Massachusetts Department of Conservation and Recreation

THE CITIZEN FORESTER

Urban & Community Forestry Program

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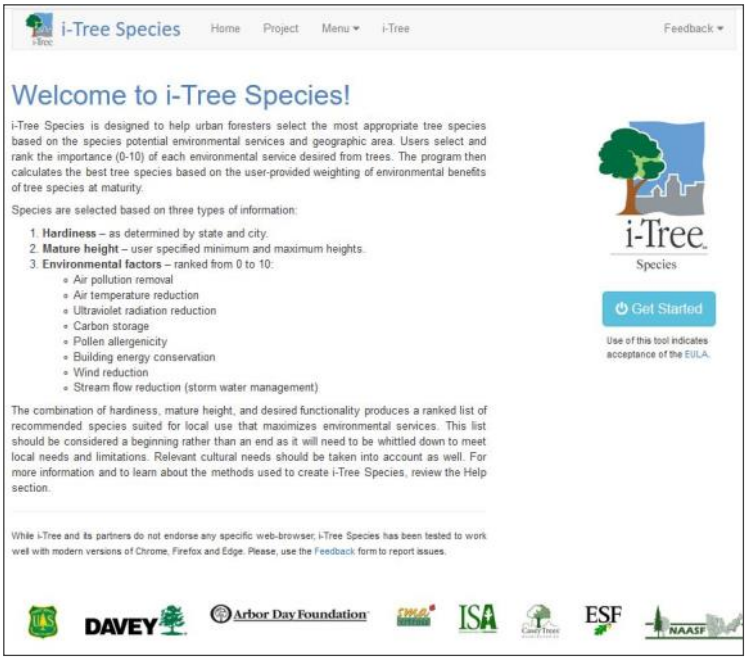
i-Tree Species: A Tool To Help You Select Trees Based on Environmental Services

By **Mollie Freilicher**

There are many resources to help you select an appropriate tree to plant. Some commonly used ones in Massachusetts are *The Tree Book* by Michael A. Dirr and Keith S. Warren (and Dirr's earlier *Hardy Trees and Shrubs*), the web version of Cornell's *Recommended Urban Trees*, the Vermont Tree Selection Guide (which the City of Northampton adapted and makes available), and *Planting for Resilience*, among others. Many cities and towns, have a list that they have developed for planting in the community and a few, like Greenfield, have developed an online tool to help with plant selection. These guides, and others, provide important and useful information about tree characteristics, from mature height and spread to ornamental traits, to what a tree can tolerate (or just as important, what it can't tolerate).



i-Tree Species takes a different approach. i-Tree Species is a web-based tool that is part of i-Tree, a suite of tools developed by the USDA Forest Service and partners. i-Tree is based on peer-reviewed science and is freely available to download. Some tools, including Species, are also available for use online using a web browser. i-Tree Species helps users select a tree or trees based on environmental functions that trees perform.

Behind i-Tree Species is a database of nearly 1,600 species developed with Horticopia, Inc. The database incorporates several tree characteristics: hardiness zone, tree size and shading coefficients, leaf area and leaf biomass, relative transpiration rates, physical characteristics of leaves (like crown density, leaf surface roughness), VOC emissions for species, leaf persistence, and pollutant sensitivity. Methods of estimating tree functions were derived from scientific literature. The database includes a species list that is broad and includes both native and exotic trees. Some of the trees are commonly planted in urban areas and some are not, and may not even be available in local trade.

Up Ahead:

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i-Tree Species

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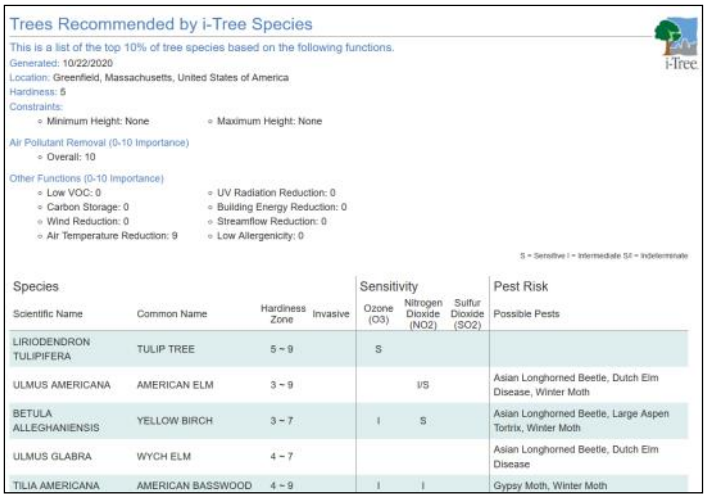
How to Use i-Tree Species

Go to https://species.itreetools.org. Read the brief information provided and click "Get Started." Enter your **location**. Location enables i-Tree Species to select trees hardy to your area. Click next to enter any **height constraints** – minimum and maximums for the mature height. On the next screen, users can rank environmental **functions** such as pollutant removal in order of importance and rank other functions. For pollutant removal, you can rank either an overall rate for five pollutants (carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, and particulate matter) or you can rank the removal of those individual pollutants. Other functions that you can rank include carbon storage, wind reduction, air temperature reduction, UV radiation reduction, building energy reduction, and streamflow reduction. Two functions relate to negative tree characteristics: allergenicity and VOC emissions, so users can rank the importance of low VOC emissions and low allergenicity here as well.

If you are primarily interested in trees for carbon storage, for example, you might choose to rank only that characteristic and rank it the highest (10). If you were interested in more than one environmental function, such as streamflow reduction and pollutant removal, you could rank those. What you end up with is a listing of trees by scientific and common name, their hardiness zones (which includes the hardiness zone of the location), invasiveness, sensitivity to ozone, nitrogen dioxide, and sulfur dioxide, and possible pests of the tree. The list will not reflect local or cultural limitations, so will require some additional investigation.

You may see some trees on the i-Tree Species list that you've never heard of, like Durmast oak (*Quercus petraea*) native to Europe, Turkey, and Iran and not common in the nursery trade in the United States. You may see some trees that you know you shouldn't plant right now, like white



Trees Recommended by i-Tree Species

This is a list of the top 10% of tree species based on the following functions.

