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Yale SCHOOL OF THE ENVIRONMENT  
*The Forest School*



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# URBAN ISSUES

NEWSLETTER OF THE URBAN RESOURCES INITIATIVE AT THE  
YALE SCHOOL OF THE ENVIRONMENT



Photo credit: Anna Ruth Pickett

URI Associate Director Chris Ozyck stands in Edgewood Park with Max Piana, postdoc research ecologist with the U.S. Forest Service.

## BRINGING SILVICULTURE TO URBAN FORESTS

by Sara Santiago

### What is Silviculture?

Silviculture is often referred to as both an art and a science. Silvi, Latin for trees or forest, and culture, Latin for growing or cultivating, is the study and practice of establishing, growing, and managing forests for particular outcomes. Yale School of the Environment's Professor of Silviculture and Forest Ecology Mark Ashton often tells students in his silviculture course that he is teaching them to become "tree doctors"—by determining how to discern the state and health of a forest, its growth, and how to cut, prune, and protect it for certain benefits.

We may commonly think of following silvicultural practices in large rural landscapes, but what about forests and forest patches in urban landscapes? City greenspaces provide shade and cooling to city residents, beautiful aesthetics, and habitat to migratory and native wildlife. They also brunt the impacts of climatic stressors like high winds, extreme heat and cold spells, and flooding and droughts. Max Piana, post-doctoral research ecologist at the U.S. Forest Service's Northern Research Station, and his colleagues are rolling out a new research project,

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One of our aims is to foster a culture of learning at URI. The work we perform on the landscape, such as supporting Greenspace volunteers to carry out their greening efforts, and our planting hundreds of trees each year, imposes long-term changes on the land. For example, given that the life expectancy of most oak trees is well over 100 years, the decisions about what species we plant will make a difference well into the future. As we cannot know the insect infestations or

diseases that trees may eventually face, we carefully plant a varied array of street trees—not more than 5% of a single species, 10% of a genus, and 20% of a family. Planting a diverse mix of tree species hedges against losing many from a disease like the one that caused New Haven’s historic loss of elms or the current emerald ash borer infestation killing ash trees. Beyond unforeseen diseases that may affect trees, the changing climate also creates unknown future consequences. URI is working, along with the U.S. Forest Service and others, to understand oak regeneration in changing climate conditions, as Sara Santiago describes in her cover article.

This spring, in addition to planting 200 street trees on behalf of New Haven tree adopters, our team is also planting 1500 oak seedlings in natural areas as part of a research project led by the U.S. Forest Service. Planting street trees remains critically important to our mission, as city residents derive direct benefit from the trees planted right outside their homes. However, managing the natural forests of the city is essential, too. Across the U.S., as in New Haven, natural areas account for about 2/3 of all tree cover in the city. Joshua DeAnda enthusiastically shares how we are broadening our work in these vital areas as we engage Greenspace volunteers to control invasive vines. By participating in the “Forests in Cities” network led by New York City’s Natural Areas Conservancy, URI’s Associate Director, Chris Ozyck, continues his mastery of best practices to care for these city forests and extends this knowledge to our community.

We are mindful of our shared responsibility to care for the land, and the imperative to keep learning and strengthening our impact.

*Colleen*  
Murphy-Dunning

## Spring Events at Trowbridge

*Exploring Nature* at East Rock Park’s Trowbridge Environmental Center (41 Cold Spring Street) was launched last November as described in the Fall 2022 Urban Issues. URI is partnering with the Friends of East Rock Park and Fair Haven Community Health Care to provide access to Trowbridge and some exciting nature-based workshops and events with the support of many local experts and volunteers.

URI and our partners open the Environmental Center every Tuesday and Thursday from 3:00–5:00 pm and Saturdays 10:00–noon. Below are special extra events.

On Saturday, April 29th, the 15th Annual Rock to Rock Earth Day Ride and Walk will begin and end at the Trowbridge Center with six different biking routes and two walking routes. This Earth Day event is a collaboration of 21 local organizations doing environmental work. Learn more at [www.rocktorock.org](http://www.rocktorock.org).

**May 2:** *Junior Explorers Club*, meets weekly on Tuesdays (3:30–4:30 pm)

**May 4:** *Talking Turtles*, live turtle show brought by The Turtle’s Back, Inc. (Thurs., 3:30–4:30 pm)

**May 6:** *Exploring Nature Herpetology Talk and Walk* (Saturday, 10:00–11:00 am); Oak Regeneration Talk and Sapling Giveaway (11:00–noon).

