *Vermont Tree Selection Guide* (2022) https://vtcommunityforestry.org/sites/default/files/2022-11/complete-vt-tree-selection-guide-2022.pdf
- Dropkin, et. al. *Woody Shrubs for Stormwater Retention Practices*. Cornell University. (2013). http://www.hort.cornell.edu/uhi/outreach/pdfs/woody_shrubs_stormwater_hi_res.pdf
- Xerces Society. "Native Plants for Pollinators & Beneficial Insects: Northeast." (2023). https://xerces.org/sites/default/files/publications/22-026_01_NPPBI%E2%80%94Northeast_web.pdf

Tree and Shrub Family Reference by Family and Genus

Follow the 10-20-30 rule for tree diversity for new plantings.
To ensure landscape resilience, plantings must be comprised of no more than 10% of any one species, 20% of any one genus, or 30% of any one plant family.

FAMILY	GENUS-COMMON NAME
Adoxaceae (Formerly Caprifoliaceae)	Sambucus-Elder Viburnum-Viburnums
Anacardiaceae – Cashew Family	Rhus -Sumac
Aquifoliaceae - Holly Family	Ilex-Holly
Betulaceae - Birch Family	Betula–Birch Carpinus–Hornbeam Corylus–Hazelnut Ostrya–Hop-hornbeam
Caprifoliaceae–Honeysuckle Family	Diervilla–Bush honeysuckles
Clethraceae–Summersweet Family	Clethra–Summersweet
Cornaceae–Dogwood Family	Benthamidia, Cornus, Swida–Dogwood
Ericaceae–Heath Family	Oxydendrum–Sourwood Leucothoe–Leucothoe Rhododendron–Rhododendron & Azalea Vaccinium–Blueberry
Fabaceae/Leguminosae–Legume Family	Cercis–Redbud Gleditsia–Honey locust Gymnocladus–Kentucky Coffeetree
Fagaceae–Beech Family	Fagus–Beech Quercus–Oak
Ginkgoaceae–Ginkgo Family	Ginkgo
Hamamelidaceae–Witchhazel Family	Hamamelis–Witchhazel Liquidambar–Sweetgum
Hydrangeaceae–Hydrangea Family	Hydrangea–Hydrangeas
Hypericaceae–St. Johnswort Family	Hypericum–St. Johnswort
Juglandaceae–Walnut Family	Carya–Hickory
Magnoliaceae–Magnolia Family	Liriodendron–Tuliptree Magnolia–Magnolia
Myricaceae–Sweet Gale Family	Comptonia–Sweet Fern Morella–Bayberry Myrica–Bayberry, Sweet Gale
Nyssaceae	Nyssa–Tupelo
Oleaceae–Olive Family	Chionanthus–Fringetree Fraxinus–Ash
Pinaceae–Pine Family	Abies–Fir Pinus–Pine

Platanaceae–Planetree Family	Platanus–Planetree
Ranunculaceae–Buttercup Family	Xanthorhiza–Yellowroot
Rhamnaceae–Buckthorn Family	Ceanothus–New Jersey Tea and others
Rosaceae–Rose Family	Amelanchier–Serviceberry Aronia–Chokeberry Crataegus–Hawthorn Dasiphora–Shrubby Cinquefoil Malus–Crabapple Physocarpus–Ninebark Prunus–Cherry Rosa-Rose Rubus–Raspberry Spiraea–Spiraea
Sapindaceae–Soapberry Family	Acer–Maple species Aesculus–Horse-chestnut, buckeye
Saxifragaceae-Saxifragaceae Family	Itea–Sweetspire
Styracaceae–Silverbell Family	Halesia–Silverbell
Taxodiaceae & Cupressaceae–Cypress Family	Metasequoia–Dawn Redwood Taxodium–Baldcypress Thuja-Arborvitae
Tiliaceae–Linden Family	Tilia–Linden
Ulmus–Elm Family	Celtis–Hackberry

Sources of information utilized in this section:
(Hyperlinks directing to external organizations are subject to change)

Dirr, Michael A. *Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses*. 5th ed., Stipes Publishing, 1998.

The Native Plant Trust's GoBotany Tool: https://gobotany.nativeplanttrust.org/
University of Connecticut–College of Agriculture, Health, and Natural Resources, Plant Database: https://plantdatabase.uconn.edu/

Planting Guidelines

Before Planting: Locate Underground Utilities

Before digging in the soil for a shrub or tree planting, it is critical to know the location of underground utilities in order to avoid damage. Call Dig Safe at 811 or (888) 344-7233; you will need to mark the area being considered for the planting using white flags, paint, and/or stakes. Note that municipal water and sewer departments are not required to join Dig Safe, and thus may not mark underground utilities. To locate those pipes, you may need to hire a private locator. For more information: https://www.mass.gov/guides/about-dig-safe.