Generated: 10/22/2020

Location: Greenfield, Massachusetts, United States of America

Hardiness: 5

Constraints:

- Minimum Height: None
- Maximum Height: None

Air Pollutant Removal (0-10 Importance)

- Overall: 10

Other Functions (0-10 Importance)

- Low VOC: 0
- Carbon Storage: 0
- Wind Reduction: 0
- Air Temperature Reduction: 9
- UV Radiation Reduction: 0
- Building Energy Reduction: 0
- Streamflow Reduction: 0
- Low Allergenicity: 0

S = Sensitive I = Intermediate S/I = Indeterminate

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O3)	Nitrogen Dioxide (NO2)	Sulfur Dioxide (SO2)	Possible Pests
LIRIODENDRON TULIPIFERA	TULIP TREE	5 ~ 9		S			
ULMUS AMERICANA	AMERICAN ELM	3 ~ 9			I/S		Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth
BETULA ALLEGHANIENSIS	YELLOW BIRCH	3 ~ 7		I	S		Asian Longhorned Beetle, Large Aspen Tortrix, Winter Moth
ULMUS GLABRA	WYCH ELM	4 ~ 7					Asian Longhorned Beetle, Dutch Elm Disease
TILIA AMERICANA	AMERICAN BASSWOOD	4 ~ 9		I	I		Gypsy Moth, Winter Moth

ash (*Fraxinus americana*) because of emerald ash borer. You may see some trees that you know are on the Massachusetts prohibited plant list, like sycamore maple (*Acer pseudoplatanus*), because of its invasiveness. What you do get is a starting place – a list of species that perform environmental functions that you prioritized and that you can work with to further determine suitability for your location.

Once you've gotten a list from i-Tree Species, you can export it as a .csv and work with it in a spreadsheet application like Excel or Numbers. You can also export a PDF of the list as it appears on the webpage. From here, you can compare the species list to any number of references to help determine appropriate species for your location. You could start with the DCR factsheet *Selecting Trees For Your Urban And Community Forest*, which indicates many trees that are native to Massachusetts and also lists the trees on the Prohibited Plant List and other ones to watch for invasiveness. i-Tree Species does indicate whether a species is on the Prohibited Plant List in Massachusetts, as well as invasive species for many other states, which will show up based on the location you entered. For Massachusetts, it does not include species that are not on the Prohibited Plant List, but which may have invasive tendencies and should be planted with caution or possibly not at all.

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i-Tree Species

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If you are interested in planting native trees, you can evaluate the list for natives, using a search tool like GoBotany, the Native Plant Finder, or other sources. If you are interested in value for pollinators, the Native Plant Finder incorporates information on butterflies and moths. Or, you can look up species in other references of your choice.

As you've gathered, it will take a bit of effort to develop a list for your community from i-Tree Species, but what you'll end up with is a list that accounts for environmental functions of trees that you can use again and again as you plan plantings in your community. Check out i-Tree Species at https://species.itreetools.org and all of the other i-Tree Tools at https://www.itreetools.org/.

References

i-Tree Species References: https://species.itreetools.org/references/

DCR Factsheet *Selecting Trees For Your Urban And Community Forest*: https://www.mass.gov/doc/selecting-trees-for-your-urban-and-community-forests-fact-sheet/download

i-Tree Species Methods: https://www.itreetools.org/species/resources/SpeciesSelectorMethod.pdf

GoBotany (Native Plant Trust): https://gobotany.nativeplanttrust.org/

Native Plant Finder (National Wildlife Federation): https://www.nwf.org/NativePlantFinder/

2021 DCR Arbor Day Poster Contest Theme

The Trees Out Our Window

Fifth grade classes from schools across the Commonwealth are encouraged to participate in the annual Arbor Day Poster Contest by having fifth-grade students create posters highlighting this year's theme, **The Trees Out Our Window**, and then hosting a school poster contest. The winning poster from each school can be submitted to DCR. Home-schooled or non-participating school students may submit their posters and enter the contest individually.

The Arbor Day Poster Contest is sponsored by the Department of Conservation and Recreation, the U.S. Forest Service, and the Massachusetts Tree Wardens' and Foresters' Association.

For complete rules and guidelines, go to the Arbor Day Poster Contest page on the DCR website.

Tree City, Tree Campus, and Tree Line USA

Applications Due: December 31

NOTE: The online portal carried over all attachments from 2019. Please ignore them and upload new documents for 2020. **If your community ordinance /bylaw hasn't changed, you don't need to upload a copy of the ordinance/bylaw again.** Also note: Standard 4 has been waived this year.

Find this year's application instructions at The DCR UCF website.

Questions? Contact Mollie Freilicher, 508-726-9255 or mollie.freilicher@mass.gov.

From the Woods

A Habitat Restoration Project in New Salem

By **Andrew Rawcliffe**

All foresters try to improve the stands of timber in which they work. Mostly this comes from a sense of pride in our work and our intention to do the best we can for each of our clients and a sense of responsibility in working with nature. Responsible management can be accomplished in many ways and some ways are more unusual than others. This is where we can turn to the work done by public foresters (those employed by state and federal agencies), who may be able to work on projects private foresters would shy away from because of the time involved in these unique projects that take away from the immediate financial benefits. Many public timber sales yield a net zero income and that is not feasible in the private sector. In 2019, Mass Wildlife partnered with DCR to complete a timber harvest on public land in New Salem for the purpose of habitat restoration. In this case, the habitat restoration was to attempt to change the current status of the forest to its composition in the past, restoring a historically fire-influenced natural community. On the surface, every timber harvest can be done for habitat restoration, but not all timber harvests would favor a tree species that isn't normally favored in a timber harvest: in this case, pitch pine (*Pinus rigida*).

The long-term goal of the project was to restore the area to the natural community of a "pine barrens" by overcoming decades of landscape stasis in a community that requires regular episodes of disturbance. This isn't a vanity project though; many species of plants and wildlife that originally adapted to the pine barrens landscape still exist to this day, though their habitat largely has disappeared because the episodes of disturbance this community relies upon, such as fire, have been stopped. This has allowed different species of trees to overtake the area and push out the disturbance adapted species such as pitch pine ultimately transforming the community and taking away valuable habitat for wildlife and plants. Some

Example of a prescribed fire within ~100 acre loblolly pine tree stand backed to the fire line on the Sumter National Forest in Whitmire South Carolina in 2017. (Andrew Rawcliffe)

animal species that rely on pine barrens include the field sparrow, eastern towhee, rare moths, American woodcock, the whip-poor-will, and several species currently listed as protected under the Massachusetts Endangered Species Act.