**May 13:** *Live Raptor Show* (Saturday, 12:30 pm)

**May 18:** *Nature Book Club*, third Thursday of each month, (3:30–4:30 pm)

**May 20:** *Cyril the Sorcerer Magic Show* (Saturday, 11:00 am)

*Please join us at these special events and register online via: [tinyurl.com/registerExplore](http://tinyurl.com/registerExplore). To learn more and see schedule updates, visit: [tinyurl.com/exploringnatureERP](http://tinyurl.com/exploringnatureERP).*



URI was honored with the Friend of Wooster Square Award at the April 16 Cherry Blossom Festival

Photo credit: Rosa DeLauro Staff



# Bringing Silviculture to Urban Forests

by Sara Santiago (continued from page 1)

*“Silviculture in the City: Urban and Climate Adapted Management Strategies for Forested Natural Areas in the Northeastern U.S.”* to apply rural silviculture practices to their cousin forests in cities with Yale forestry researchers, Urban Resources Initiative, and many partners.

Connecting at the Northeast Urban Silviculture Workshop in December 2020, the scientists and practitioners are collectively experimenting in upland oak forests in Baltimore, Md., Philadelphia, Penn., New Haven, Conn., and Springfield, Mass. “Originally, the meeting was to be hosted in person during the spring of 2020,” explains Piana. “But due to the pandemic, we switched to a virtual format. This was fortuitous, as we were able to include more cities and experts from across the East Coast, arriving at a climate adaptation study because of the latitudinal distribution of the participants and the enthusiasm to conduct a collaborative multi-city research project.”

The group is working under the projection that oak species will adapt to warming conditions along this latitude – as well as the high-emissions projection that Springfield’s climate will be similar to southern Missouri’s in 2080.

## **Silviculture in the City:**

Along the northeast corridor, Piana and his Forest Service colleagues are developing and testing silviculture practices that help greenspaces adapt to climate change, such as planting tree species that are resilient to insect and disease invasion to prevent future canopy loss. This is the most densely populated corridor in the United States and is also home to over 250,000 forests and forest patches. In this human-dominated

landscape, many of the forest patches and small forests require management techniques that are distinct from those needed to manage individual street trees.

Described as “an overstory of trees with an understory of people,” these forest patches support the quality of life of human and wildlife populations, but these natural areas are vulnerable to many threats. According to the Northern Research Station, this patchwork mosaic is typically in “poor ecological health, threatened by climate change, impacted by pests and disease or overrun with biotic invasives,” which prevents the forest’s regrowth. The researchers warn that forest health and longevity will continue to decline without intervention and management.

Forest Service research ecologists, URI staff, professors from the University of Kentucky to the University of Massachusetts, municipal staffs, nonprofit practitioners, and faculty from The Forest School at the Yale School of the Environment, Mark Ashton, Marlyse Duguid, and Morgan Grove (also USFS) are all contributing to this effort. Project co-leads are Richard Hallett (USFS), who has collaborated closely with Ashton (YSE), and Tara Trammell (University of Delaware).

“It is really nice to see former master’s students who worked with URI to come back as Forest Service research scientists to engage with URI and the School as alumni,” says Ashton. “Piana and his colleagues are bringing back their expertise to work on urban forestry issues that URI now faces in New Haven – along with other eastern cities of the U.S.”

## **Experimenting from Acorns to Seedlings:**

Urban Resources Initiative in New Haven, like its counterparts in other cities, is planting oak seedlings grown from the



Photo credit: Max Piana

**In early March, forest scientist Richard Hallett dips oak seedlings in hydrogel to prepare them for shipment from a Kentucky nursery to New Haven.**

more than 100,000 acorns collected in six cities with Piana. These progenies will be brought to New Haven and to the three other cities to be planted in naturally occurring gaps within healthy urban forest stands. Each research plot will include 25 trees from each of the three cities and two southernmost sites, located in Kentucky and Tennessee, for a total of 150 oaks per research plot and 1,500 across the entire city of New Haven. Overall, 6,000 trees are being planted as part of the study in addition to another 4,000 trees in related project work. The partners will monitor the trees and measure their growth and survival rate over the next several years to determine which progenies perform best.

Max Piana guided URI staff, including Chris Ozyck and William Tisdale, who together with the EMERGE GreenSkills crew prepared the research plots in forest patches at East Rock and Edgewood Parks

and the Yale Preserve during the winter months. In April, URI’s GreenSkills team will plant the oak seedlings, introducing the planting team to this urban silviculture strategy.

## **Hopes and Applications:**

This collaborative project aims to identify and promote silvicultural practices that are effective in creating healthy, diverse forest patches in cities. “I’m excited that URI has this chance to learn how to better manage regeneration of oak species in our city’s natural areas alongside federal and local partners through this research project,” says URI Director Colleen Murphy-Dunning. “Not only will our staff understand new strategies for managing forested areas in changing climate conditions, but we also extend that opportunity to our planting teams, who can experience both planting trees along city streets as well as within natural areas.”

# De-vining New Haven

by Joshua DeAnda

My introduction to de-vining started last summer, when I was a Greenspace intern with URI. On my first day, Chris Ozyck gave us a tour of New Haven, where we learned about ongoing projects and the flora we'd be working with throughout the summer. As we walked through Beaver Ponds Park, he pointed out a large willow tree he had planted some years ago and the beautiful gathering space he helped create under a catalpa tree's canopy. Chris also showed us a plant that had been on his mind for a long time—the wretched Oriental bittersweet (*Celastrus orbiculatus*). Bittersweet is an invasive vine that is ubiquitous in Connecticut, especially in urban forests. Chris taught us to recognize bittersweet quickly and to share the importance of its removal.