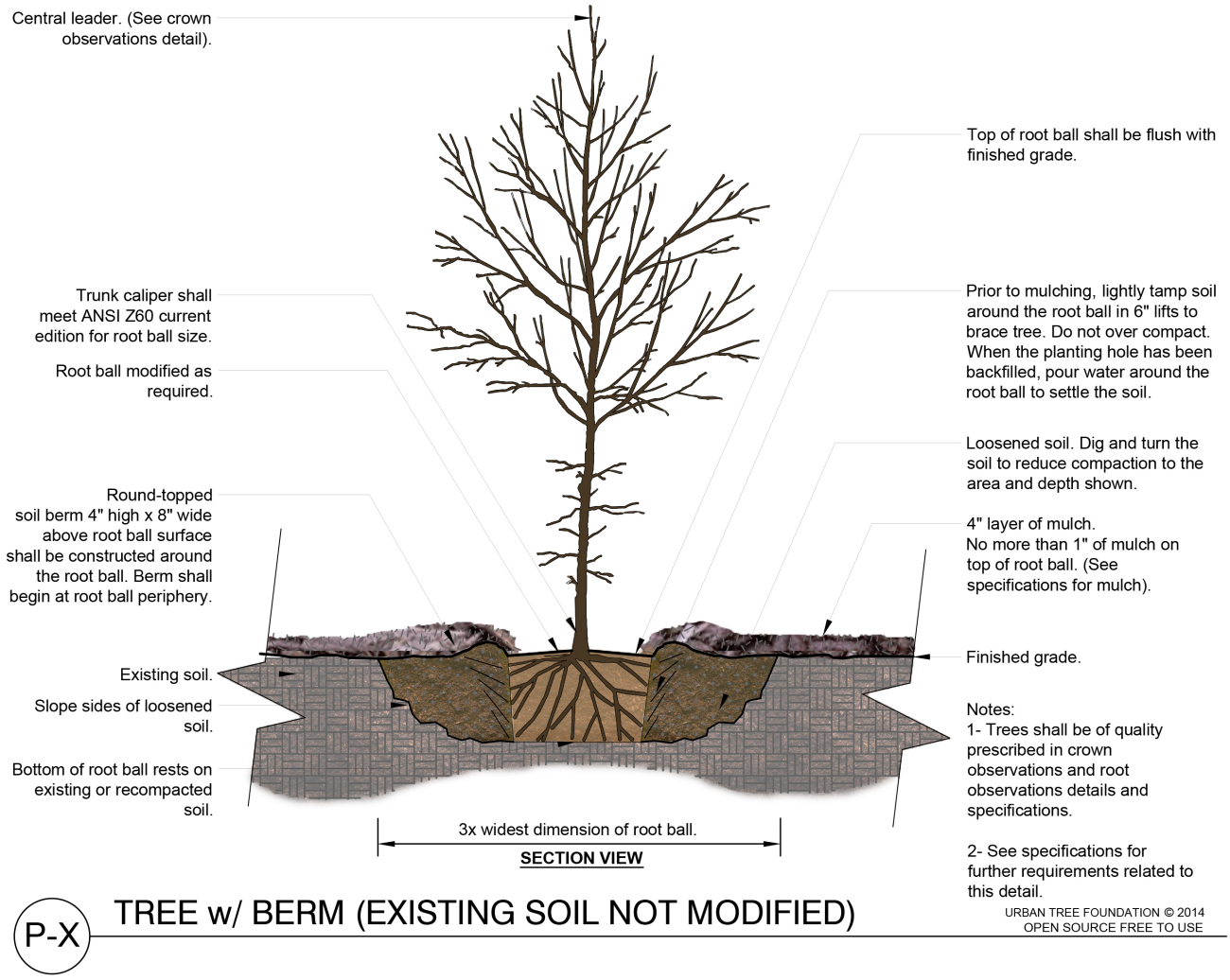
Planting Construction Details

For construction details that can be used in construction documents, one resource is the "Planting Details and Specifications" posted on the International Society of Arboriculture's website (https://www.isa-arbor.com/education/onlineresources/cadplanningspecifications). These details were prepared by Dr. Ed Gilman from the University of Florida, Jim Urban, FASLA, and Brian Kempf and Tyson Carroll of the Urban Tree Foundation. Details have been peer reviewed and are available for free in CAD, PDF, and Word format. They are open source and editable. Examples from this resource are provided on the following pages (color and textures are not original and were added for this guide).

Planting and Maintenance

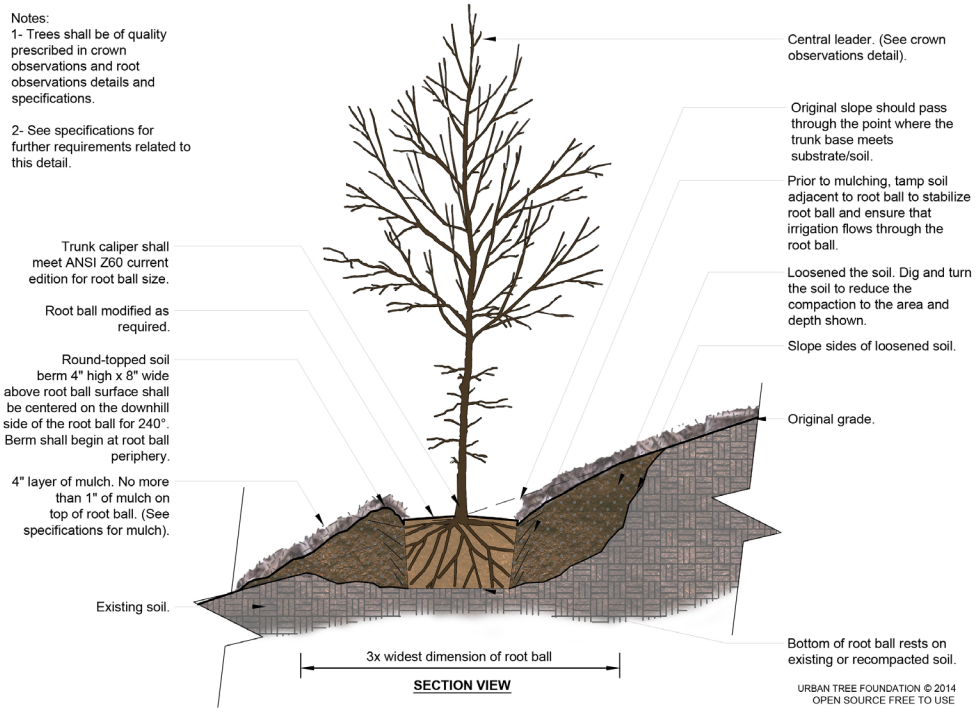
The **Massachusetts Urban & Community Forestry Program's Tree Planting 101 fact sheets** follow the construction details below. These fact sheets present critical steps in planting and maintaining trees, and can be utilized for shrub planting as well.