The goal after the project in New Salem is to apply prescribed fire through the area every three to five years to imitate historical fire regimes that used to exist on this landscape. To accomplish this goal, the existing trees, such as eastern white pine (*Pinus strobus*), which are considered generalists (that is, they will grow just about anywhere and are outcompeting the fire-adapted species that need this particular area) were removed and the desired trees were retained as a seed source for a future cohort (generation). The primary species at this site was red pine (*Pinus resinosa*), a species native to the United States and Canada, but is largely absent from Massachusetts and proliferates in higher latitudes. This species was historically planted in monocultures around reservoirs in the belief that this would protect water quality. This planting of red pines often occurred from the early 1900s to the 1960s as part of a large effort to regain forested areas from abandoned farm fields. However, as forests have reclaimed the abandoned farms of the past, we can look at removing this species as this kind of monoculture is not natural to this area and is susceptible to red pine scale, a small insect native to Asia that has devastated plantations of red pine in Massachusetts. Red pine scale

A Habitat Restoration Project in New Salem

I saw this pitch pine on the Francis Marion National Forest in South Carolina as I was marking a stand in 2017. I left this tree because of the crazy aesthetics that gave it immense wildlife value and expansive crown that will allow it to grow many seeds to repopulate the stand. (Andrew Rawcliffe)

attaches itself to the leaves (needles) and desiccates the leaves until the tree dies. This is a landscape level infestation that cannot be stopped so the removal of the red pine is important to reduce the risk of catastrophic wildfires and to promote new forest growth more quickly to create a healthy and productive forests. The red pine on this site was harvested and as much of the existing pitch pine was retained to promote its future growth.

The timber harvester was also asked by the DCR forester to avoid and protect as much blueberry as possible as well as it too is a fire adapted species and will respond very well to prescribed fire and disturbances in general. Protecting pitch pine and blueberry are fairly unusual practices in traditional forestry. Pitch pine has little economic value, (and questionable aesthetic value) and protecting blueberry is unusual because it always sprouts back fast and strong so it doesn't need as much intentional protecting. According to Chris Buelow, Senior Restoration Ecologist with MassWildlife's Natural Heritage and Endangered Species Program, low blueberry often doesn't occur in large contiguous carpets like it does in these communities. In fact, these areas are considered sandplain heathland communities and are considered imperiled (ranked as S2). In this context, they support a suite of very rare moths (several listed on the Massachusetts Endangered Species) that can't occur in smaller, canopied low blueberry occurrences.

Ecologically and historically, pitch pine has a fascinating story. Pitch pine is categorized (its taxonomy) in the family Pinaceae, within the genus *Pinus,* under the subgenus *Pinus*, (meaning "hard pines"), under the subsection *Australes* (unlike the Eastern White Pine which is considered a "soft pine" and is in a different subgenus). The subsection, *Australes,* includes many species of pines, including four of the most important pine species in the southeastern United States. The "Big Four of the South" are longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus enchinata*), loblolly pine (*Pinus taeda*), and slash pine (*Pinus elliottii*). Although laborious to read these details, they are important, as the Big Four essentially run the timber industry of the southern forests which are among the most productive forests (in regard to timber) in the world. Pitch pine is among this group of "hard pines." Also, an important fact is the acceptance of the general decline of southern yellow pine (which comprises a total of six species) due to loss of pine barren habitat among other reasons, both biotic and abiotic. Each of these species shares commonalities in their genetics which dictates certain growth habits of their leaves, cones, seeds, and robust fire adaptations. The ecological range (its native habitat) of pitch pine runs the gambit of the east coast from some patches in South Carolina up to Maine and is the only species within this subsection of Australes to be found in Massachusetts. Its preferred habitat is very infertile, sandy soils under a variety of moisture conditions, including swamps.

Approximately 14,000 years ago, the Laurentide ice sheet receded from what is now Massachusetts. What the ice sheet left behind in river valleys and on the coastal plains essentially resembled a cold desert with undulating hills of

Habitat Restoration Project in New Salem

Epicormic sprouts growing out of the trunk of a pitch pine after management consisting of a harvest and subsequent prescribed fires of years past. (Andrew Rawcliffe)

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sand blowing in the wind that, in places, can still be seen to this day. It took time, but eventually life returned to the desert. Grasses and sedges were first, followed by birds and other types of wildlife and eventually trees: the "pioneer" species. It took pitch pine longer to populate the area because the wind is the primary dispersal vector for its winged seed - and the wind can only blow a seed so far. Seed dispersal by wind is called anemochory. Other species, such as blueberry, rely on animals to eat the fruit and defecate the seeds at a much further distance than a winged seed can fly. This type of seed dispersal vector is called endozoochory and allowed shrubs like blueberry to arrive before trees with the assistance of birds and mammals. Since most mammals are colorblind, they do not see the "blue" blueberries, but birds can and they prefer the colors of red and blue on the fruit. Most birds do not have a fantastic sense of smell, so unlike birds, mammals mostly rely on scent to find fruit, and the larger the fruit, the more attractive they will be to mammals rather than birds. That said, most fruits are not dispersed exclusively by either birds or mammals.

Plant life had it difficult trying to grow in these sandy, well-drained soils, and only plants that were adapted to this rugged way of life could establish here. Because of the frequent fire regime, plants also had to store more nutrients in their roots to allow them to immediately sprout back year after year after each fire. With a landscape of grasses, a fire can run extremely fast and hot through the landscape with nothing to stop it. Grasses had it relatively easy as they can quickly re-sprout from their roots, but trees had it a bit more difficult as they take decades to mature. The roots also had to be longer to be able to catch the water moving quickly through the sand. Eventually, after the animal species (primarily avian species) were able to spread the seeds of some plant species, there came a balance of trees and grasses that created a habitat of "Pine Barrens" within these special communities. These pine barrens were concentrated in river valleys and the coastal plains, but not all valleys and plains, and so they were rare in occurrence. The plant life also needed to be adapted to fire. It is estimated that New England has a recurring fire regime of one moderate intensity fire per 30 years. Without the presence of humans, the main cause of fires was lightning. Native Americans have been shown to have purposely put fire on the landscape for many reasons. The full extent of their use of fire is still being studied but it is known that fire was purposefully used as a tool.

Pitch pine made several adaptations that reflect the influence fire has historically had upon our landscape. The most obvious of these adaptations is the bark: not the bark itself, but the thickness of the bark. The thicker bark can protect the cambium layers from the heat of a fire; the cambium transfers vital nutrients from root to leaf. A less obvious adaptation is the tree's ability to create epicormic sprouts, and for a pine tree this is a major adaptation as very few pine trees have this adaptation. Along the entire length of the tree trunk and on its branches, in between the bark and cambium, the tree has dormant buds. These buds usually will lie dormant for the life of the tree unless there's a disturbance, such as a fire. If a fire is hot enough and gets into the canopy of the trees, it can create a "canopy fire." These fires are considered catastrophic as the burning of

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Habitat Restoration Project in New Salem

the canopy of a tree will usually kill that tree. Pitch pine will also succumb to a canopy fire but, as described below, it has adapted a way for the cones to survive to allow the seeds to disperse post-fire. Once the crown of the neighboring tree has been burnt away and is gone, the sun can shine light on the surviving trees. Those dormant buds will sense the gentle increase of warmth and will sprout new branches (also considered adventitious branches) that can utilize the extra sunlight not being captured any longer by the neighboring trees. It should be noted, as well, that unlike other pines, such as eastern white pine and red pine, pitch pine is the only pine in this area that has dormant buds that create epicormic branching.