He explained that vines like Oriental bittersweet endanger our urban forest by killing native trees that provide valuable community and ecosystem benefits. Invasive vines like bittersweet are masters at preserving energy. They use a tree's structure to reach up into the canopy instead of making their own upright trunk. And bittersweet vines can get really big. David Shimchick of Friends of East Rock Park notes that, "Some of the bittersweet has the diameter of an anaconda—they literally strangle the tree and weaken it." David is right. Gone unchecked, a bittersweet vine will coil around a tree and thicken over time, squeezing the trunk like a giant snake. The squeezing can become so tight that girdling occurs, where water and nutrient flow are restricted, resulting in the tree's death. While bittersweet will thrive in a tree's sunny canopy, it will also do well in a shady ground story. Its shade tolerance and horizontal root structure make it a resilient (and difficult to manage) plant. For humans, that means this plant is a severe threat. As Stephanie FitzGerald of Edgewood Park explains, "We have adult trees and tiny trees, and the tiny trees don't make it because



Photo credit: Chris Ozyck

**New Haven Climate Movement volunteers "de-vining" with Chris Ozyck in East Rock Park.**

of the bittersweet vines. As a result, we don't have many teenage trees." Which makes a lot of sense; invasive vines like bittersweet can take over understories and suppress native-tree regeneration, resulting in less diversity in forest stratification. We haven't even mentioned how easily bittersweet spreads either. Its bright red/orange berries attract birds, making it an easy target for extensive bird dissemination.

While birds are the predominant medium of bittersweet dispersal, how did it get here in the first place? Like many invasive plant species in the United States, bittersweet is native to Southeast Asia and was introduced in the 1860s as an ornamental and erosion-control plant. By 1940, it had spread to Connecticut, Massachusetts, and New Hampshire. In 1974, bittersweet's reach encompassed over 33 states. Today, its greatest concentrations can be found in New York and coastal Connecticut—that's us, New Haven! So what are we doing about it?

My Greenspace intern cohort wasn't the only group learning about invasive vines. Chris collaborates with groups all over New Haven,

including youth groups like the Common Ground & Wilbur Cross Climate Action group, Greenspace groups (Mill River, Beaver Ponds, and East Rock, among many), and anyone who's interested in joining. He first started the de-vining initiative in 2020 when COVID-19 was in full force. De-vining turned out to be a safe way of socializing, getting outside, and protecting our urban canopy. For Joan Hilliard of Beaver Ponds Park, "De-vining allows me to get outside and move, instead of sitting all day." Movement for the mind and body is crucial, and Stephanie noticed the benefits among her Edgewood group, too, "I love the camaraderie of the people, I love the fresh air, and my mood is always better after doing this work."

From releasing strangled oak saplings to mature hickories, de-vining isn't just satisfying, it has a positive impact on urban-forest health and community resilience. First, freeing a native tree from bittersweet's death grip supports biodiversity and urban-ecosystem health. A rescued native tree can contribute to bird and mammal food sources (via insects laying eggs on native trees and an increase in hard mast, like acorns and hickory nuts). The tree will also serve as another seed source for native-tree regeneration. Second, a healthier, bittersweet-less urban forest is better equipped to collect stormwater runoff and reduce flooding. It also means that we have more trees photosynthesizing, converting CO<sub>2</sub> into O<sub>2</sub>, and providing cleaner air for New Haven. Lastly, de-vining brings people together. It's a collective effort that has community-wide impact, and building community is at the core of URI's work.

If you join a community group as a volunteer, you will get trained to ID many plants, including invasive vines. Once you've learned how to ID bittersweet, it's hard to miss, with its gray bark and X-shaped ridges and lenticels. You can find it coiling around anything it can

latch onto, including itself. When you come across a bittersweet vine, the protocol is to cut it down low, as low as you can go, and at eye level, too. Loppers are the tool of choice, but a pair of pruning shears works fine with some twisting and turning. If the vine is very large, a pruning saw will do.

Removing bittersweet can sometimes mean going into bushy areas where a trail hasn't been cleared. As you traverse through forests or parks, keep an eye out for poison ivy. As the old adage goes, "Leaves of three, let it be." The stem where the three leaves meet is red. In the winter, you can ID it by its brown, naked buds (no scales) and fuzzy-like vine. In general, leave all fuzzy vines alone (poison ivy and Virginia creeper) and remove hairless vines like bittersweet and porcelain berry (which has purple, blue, and pink berries).

Now that you know how important it is to remove invasive vines like bittersweet, what are you waiting for? Come help us de-vine New Haven! And don't forget your loppers!



Photo credit: Anna Ruth Pickett

**The Friends of Edgewood Park show off their "de-vining" tools.**