Tree Planting in Existing Soils



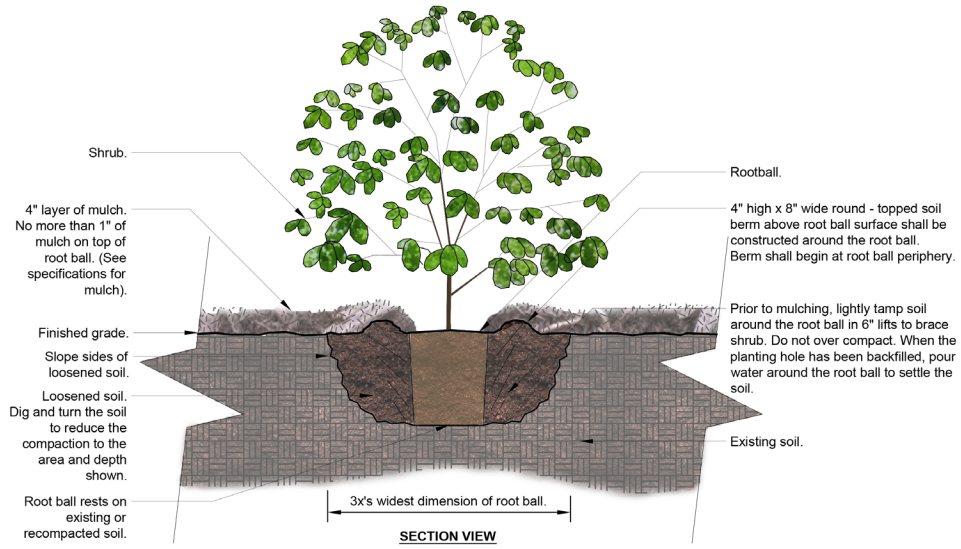
P-X TREE w/ BERM (EXISTING SOIL NOT MODIFIED)

Tree Planting on a Slope in Existing Soils



P-X TREE ON SLOPE 5% (20:1) TO 50% (2:1) - UNMODIFIED SOIL

Shrub Planting in Existing Soils



Notes:
1- Shrubs shall be of quality prescribed in the root observations detail and specifications.

2- See specifications for further requirements related to this detail.

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P-X SHRUB - UNMODIFIED SOIL

dcr Massachusetts

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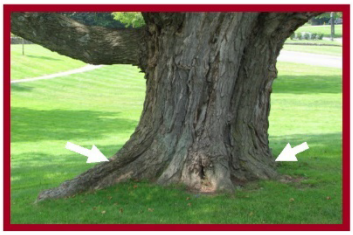
TREE PLANTING 101

The saying goes, "The best time to plant a tree was 20 years ago, but the next best time is now." Planting your tree properly is one of the best things you can do to ensure the successful establishment of your tree in the landscape. Prior to planting, treat your tree gently and protect it during transport. Keep it in a cool, shaded place and keep the root ball moist. Plant the tree as soon as possible. Follow these steps for a successful planting. And remember, call Dig Safe® at 811before you dig.



Trunk flare on mature tree

1. **Take Stock!** Examine your tree and remove packaging around trunk and branches.
2. **Find your Flare!** Locate the trunk flare (also called root flare or the root collar). The ANSI A300 defines this as "the area of transition between the root system and the trunk," and it should be at or just above the finished grade. It is where the trunk will typically start to curve and where structural roots become distinct from the trunk. This is often highly visible on trees in the woods, and can be less conspicuous on young, nursery-grown trees. There may be excess soil on top of the trunk flare, so you may have to remove soil from the top of the root ball to identify the flare. You can gently probe the root ball with a chaining pin, skewer, screwdriver, or wire in order to locate structural roots.

Removing excess soil from the top of the root ball using a hand cultivator

3. **Determine the size of the planting hole.** Measure the width and depth of the root ball and use this to determine how wide and deep to dig, keeping in mind that the flare should be at or just above grade. The hole should be 2 to 3 times as wide as the root ball. In hard, compacted soil, the hole should be closer to 3 times as wide.
4. **Get digging!** Dig a wide hole with sloped sides. If the sides appear smooth or "glazed," use a shovel to rough up the sides. Dig only as deep as the root flare. Periodically check your depth and width by comparing with the root ball.
5. **Remove packaging from the root ball.** For container trees, this means removing the tree from the container. For balled and burlapped trees (B&B), this means removing the burlap and wire basket. For in-ground fabric, this means removing all of the bag. If it seems like the root ball of a B&B tree will fall apart, you may want to place the tree in the hole and then remove packaging. For all trees, remove trunk wrap and check the canopy for flagging tape, rope, or other items, and remove.

B&B trees with trunk wrap

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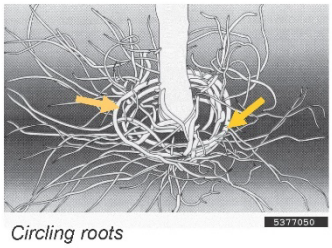
TREE PLANTING 101

6. **Examine the roots!** For all trees, cut circling roots. For container trees, remove roots growing against the container and remove a thin layer of roots from the side and bottom. For B&B trees, straighten, cut, or remove circling roots. If you plant trees a lot, you may want to dedicate a pair of cheap hand pruners for this purpose.
7. **Place the tree in the hole.** Roll or place the tree in the center of the hole. Check the depth of the root flare and adjust hole depth, if necessary.
8. **Check the placement of the tree.** Examine the tree from two sides, 90° apart. Is the trunk straight? Are branches facing the way you want? You can backfill with a little soil to help stabilize the tree as you check the placement.
9. **Backfill and water**. Once the tree is stabilized, continue to backfill with the soil that you dug out. Halfway through the backfilling process, water the tree to help remove air pockets and reduce future settling. Continue to backfill. To aid in watering, you can build a low dirt berm around the edge to help guide water to the root ball. Water thoroughly after planting.
10. **Mulch.** Use an organic mulch in a ring around the tree. Mulch should be 2 to 4 inches high. Once mulch has settled, the depth should not be greater than 2 inches. Keep mulch 3 inches away from the trunk. Do not apply mulch against the trunk of the tree so that it appears like a volcano; this is incorrect and detrimental to the tree, though is often observed in the landscape.