Pitch pine also has the fire adaptation of "stump sprouting" which is also rare among pines and is the only pine in Massachusetts to have that adaptation. Stump sprouts occur after the main tree dies. Whether that's from a canopy fire, disease, or a logging operation, the roots remain alive and new sprouts will grow from the root system, which could grow into a new tree sustained by the original root system. Another unique adaptation of pitch pine is that is can reproduce (create cones and seeds) after only three to five years. In contrast, the eastern white pine will not be sexually mature until it is five to ten years old.

Canopy fires were so frequent in these pine barrens that pitch pine made yet another adaptation. If a fire were to rush through a canopy, not only would the leaves be burned away but also the cones would burn up, including the seeds inside the cone. Without any seeds, the tree could not propagate the next generation, so pitch pine adapted. The result is pitch pine's ability to create serotinous cones. Serotiny is a term generally leveraged to a fire adaptation and is used to describe external environmental triggers to make that adaptation happen; however, the word itself simply means "late." These are cones that open up late, outside of their normal cycle, because of an

New Salem 2019. Pitch pines that were retained after the removal of red pines. Notice the available sunlight to warm the trunks and stimulate the growth of epicormic sprouts from the crown to the ground. The weird bends and crown shapes are results of the trees trying to find as much sunlight as possible as they grew taller into the upper canopy of the forest. (Andrew Rawcliffe)

external trigger (fire). While the cone develops, the tree excretes a resin into the cone that seals the cones shut. These cones will not open unless they are introduced to extreme heat from a canopy fire in excess of 400 degrees Fahrenheit. The entire canopy is not made of up these serotinous cones, though, usually only a portion of the top half of the tree's canopy will have them, while the rest of the canopy will have cones that open at a normal time to disperse the seeds. Not all pitch pines create serotinous cones; the tree must exist in an environment where fire is frequent enough to develop those types of cones. The pitch pines in New Salem do not share this adaptation today because there hasn't been a fire in that stand in over 70 years due to fire suppression efforts. However, were fire to be introduced to the landscape again then the trees will "notice" and start producing the resin to create serotinous cones again. The closest areas where serotiny is observed in pitch pines is on Long Island and in the Pine Barrens in central New Jersey as, especially in the Pine

Habitat Restoration Project in New Salem

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Barrens of New Jersey, they apply prescribed burns to the landscape.

As our forests have aged, they have gone through different forms of succession, moving from one stage of growth to the next stage, resulting in the forests we have today. Humans have had a large impact in creating the forests we see today as well, but if you look closely, you can still see hints of what forests once were. Many plants and animals are still adapted to the conditions of the past and so restoring their native communities is crucial in their future survival. All foresters try to improve the areas in which they work, but sometimes it takes a public forester to do an unusual restoration project.

This project concluded only last fall, so as we approach these early growing seasons, we're looking for small things right now. The response of the pitch pine may take several years, but the response from herbaceous species, and thus wildlife, will be more immediate. Being in such a diverse and prime location, the response will vary from avian to mammalian species but the positive reaction is expected to have a booming response through the next five years in increases of diversity and population. As of now the project area will be left alone and will be revisited in approximately five years to measure the response of the grasses and shrub species on the forest floor. If the response of grass and shrub growth is sufficient, then the application of prescribed fires will enter the planning stage, and hopefully a rotation of prescribed fire in the project area will begin to more fully restore this community to what it once was.

Andrew Rawcliffe is a Service Forester with DCR and covers the North Quabbin area, including New Salem.

The Service Forestry program is an outreach and regulatory program within the DCR, whose core mission is to encourage sustainable forest management on privately owned forest lands. DCR Service Foresters provide technical assistance and programs to landowners as well as to municipalities. Each Service Forester covers a district. Find out more about Service Forestry (including your local forester) at https://www.mass.gov/service-details/service-forestry.

Notice the largely undisturbed ground in between the pitch pine trees. This undisturbed area is largely where blueberry bushes were avoided and will have an explosion of growth over the next few years. The sandy soils will see the return of native grass species that can provide habitat for various avian and reptilian species. (Andrew Rawcliffe)

First growing season after harvest. Notice the expansive response by both blueberry and grasses. The trees will take more time, but for now this growth will be the primary factor of success, which the animal response will follow. Prior to the harvest the ground cover was less than 5% of the area, but now is roughly 80%.

Species Spotlight

Pitch pine, *Pinus rigida*

By **Peter Grima**

Every forester has a favorite tree (or two), and the pitch pine, *Pinus rigida*, has long ago earned its place as mine. I don't know if it was ever a contender for State Tree, although it surely would have fallen to the popular grandeur of the American Elm like Ben Franklin's turkey pitted against the bald eagle, but if we were to revisit that title, the pitch pine would surely be my nominee. It is tenacious, resilient, and unconventional, and it deserves to be celebrated in its own right. Here I'll share a few of its virtues in hopes that you'll agree.

Bundle of pitch pine needles (Northern Forest Atlas)

Firstly, what you need to know is that, of our native pines, it is the only 3-needle species. Each bundle, or fascicle, contains 3 needles, as opposed to white pine (5) and red pine (2). The 3-needle trait comes from its kinship with the yellow pines, better known as Southern yellow pines, like the famous longleaf (*Pinus palustris*) and loblolly (*Pinus taeda*) of the southeast. Another name for yellow pines is "hard pines," which speaks to the dense, harder, heavier wood, which is quite different from the familiar soft, light wood of white pine that you see at the home improvement store. Like its southern relatives, it has also been an important species in the ship-building industries, both for building materials (G. B. Emerson notes that "entire vessels" were commonly built of pitch pine in the 19th century, and I have known a contemporary ship-builder who corroborated this sentiment in the 21st century!) and for tar or turpentine (i.e., the pitch). Its cones are like small egg-shaped grenades, armed with stiff, stout prickles that seem to shout "don't touch!", though the red squirrels will scarcely heed the warning. It is not as "well-behaved" as most conifers, tending to grow irregular crooked branches and multiple leaders, although the effect is ultimately of a handsome, rounded crown of distinctive yellow-green foliage that softens the effect of its unruly architecture.