Circling roots


Correct mulch technique. Wide ring, away from trunk.


Improper mulch technique

Caring for your New Tree

The next two years are critical for the successful establishment of your tree. Make sure you water your tree, but be careful not to overwater. During hot, summer months, your tree may need 10 gallons per caliper inch per week. When it is cooler, that amount may be 5 gallons per caliper inch per week. You can check the soil moisture of the root ball by probing the soil with a chaining pin or stiff wire. If the rod goes in easily, there is likely adequate moisture, but if it is difficult, that may indicate the soil is dry. As you remove the rod or chaining pin, if you notice suction has developed, that may indicate the soil is too wet; likewise, if the leaves are wilting, but you are watering regularly, you may be watering too much. Newly-planted trees typically do not need to be fertilized or pruned.

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CARING FOR NEW TREES

Congratulations! If you are reading this, it means you are caring for a newly-planted tree. Your actions over the next two to three years will help your tree become established in the landscape and survive for years to come. What should you be doing?

WATERING

New trees need water, especially during hot summer weather! Watering with a garden hose at low volume or utilizing a soaker hose is ideal since it allows water to slowly infiltrate the soil while minimizing the potential for root ball erosion. Less frequent, but thorough, watering is more beneficial to root development than more frequent, but shallow, watering. Remember that tree roots need oxygen and over-watering is just as problematic as under-watering.

Watering technique using one-gallon jugs

It is hard to say exactly how much to water your tree. Natural rainfall and specific soil conditions can vary, but newly-planted trees need approximately 1.5 inches of rain per week. This translates to about 10 gallons per caliper inch, per week, from spring through autumn.

An Easy Watering Technique

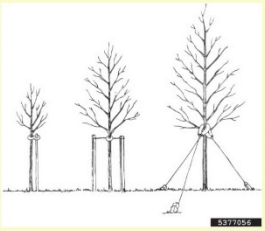
Using 10 one-gallon plastic jugs, carefully perforate the bottom of the jugs and place them around the base of the tree tied together and then fill them with water. This will allow the water to slowly seep out and water the tree.

You can also purchase watering bags that you fill, using a hose to allow for a slow soaking.

Watering bag

TREE STABILIZATION

Tree stabilization may be necessary in areas with high winds, where mower or string trimmer damage is likely, for high-traffic areas, or for trees that do not have an adequate root system. Tree stabilization may consist of stakes, guys, and other materials. Here we describe a method using stakes, but there are a variety of systems out there, with varying costs and amounts of labor required. If you are using stakes, use 2 to 3 stakes, placed just inside the edge of the mulch ring and wide nylon or canvas straps, tied loosely around the trunk. For an unstable root ball, use 1-3 stakes attached low on the trunk. Remove after 1 year.



Staking techniques, ISA, bugwood.org

TRUNK GUARDS

If winter damage to the trunk by rodents is a concern, install a trunk guard made of plastic tubing, hardware cloth, or wire fencing. Allow 1-4 inches of space around the trunk and ensure it is tall enough to protect in snow. Remove in the spring.

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CARING FOR NEW TREES

MULCHING

Mulch is any woody or herbaceous material applied over the root zone that improves tree health by replicating the forest floor. Mulch can be aged wood chips, shredded bark, pine needles, composted leaves, composted grass clippings, and other organic material.

Why mulch? Mulching your new tree is important and serves more than just an aesthetic function. Mulch reduces the shortcomings of urban sites by replicating natural processes occurring in the forest. Mulch increases available nutrients and water retention, buffers soil temperatures, and provides root protection. Mulch also reduces root-zone erosion potential, soil compaction, and weed growth, and prevents lawnmower and other machinery damage.

How to use mulch. Place mulch in a ring at least 3 inches away from the tree trunk, at a depth of 2-4 inches, and ideally out to the tree crown. Raking away old mulch before applying new mulch helps maintain correct mulch depth. Occasionally, you may need to pull mulch away from the trunk of the tree as the mulch settles around.

Correct mulch technique


Improper mulch technique—piled on trunk and does not cover whole root zone

FERTILIZING

Fertilizer should only be used if a soil test indicates a deficiency. New trees typically do not require fertilization. For information on testing your soil, contact the UMass Soil and Plant Nutrient Testing Lab, https://soiltest.umass.edu/ or 413-545-2311. Improper use of fertilizer can damage your tree.

PRUNING AND PERIODIC INSPECTION

Prune dead and broken branches at planting. After 2 years, you may begin structural pruning. Your tree will likely require pruning every 1-2 years to establish and maintain proper structure. If your tree is within 10 feet of utility lines, or you need to use a ladder or chainsaw, contact an arborist. For guidance on tools, techniques, and safety, see *The Tree Owner's Manual*, pages 18-23. Periodically, inspect the tree for insect and disease problems. Protect the tree from human activities such as construction, soil compaction, and road salt.

REFERENCES: *Tree Owner's Manual*, www.treeownersmanual.info ♦ *Tree Planting Best Management Practices*. 2014. 2nd ed. Champaign, IL: International Society of Arboriculture ♦ *New Tree Planting*. 2011. International Society of Arboriculture, www.treesaregood.com/treecare/resources/new_treeplanting.pdf

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PROTECTING OUR COMMUNITY TREES

In Massachusetts, we are lucky to have state laws that govern and protect our public roadside trees. The best way to learn about these laws is to read them in full. You can do this by visiting your local library or the Massachusetts State website at www.malegislature.gov/Laws/GeneralLaws/. This Fact Sheet attempts to summarize these laws.

Which Laws Govern Public Trees in Massachusetts?

- Massachusetts General Law, Chapter 87 is the most important law governing public shade trees. It outlines the powers of the Tree Warden, procedures for removing shade trees, procedures for planting public trees, and penalties for violating provisions of the law.
- Massachusetts General Law, Chapter 40, Section 15C augments Chapter 87 with additional requirements concerning the removal of trees on Scenic Roads.
- Some communities also have additional local ordinances governing the protection of both public and private community trees. For example, Wellesley recently passed an ordinance that provides protection to trees during construction, and Springfield has a law that provides protection for all trees over 36 inches in diameter.

What are the Key Elements of Chapter 87?

- All trees within the public way are defined as public shade trees.
- The Tree Warden is responsible for the care, control, protection, and maintenance of all public shade trees, except those within a state highway, and shall enforce all the provisions of law for the preservation of such trees.
- No other person may plant, trim, cut, or remove a public shade tree without permission of the Tree Warden.
- No person, including the Tree Warden, may cut, trim, or remove any tree, greater than one and one-half inches in diameter, without a public hearing.
- Public notice of such a hearing must be posted, at least seven days prior to the hearing, on the trees in question, in two or more public places in town, and in a newspaper of general circulation for the town in each of two successive weeks.
- The Tree Warden shall not cut or remove a public shade tree if, at or before the public hearing, objection is made in writing by one or more persons, unless such cutting or removal is approved by the selectmen or by the mayor.
- Any person injured in his property by the trimming, cutting, removal, or retention of any such tree may recover the damages, if any, from the town under Chapter 79.
- Utilities may, or at the request of the Tree Warden must, file an annual vegetation management plan and or hazard tree removal plan with communities.
- **Finally,** nothing contained in chapter 87 shall prevent the trimming, cutting, or removal of any tree which endangers persons traveling on a highway, or the removal of any tree, if so ordered by the proper officers, for the purpose of widening the highway.

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PROTECTING OUR COMMUNITY TREES

What if a Tree is Located on a Designated Scenic Road?

- No public shade tree may be cut, trimmed, or removed from along a designated scenic road, for the purposes of road repair, maintenance, reconstruction or paving work, without the prior written consent of the Planning Board after a public hearing.
- The public hearing regarding the cutting or removal of trees along scenic roads shall be consolidated into a single public hearing before the Tree Warden and the Planning Board, and notice of such consolidated public hearing shall be given by the Tree Warden as provided for in Chapter 87.

What if a Tree is Located on a Numbered State Highway?

- The Massachusetts Department of Transportation shall have the care and control of all trees within state highways, and may trim, cut, or remove such trees.
- No public hearing is required.

What Should a Citizen do if He or She Feels These Laws are not being Enforced?

- First contact your Tree Warden to discuss the issue with him or her and make sure that he or she is aware of the issues involved and these regulations.
- You may also want to share this Fact Sheet with the Tree Warden, Select Board, Planning Board, and other town officials.
- Please also contact us if we can be of assistance in any way regarding community trees or forests.
- Finally, consider advocating for the creation of a Tree Board or Committee in your community. Many communities have found that such committees can work effectively with their Tree Wardens to improve the management, maintenance, and public support for community trees and forests.

To contact the South Hadley Tree Warden, call the Department of Public Works:

413-538-5033 x 6500

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TREES AND ROADS WORKING TOGETHER

Trees are an important part of a community's infrastructure that can sometimes be damaged during municipal construction and maintenance activities, leading to hazardous conditions and increased costs. Tree Wardens and Public Works staff can work together to protect trees and minimize costs to the community.

Roadside community trees are a vital public utility.

Just as roads perform a necessary transportation function, wires conduct electricity, and pipes move water, roadside trees provide a host of community benefits. Community trees help reduce storm-water flows and mitigate flooding, filter the air, reduce heating and cooling costs, contribute to property values, add to community character, and beautify the landscape -- strengthening the social and economic vitality of our towns and cities.

Community trees are under the control of the Tree Warden.

Under Massachusetts General Law Chapter 87:

- All trees within the public way are defined as public shade trees.
- The Tree Warden is responsible for the care, control, protection, and maintenance of all public shade trees, and shall enforce the provisions of law for protecting these trees.
- No other person may plant, trim, cut, or remove a public shade tree without permission of the Tree Warden. *This includes the cutting of roots during construction.*
- **No person, including the Tree Warden, may remove any healthy tree, greater than one and one half inches in diameter, without a public hearing.**

The importance of roots and bark

Roots and bark are two vital organs for trees. Roots take up water, oxygen and nutrients, and provide stability. Bark transports water, food, and nutrients to the rest of the tree. If these are damaged, a tree will decline and may die.

- 90% of tree roots are in the top two feet of soil.
- 60% of the roots are outside the "dripline" of the tree.
- The inner bark serves as part of the vascular system for the tree.
- Roots are rarely observed under existing paved roads.

Some suggested guidelines for protecting trees

Prior to construction or road improvement activities:

- Be involved early. The Tree Warden should have a process for being informed of upcoming construction activities early in the planning stages.
- The Tree Warden and Public Works staff should meet on site to discuss the type of work to be completed and collaboratively develop strategies for to protecting desirable trees and groupings of trees.