The probable namesake of Pine Cobble in Williamstown, MA, this gnarly specimen of Pinus rigida ekes out its existence at nearly 1900' elevation in the company of *Quercus montana* and *Sassafras albidum*, equally unusual at that latitude and elevation. (Peter Grima)

Most readers will be familiar with the pitch pine as emblematic of Cape Cod, or at least of the drive down 495 or Route 3 to get there. A true coastal denizen, it is true that pitch pine loves the sand as much or more than any beach-goer. Yet we are well-endowed with sandy sites in our state, and the pitch pine has laid claim to countless old fields well inland, including far up the Connecticut River Valley, reaching all but the coldest high-elevation towns in the Berkshires. It

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Pitch pine, *Pinus rigida*

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shows up frequently in Thoreau's writings describing his native Concord, including the young trees that grew about his cabin at Walden.

"Poor sites" (i.e. "too poor to grow crops") are what it prefers – or, more accurately, where it competes best – which includes both extremely dry, sandy sites and thin-soiled (or nearly soil-less) ridges, ledges and hilltops. The latter habitats give us some of the most unusual populations of this hard-scrabble pioneer. Bounding our Commonwealth to the west are two high-elevation pitch pine communities worth noting and worth visiting. To the southwest, in the town of Mt. Washington, lies the curious stunted pitch pine forest at the top of Mt. Everett (elevation 2,602 ft.). And at the northwestern extremity of the state, in Williamstown and Clarksburg, pitch pine populates the sprawling ridgetop boulder fields of angular quartzite at Pine Cobble (and further up at East Mountain, near the Appalachian Trail). There, 150 miles from the Cape Cod Canal, it grows together with its coastal plain familiar, the black huckleberry (*Gaylussacia baccata*), but also in the company of more northern species like red spruce (*Picea rubens*) and mountain holly (*Ilex mucronata*) more reminiscent of the spruce-clad summit of Mt. Greylock sitting directly across the Hoosic Valley! Many lesser hills and ridges are also adorned with scraggly pitch pines clinging to rock faces, like Mt. Tekoa in Westfield, Sachem's Head in Greenfield and the Blue Hills outside of Boston. These sites give us some of our most picturesque trees, bonsai-like testaments to perseverance in the least endearing of circumstances, which is the particular specialty of the humble pitch pine. Often the antiquity of these ridgetop specimens is belied by their short stature and small diameters. A study at Mt. Everett found trees that dated to the 1830's, even though the average height was just 5' 3"!

Pitch pine sprouting from the trunk (Northern Forest Atlas)

I haven't seen such a copious number of cones on such a small tree since the pygmy plains of New Jersey, but here I found a number of stunted pitch pines atop Pine Cobble in Williamstown that were endowed with an abundance of fruits, though none of them exhibiting serotiny. (Peter Grima)

While its toughness gives it a reputation for resistance to difficult circumstances, pitch pine is perhaps better known for its resilience in the face of more acute hardships. Most notably, and unique among the native pines in New England, pitch pine can sprout from its branches, bole, and even stump, which allows it to recover from defoliation (by pine sawflies, for instance, as I learned from personal experience) and, more remarkably, in the wake of seemingly catastrophic wildfire. There is hardly a more

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Pitch pine, *Pinus rigida*

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encouraging sight than tufts of vibrant green needles sprouting from the charred limbs of a pitch pine! This adaptation to fire has given it an edge in areas where fire is more prevalent, the epitome of which is found in the so-called pygmy pitch pine plains of the New Jersey Pinelands. Fire has been so frequent there that the pitch pines exhibit their other, and perhaps more famous, adaptation: serotiny. The cones of trees in the pine plains are essentially glued shut by their own resin, and they only open following the heat of a passing fire. This phoenix-like quality is the stuff of legends, and even the most casual of visitors to the Cape is likely to have heard of this trait in pitch pine. However, even after consulting the best authorities on the matter, nobody I know of has ever observed serotiny in a Massachusetts pitch pine. Which is not to say the trait doesn't lie dormant in its genes, waiting for a trial by fire to call it into action! Note that the cones mostly stay attached to the tree for many years, and they will alternately open and close during dry and wet periods. If you find a closed one that you think is serotinous, take it home and let it dry in a container for a week or so. If it still doesn't open, let me know!

Drought-resistance is probably on the minds of many, especially after this summer, so let us take a hint from our forests. Even if it isn't a contender for state tree, the pitch pine is unquestionably the champion of droughty sites. Saplings below knee-height transplant well and are very forgiving of a lax watering regimen in their first year (also from personal experience). A stunted 'bonsai' effect can be achieved with vigilant pruning of the spring growth (known as "candles" because the elongating stem looks like a waxy green candle), as is recommended for shaping the ornamental Mugo pine (*Pinus mugo*). However, be aware that, also unlike most other pines, pitch pines can sometimes put out late-summer growth, known as lammas growth, that can thwart your spring pruning

A maturing pitch pine cone on a stunted ridgetop tree at the Sachem's Head, Rocky Mountain Park, Greenfield, MA. (Peter Grima)

efforts! The cones offer food for squirrels (especially red squirrels) and wintering birds like nuthatches, and the foliage keeps a vivid green through winter, unlike the drab gray-green of the white pine.

If nothing else, when the world seems as rough and inhospitable as a charred sandplain or a granite bald, keep the spirit of the tenacious pitch pine in mind and persevere!

References:

Burns, R. M. and B. H Honkala. 1990. Silvics of North America, Volume 1: Conifers. Agriculture Handbook 564. USDA Forest Service, Washington, DC.

Emerson, G. B. 1846. A Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts. Boston: Dutton and Wentworth.