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TREES AND ROADS WORKING TOGETHER

Protect roots:

- Ideally, steps should be taken to protect the "critical root zones" of desirable trees.
- The radius of the "critical root zone" is determined by multiplying the diameter of a tree in inches, by feet. In other words, a 10-inch diameter tree will have a 10-foot radius "critical root zone." Do not just protect to the "dripline" of the tree.
- Roots are rarely observed to travel under existing paved roads.
- The "critical root zone" should be protected by placing hard fencing around the zone. Snow fencing is often moved.
- Within this protected zone, there should be no activity, storage, or soil compaction.
- Avoid any kind of trenching or soil disturbance close to the trunk of the tree.
- It may not always make sense to protect the full "critical root zone," especially for roadside trees. In these cases, the Tree Warden and Highway staff should work together to establish a "zone of tree protection" that makes sense.

Protect the bark:

- If the "critical root zone" is protected, then the bark should be protected. However, sometimes bark stills gets damaged during construction and maintenance activities.
- Work with staff and contractors to be sure everyone understands the importance of bark and the need to protect bark from nicks, scrapes, and gouges.
- Fences and well-defined tree protection zones can help protect bark.
- You may want to additionally mark or flag trees that could be in danger of injury from equipment, including trees that may be damaged during routine snow removal.

Protect against changes in grade:

- Changes in grade can be as damaging to tree roots as cutting, trenching, or soil compaction, and may eventually lead to tree decline and death.
- Make sure that the grade is not changed within the identified tree protection zone.
- You may want to inspect and restore changes in grade that result from normal road maintenance activities, such as snow removal and road re-grading.

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Resources

Educational Resources

The **Native Plant Trust** provides workshops via Zoom and in-person at the organization's locations in Framingham and Whately. Their nursery in Whately sells many of the tree and shrub species in this guide, along with perennials, grasses, and groundcovers. Website: https://www.nativeplanttrust.org/

The **Wild Seed Project**, based in Maine, has an online resource library with guides and videos addressing many aspects of ecological landscaping, such as propagating your own plants, growing in the grass strip between the sidewalk and the street, and more. Their publications available for purchase cover topics such as *Planting for Climate Resilience* and *Native Shrubs for Northeast Landscapes*. Website: https://wildseedproject.net/

The **Ecological Landscape Alliance** provides articles on ecological landscaping topics along with a database of designers that you can reach out to for help on your property. The organization has regular webinars and annual conferences that draw designers, contractors, homeowners, large-scale property managers, and more. Website: https://www.ecolandscaping.org/

Grow Native Massachusetts provides many resources on its website including plant databases, plant lists, and sourcing information. Events include pop-up markets, site visits, and presentations. Website: https://grownativemass.org/

To find more information about **individual tree and shrub species**, consult:

- **UCONN Plant Database**: http://hort.uconn.edu/
- **Cornell University's Woody Plants Database**: https://woodyplants.cals.cornell.edu/home
- **North Carolina Extension Gardener Plant Toolbox:** https://plants.ces.ncsu.edu/

For information on climate-smart planting choices, follow the **Climate Smart Gardening project**: https://scholarworks.umass.edu/entities/publication/1f91536f-00e4-4213-b2c2-6a51e6f82201?_gl=1*1c9wsfb*_gcl_au*MTMxOTA0NDA4My4xNzQ5NzU2MjE2*_ga*MTcwMjU2MzM5My4xNzMxMzUzMTM3*_ga_21RLS0L7EB*czE3NTA4NjIxODEkbzI2JGcxJHQxNzUwODYyNjgwJGoxMCRsMCRoMA.

Information on Sourcing Plants

Many of the species on the **Recommended Plant List** in this guide are available in plant nurseries. Others may be more difficult to procure. Given increased demand for native plant species, it is recommended that plants are pre-ordered (e.g., during late fall/early winter) prior to the start of the planting season (in spring). Several organizations maintain lists of nurseries that specialize in native plants, such as:

- Grow Native Massachusetts: https://grownativemass.org/Great-Resources/nurseries-seed
- Wild Seed Project: https://wildseedproject.net/blog/where-to-buy-native-plants

The list below draws from these and other resources.

Note that some nurseries are wholesale, some are retail, and some are both: wholesale-only nurseries often only sell to landscape professionals/contractors, and prices tend to be lower as businesses often purchase large quantities. Retail nurseries sell to the general public, and prices tend to be higher. The list below includes nurseries in Massachusetts, southern Vermont and New Hampshire, northern Connecticut, and upstate New York. It is not comprehensive and website links are subject to change. Several of these nurseries also engage in **contract growing**: for large orders and/or species difficult to find in the trade, these nurseries may be able to grow the desired, pre-ordered quantities.

Hiring a landscape professional to help with planting selection and sourcing can help to maximize the success of your project. These professionals may additionally look into where nurseries obtain their plants (e.g., trees and shrubs grown in the southeast U.S. may not fare as well in Massachusetts as those grown in similar climates). These professionals may also consider the value of plants grown from seed or propagated vegetatively (e.g., from plant divisions or cuttings). Growing plants from locally collected seeds (i.e., local ecotypes) supports genetic diversity; these plants may also tolerate local conditions better than those propagated vegetatively and those grown in other regions.