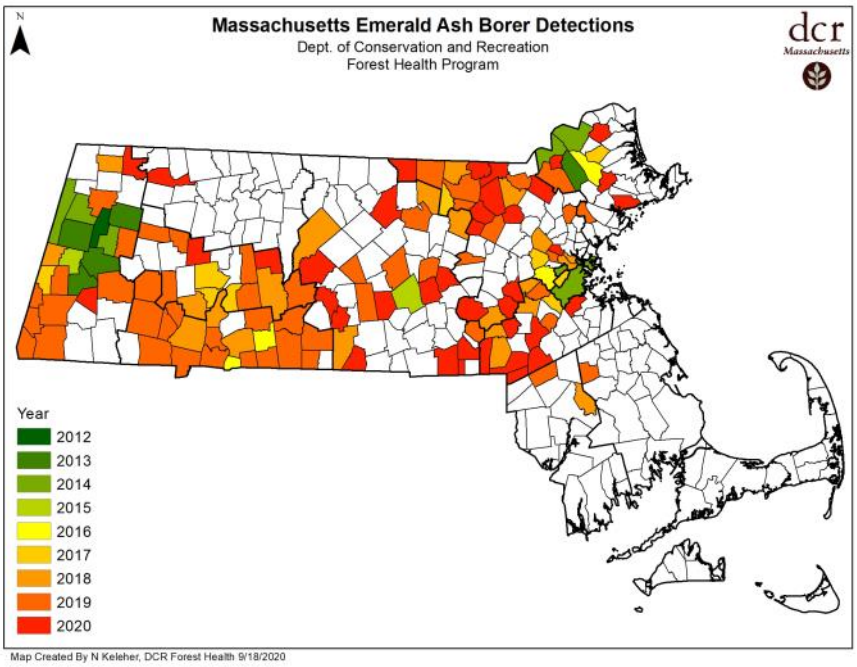
Motzkin, G., D. A. Orwig, and D. R. Foster. 2002. History and dynamic of a ridgetop pitch pine community, Mount Everett, Massachusetts. Harvard Forest Paper No. 25. Harvard Forest, Petersham, MA.

Peter Grima is a Service Forester with the DCR and covers the northern Berkshires.

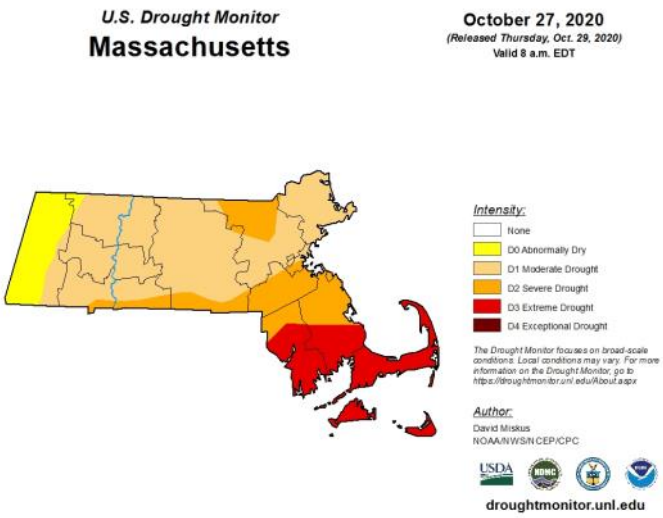
Growing on Trees

Emerald Ash Borer Update

The DCR Forest Health Program has confirmed the presence of emerald ash borer (EAB) in 22 additional towns: Adams, Ashland, Clarksburg, Colrain, Conway, Hawley, Leverett, Lincoln, Maynard, Montague, Monterey, New Ashford, Norfolk, Sandisfield, Savoy, Southbridge, Stow, Sudbury, Sunderland, Tolland, Williamstown, and Worthington.



The total number of municipalities with confirmed EAB is now 161, with 62 detections in 2020. Barnstable is the only county on the Massachusetts mainland without a known detection of EAB. EAB also has not been detected on the islands. For information on what to look for go to http://www.emeraldashborer.info/.



Weather and Climate

Over the last month, drought conditions have worsened and eased for parts of Massachusetts. As of October 27, the portion of Massachusetts in Moderate or Extreme Drought dropped to 37%, down from 82% the week before. Much of Berkshire County and a sliver of western Franklin County are not in a drought status, while the Cape, Islands, and much of southeastern Mass. are in Extreme Drought. All in all, 98% of residents in Massachusetts are in a drought status.

If you are planting trees this fall, be sure to water them until the ground freezes. Check out our recently updated factsheet (PDF) for other tips on caring for new trees.

Looking for information on what drought means for plants? Check out the UMass Landscape Message.

Find out more: National Climate Report | https://www.ncdc.noaa.gov/sotc/

The Northeast Regional Climate Center: http://www.nrcc.cornell.edu/regional/drought/drought.html

The U.S. Drought Portal | https://www.drought.gov/drought/states/massachusetts

Growing on Trees—Webcasts and Online Events

Cornell Cooperative Extension

November 2, 2020 | Tree Biology
November 9. 2020 | Wildlife Benefits of Trees
November 16, 2020 | ID Common Tree Problems
November 30, 2020 | Invasive Species
Free, registration required. Find out more.

Urban Forestry Today

November 5, 2020 | 12:00 p.m. (EST)

Tree Biomechanics: Responses to Wind and Gravity

Karl Niklas, Ph.D., Cornell University

Attend live and earn free ISA/MCA CEUs. To attend, click here OR visit: http://www.joinwebinar.com and enter the code: 318-953-083 . To view archived webcasts, go to www.urbanforestrytoday.org/

UMass TickTalk Webinar

November 18, 2020 | 12:00 p.m. (EST)

Babesiosis

Find out more: www.ag.umass.edu

Free, registration required. Register here.

EPA IPM Webinar Series

November 12, 2020 | 2:00—3:30 p.m. (EST)

IPM for Scale Insect Pests of Trees and Woody Ornamentals

Free, registration required: www.epa.gov

Planting Event Recommendations in the Era of COVID-19

Check out these recommendations from the Alliance for Community Trees: https://youtu.be/59NJ_17Jz9Q.

Also check mass.gov/covid for the latest regulations and guidance.

Upcoming Conferences

Have you thought about attending a national or international urban forestry conference, but never made the trip? This is your year to try one or more out virtually and see what it's all about.

Partners in Community Forestry Conference

November 18, 2020 | 12:00 - 4:30 p.m. (EST)

One registration covers events on November 18 and several other events throughout the week. Sessions include municipal forestry, environmental equity, urban forest pests, natural areas, technology, outreach and engagement, and more. Stay engaged with lightning sessions.

Registration: $45. Find out more and register at www.arborday.org/pcf.

Society of Municipal Arborists Annual Conference

November 19, 2020 | 12:00 – 6:00 p.m. (EST)

Topics include Workforce Equity: Filling the Gap, Investing in Trees for Health, Safety, and Equity: Creating the First Urban Forestry Master Plan for Columbus, Data and Beyond: Building Equitable Urban Forestry Programs, and more.

Registration: SMA Member: $50/ Non-member $145. Find out more and register at www.urban-forestry.com.

ISA International Conference

December 7-11, 2020

A mix of live and pre-recorded sessions – so you can tune in live or when your schedule allows.

Early bird registration ($129 ISA member/$199 non-member) through November 13.

Find out more: www.isa-arbor.com.