Nursery Name and Location	Retail (R) Wholesale (W) Both (RW)
Western Massachusetts	
Checkerspot Farm, Colrain http://www.checkerspotfarm.com/	R
That's a Plenty Farm, Hadley http://www.thatsaplentyfarm.com/	R
Helia Native Nursery, West Stockbridge https://www.helianativenursery.com/	R
Native Plant Trust NASAMI Farm, Whately (Also see location in Framingham) http://www.nativeplanttrust.org/for-your-garden/buy-native-plants/	RW
New England Wetland Plants, South Hadley	W

https://newp.com/	
Sudbury Nurseries West, Gill https://sudburynurserieswest.com/	W
Wing and a Prayer Nursery, Cummington https://www.wingandaprayernursery.com/	R
Central/Eastern Massachusetts	
Bigelow Nurseries, Northboro https://bigelownurseries.com/	RW
Blue Stem Natives, Norwell https://www.bluestemnatives.com/	R
Butterfly Effect Farm, Westport https://www.butterflyeffectfarm.com/	R
City Native, Mattapan https://thetrustees.org/place/city-natives/	R
Dragonfly Natives, South Dartmouth https://dragonflynatives.com/pages/about	W
Hilltop Natives, Norwood https://www.facebook.com/profile.php?id=61563103137966	R
King's Tree Farm & Nursery, Boxford http://www.kingstreefarmandnursery.com/	R
Lady Fern Farm, Worcester https://ladyfernfarm.com/	R
Natural Companions, Harvard https://naturalcompanions.wixsite.com/natural-companions	R
Oakhaven Sanctuary, North Reading https://www.facebook.com/people/Oakhaven-Sanctuary/100069720394436/	R
Red Trillium Gardens, Lunenberg https://redtrilliumgardens.com/	R
Russell's Garden Center, Wayland https://www.russellsgardencenter.com/	R
Salem Native Nursery, Salem https://salemnativenursery.wordpress.com/	R
Swampdog Farm Native Plants, Dudley https://www.facebook.com/profile.php?id=61555663114448	R
Sylvan Nursery, Westport https://sylvannurseries.com/	RW
The Monarch Gardener, Topsfield http://www.themonarchgardener.com/home.html	R
Tree Talk Natives, Rochester https://www.treetalknatives.com/	R
Weston Nurseries, Hopkinton and Chelmsford https://www.westonnurseries.com/natives/	RW

Northern Connecticut	
Earth Tones Native Plants, Woodbury http://www.earthtonesnatives.com/	R
Planter's Choice Nursery, Watertown https://planterschoice.com/	W
Rewild Native Plant Nursery, Canton https://www.rewildct.com/	R
Southern New Hampshire	
Bagley Pond Perennials, Warner https://bagleypondperennials.com/	R
State Forest Nursery, Boscawen https://buynhseedlings.com/	R
Van Berkum Nursery, Deerfield http://www.vanberkumnursery.com/	W
Southern Vermont	
Shinleaf Native Plants, Westminster West https://www.shinleafnativeplants.com/	R
Northern Hudson Valley New York	
Capitol Native Plants, Troy https://capitalnativeplants.com/	R
Catskill Native Nursery, Kerhonson https://www.catskillnativenursery.com/	R

(Hyperlinks directing to external organizations are subject to change.)

Northeast RISCC MANAGEMENT NETWORK
Regional Invasive Species & Climate Change
Research to Practice

Climate-Smart Gardening 2.0

Plants to Promote Climate Adaptation

Summary

Gardening with native plants that are suited to both current and future climates supports native wildlife[1], increases climate resilience, and reduces the risk of introducing future invasive species. Plant hardiness zones are shifting as temperatures warm (Fig. 1), and many native plants are not keeping pace[2]. Planting native species and near-native species from nearby ecologically similar regions can help them move in response to warming conditions (Fig. 2). Therefore, **gardening with native and near-native plants can support the future biodiversity and resilience of your garden and nearby ecosystems.** Here, we provide updated and expanded state lists of "climate-smart" commercially available native and near-native plants that are expected to grow in the Northeast with continued climate change.

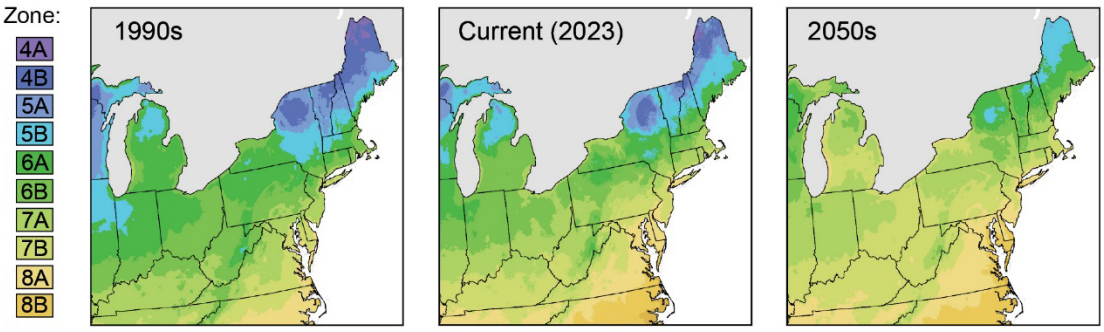
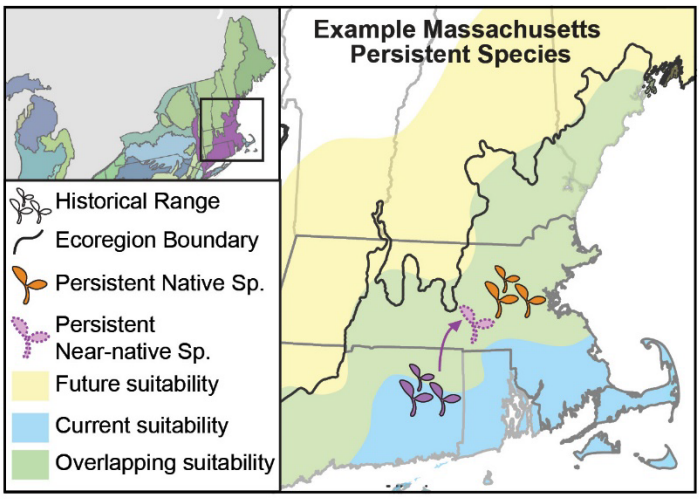


Figure 1. Plant hardiness zones (based on minimum temperatures where plants can grow) in the Northeast over time.



Definitions:

Native species: Species historically found growing without human intervention in a given state.

Near-native species: Species that are not native to a given state but are native to a nearby state with a shared Level III Ecoregion.