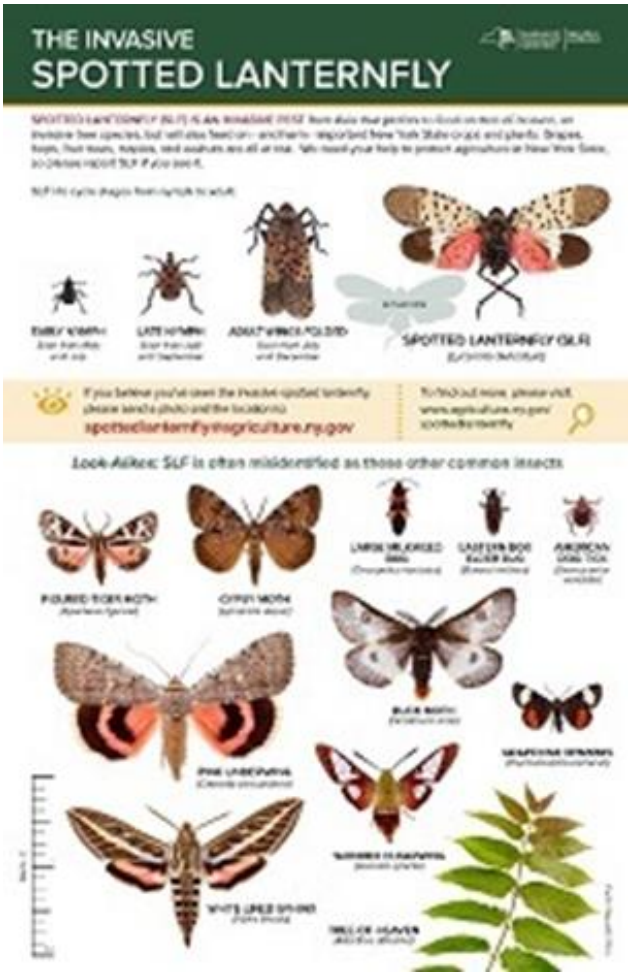
Growing on Trees

Be on the Lookout for Signs of Spotted Lanternfly This Fall

Don't Be Confused by Look-alikes

Adapted from the New York Dept. of Environmental Conservation

The spotted lanternfly (SLF) is a pesky invasive pest that feeds on lots of important plants, such as apple trees and hop vines. With the recent finding of several live adult spotted lanternfly (SLF) on Staten Island and the presence of established populations in Connecticut, it's never been more important for people to be on the lookout for this invasive insect. Since SLF spreads primarily through human activity, we really can make a difference. We are not aware of any established populations of SLF in Massachusetts.



When you're keeping a watchful eye, know that SLF can be confused with other common insects you might spot flying around this fall. This time of year, the eastern boxelder bug or even gypsy moth eggs may catch your eye. The New York Department of Environmental Conservation has a new SLF poster to help, with photos of SLF as well as some common look-alikes.

The eastern boxelder bug has black and red markings similar to those of an invasive spotted lanternfly nymph, but the elongated body and red eyes of the eastern boxelder bug help set it apart from SLF. You might find eastern boxelder bugs lounging in sunny spots or even in your home but not to worry - unlike spotted lanternfly they're harmless.

A spotted lanternfly egg mass on the left, next to a gypsy moth egg mass on the right (Photo: Emelie Swackhamer, Penn State Extension)

Spotted lanternflies will lay eggs just about anywhere including on firewood, trees, and cars. If you find an egg mass remember, spotted lanternfly eggs look a bit like mud that has dried and cracked. European gypsy moth eggs, on the other hand, are lighter in color and fuzzy in texture. You'll spot gypsy moth eggs on trees, firewood, or piles of rocks, but not on household items like SLF egg masses. Check out this guide from Philadelphia Parks and Recreation about identifying SLF eggs. If you think you have seen spotted lanternfly eggs in Massachusetts, please report it.

Everyone can help protect agriculture by keeping an eye out for spotted lanternfly. If you believe you've seen the invasive spotted lanternfly in Massachusetts, please report it: https://massnrc.org/pests/report.aspx.

Growing on Trees

Mass. Tree Wardens' and Foresters' Association

Tree Warden of the Year—Call for Nominations

The Tree Warden of the Year Award recognizes a tree warden who exhibits leadership, dedication, and a commitment to the profession. The annual award is named in honor of longtime member and past president Seth "Swifty" Swift, who passed away January 1, 2004. The association invites nominations from residents as well as from city and town officials. Nominations are due by December 1st for the January annual award presentation. **Now – at any time of year – you can nominate online. Read on to see the criteria and find out more at www.masstreewardens.org:**

- Holds position of Tree Warden or Deputy Tree Warden in a municipality
- Actively participates in the National Arbor Day Foundation's program, Tree City USA
- Demonstrates active leadership and dedication to the protection of urban trees
- Educates the community in which they work about the importance of healthy urban trees
- Holds an annual Arbor Day celebration
- Shows commitment to the profession by volunteering with a tree-related organization

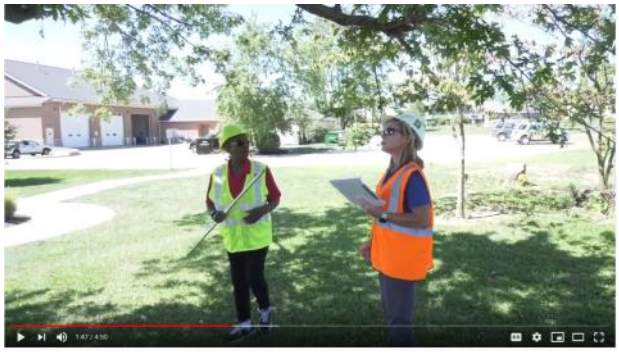
Tree-Plenish

A new organization planting trees in communities

Do you know any high school students, clubs, or organizations that are passionate about the environment? Tree-Plenish gives community members the opportunity to make their schools more sustainable and is the perfect way to stay engaged during the COVID era.

From notes to homework to worksheets, schools consume a lot of paper. Tree-Plenish's mission is to create more sustainable schools by replenishing the environment with these lost resources. Through student-led events, Tree-Plenish is able to plant tree saplings in the community based on approximations of school paper usage. With Tree-Plenish's financial and logistical support, you can plan a tree-planting event in your community to replenish the environment with the amount of paper that your school used during the past academic year. Find out more about this organization (originally founded by two high school students in Mansfield) on Tree-Plenish's website: www.tree-plenish.com.

New Video Shows the Urban Forest Strike Team in Action



Tyler Stevenson, the Urban and Community Forestry Program Coordinator in Ohio, and other Ohio staff have developed a short video to summarize their use of the Urban Forest Strike Team (UFST) to assess tree damage in the Dayton area after tornados struck there in 2019.

The Massachusetts Tree Wardens' & Foresters' Association supported both the deployment and the video, using federal grant funds they had for UFST. In addition to this and other deployments, that grant supported training of over 100 UFST task specialists and team leaders, many from Massachusetts and most from New England.

Check out this video from Ohio that shows how UFST assessments can help communities recover after disaster damage to their urban forests.

Gleanings

Tree Board University

Are you a member of a tree committee or are you thinking about joining (or starting!) a tree committee in your city or town? Tree Board University is a free, self-paced course that will help make you a better tree committee member. In Massachusetts, tree committees (also called tree boards, tree commissions, tree planting advisory groups, urban forest commissions, among other things) typically are citizen-led committees that advise the tree warden in a community. Tree Board University, funded by the USDA Forest Service and hosted by the Arbor Day Foundation, is comprised of eight modules, from Tree Board 101, to Engaging in the Political Process, to Getting Things Done, and Moving Forward.

Take this free course at your own pace on your own time. Find out more at www.treeboardu.org.

Growing Greener—in Greenfield

Photo: Melissa Patterson

Greenfield is in the middle of a multi-year tree planting grant funded by the U.S. Forest Service and administered by the Franklin Land Trust. (DCR is providing trees and technical advising.) Goals of the grant include increasing tree canopy in three communities—Greenfield, Montague, and North Adams—and developing networks of volunteers who plant and care for trees. As part of the grant, on September 26, the Greenfield Tree Committee, Greenfield Department of Public Works, and the Franklin Land Trust held a volunteer tree planting at Lunt Field.

It was the first public, volunteer planting in Greenfield during the pandemic. COVID protocols were followed (see pg. 13) and the Department of Public Works pre-dug the holes for the trees to help limit the planting time.

Photo: Mollie Freilicher

After a brief planting demonstration (top-left) the volunteers and tree committee members dispersed to plant the 25 trees that the committee had placed around the field. With the holes pre-dug, the work was pretty quick - so quick that volunteers who showed up an hour and a half after the start found most of the work pretty much finished. It was a great event (kudos to all the organizers) and despite the sanitizer, the masks, distancing, and the other COVID protocols, it felt like a welcome return to life as usual.

Right: On October 9, John Parry from the US Forest Service came to check on the progress of the tree planting grant. First stop? Lunt Field to see the newly-planted trees, which were doing great.

News

By **Marguerite Holloway**
Photographs by **George Etheredge**

Many arborists say they are spending more time taking down dead or unhealthy trees than ever before.

October 7, 2020—Bear and Melissa LeVangie spent much of their childhood aloft, in a then-forested area of Massachusetts. “Our mother would say, I don’t want to see you until it is dark,” said Bear LeVangie. “We would climb an 80-foot — it seemed like a 100-foot then — white pine and hang out and not think twice about it.”

The twins still spend much of their time in and around trees: Both are arborists, which is akin to being tree doctors. Both are seeing a surge in demand for arborists because the region’s trees are faring so poorly.

“I would never have anticipated how fast things are declining,” said Melissa LeVangie, who works for Shelter Tree, a tree care supply company, and is tree warden, or caretaker, for the town of Petersham in central Massachusetts.

As climate change accelerates, the trees in the Eastern forests of the United States are increasingly vulnerable. For many arborists, the challenges facing trees are reshaping and expanding the nature of their work. Many said they are spending more time on tree removal than ever before — taking down dead or unhealthy trees, or trees damaged or felled by storms.

Read the full story at nytimes.com

Headlines in Brief

Northampton Council Makes Tree Warden Chairman Of Shade Tree Commission

The Pleasure and Value of Our Street Trees [Commentary]

NASA Supercomputing Study Breaks Ground for Tree Mapping, Carbon Research

Discovering Beetles Abroad to Protect Trees at Home

Montreal Unveils Its Design for An Urban Forest in The Middle of Its Downtown Core

The Little-Known Women Behind Some Well-Known Landscapes

Urban Forest Strike Team evaluating damaged trees in Mobile, AL

Transforming Phoenix into An 'Urban Forest' To Combat Extreme Heat

Urban Farming during COVID (Listen to the segment from *Living on Earth*)

Red Maples Doing Better in the City

Soil Fungi Act Like A Support Network for Trees, Study Shows

On the Horizon

Nov 1	Deadline for DCR Urban and Community Forestry Challenge Grants
Nov 2	Webinar: Tree Biology, 7pm, (Free)
Nov 5	Urban Forestry Today Webinar, 12pm, www.joinwebinar.com, 318-953-083
Nov 9	Webinar: Wildlife Benefit of Trees, 7pm, Cornell Cooperative Extension (Free)
Nov 12	Webinar: IPM for Scale Insect Pests of Trees and Woody Ornamentals, 2:00pm
Nov 12	Webinar: The Bird-Friendly and Biophilic City, 1pm, (Free)
Nov 16	MAA November Online Learning – Growing Trees Near Pavement
Nov 16	Webinar: Identification of Common Tree Problems, 7pm, (Free)
Nov 17	CTSP Workshop (Virtual), 9am-6pm
Nov 18	Partners in Community Forestry Conference (Virtual), www.arborday.org/pcf
Nov 19	Society of Municipal Arborists Conference (Virtual), www.urban-forestry.com
Nov 20	Ground Operations Specialist Online Workshop, TCIA & North Carolina Urban Forest Council
Dec 4	ELA Ecological Plant Conference (Virtual)
Dec 7-11	ISA Annual International Conference and Tradeshow (Virtual), www.isa-arbor.com
Dec 7	Webinar: Clearing the Air on Pesticides, 7pm, Cornell Cooperative Extension (Free)
Dec 14	Webinar: Establishing a Backyard Ecosystem using Urban Trees, 7pm, Cornell Cooperative Extension (Free)
Dec 30	Webinar: Effect of Invasive Species on the Urban Forest, 7pm, Cornell Cooperative Extension, Free
Dec 31	Deadline for Tree City USA, Tree Campus, and Tree Line USA Applications. Contact Mollie Freilicher, 508-726-9255 or mollie.freilicher@mass.gov for details.

All times are Eastern. Check out the calendar of the New England ISA for additional opportunities: https://newenglandisa.org/events

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www.mass.gov/dcr/urban-and-community-forestry

If you have a topic you'd like to see covered or want to submit an item to *The Citizen Forester* (article, photo, event listing, etc.), contact Mollie Freilicher or click here.