Persistent species: Species which are suitable for both current and future hardiness zones of a given state.

Climate-smart gardening: Planting for present and future conditions using native and near-native species adapted to both current and future hardiness zones.

Figure 2. Both persistent native and near-native species are suited for current & future climates. Unlike native species, near-native species don't have historical ranges in the focal state. Suitability represents the range of hardiness zones a species can tolerate. Ecoregions are areas of ecological similarity[3].

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risccnetwork.org/northeast
https://doi.org/10.7275/8164

Climate-Smart Ornamental State Plant Lists

We assembled a database of ~900 regionally native plant species sold by nurseries in the Northeast, including species from the Ecoregional Revegetation Application (ERA)[4]. After standardizing taxonomy[5], we added horticultural information[4,6,7,8,9] (Fig. 3) and historical native status in each state[10]. We then investigated whether each species' hardiness zones would persist in each state under likely mid-century climate conditions[11] and classified them accordingly (Fig. 4). Species that are rare or endangered within a given state were removed. Botanical, horticultural, and ecological experts also screened state lists.

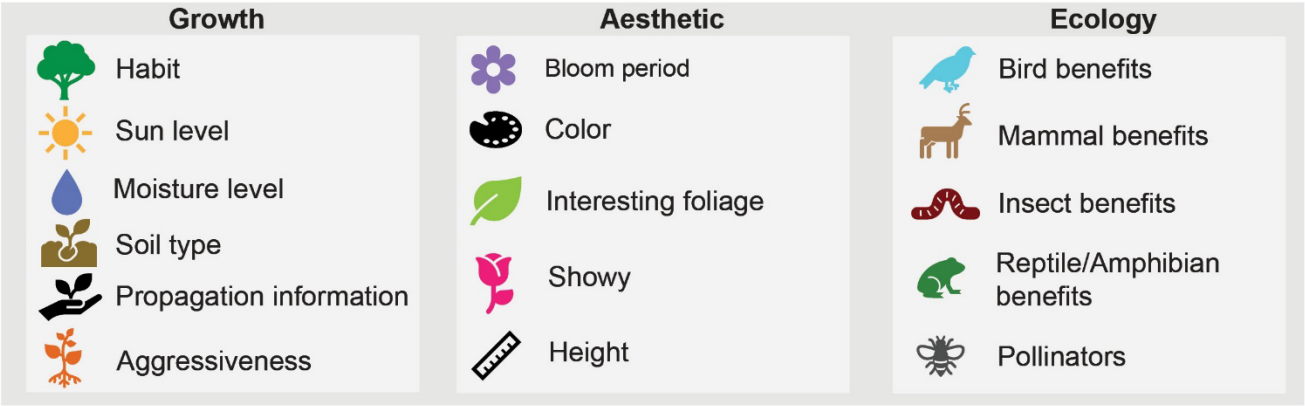

Figure 3. Horticultural and ecological information included for each plant species.

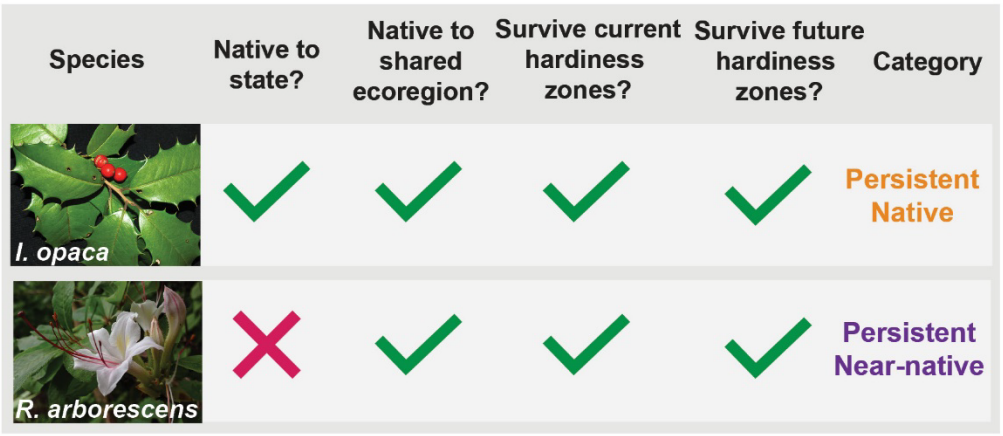

Figure 4. Example classification of climate-smart species in Massachusetts. Persistent natives and persistent near-natives already being sold in a state make good climate-smart species. Native species which are not persistent are excluded from each state list.

Proceed With Caution

Persistent near-natives aren't historically native to the focal state. These species need to move, but moving plants outside of their current range could result in unintended impacts. To minimize risk, we only included near-natives on state lists if their native range shared a Level III ecoregion with that state.

Buy native plants from reputable sources, and do not collect wild plants. Pay close attention to nursery labels and consult with state botanical societies and local/regional floras before planting subspecies, varieties, and cultivars.

Download State Lists

References: [1]Tartaglia & Aronson 2024. Urb. Ecosyst.; [2]Bradley et al. 2024. Annu. Rev. Ecol. Evol. Syst. ; [3]Omernik 1987. Ann. Assoc. Am. Geo. ; [4]USDoT ERA: nativerevegetation.org/era; [5]WFO: worldfloraonline.org/; [6]MoBot: missouribotanicalgarden.org/plantfinder/plantfindersearch; [7]LBJ: wildflower.org/plants-main; [8]Brickell & Cathey 2004. AZ Enc. Gard. Plnts.; [9]Dirr 1998. Man. Wdy. Lndscp. Plnts.; [10]Govaerts 2023: sfto.kew.org/pub/data-repositories/WCVP [11]Matthews et al. 2018: hardinesszones.daveyinstitute.com

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