

A Miyawaki Forest

The first Miyawaki forest in the U.S. northeast was planted in North Cambridge in the fall of 2021. If you are wondering to yourself, what is a Miyawaki forest, you are probably not the only reader with this question.

Miyawaki is a planting method developed by, and named after, Japanese botanist and plant ecologist Akira Miyawaki. The goal of the method is to achieve rapid growth of dense, robust forests with species native to the region. The method was originally designed to help restore ecologically damaged areas around the globe, but the technique is also being used in urban environments like North Cambridge.

So why is this planting method being embraced? Between 1990 and 2015, the world lost over 320 million acres of forest—that's seven times the acreage of New England. On Cape Cod, within a decade (2001-2011), 2,300 acres of forest cover were gone. The global loss of forests is said to be responsible for a whopping 17 percent of annual carbon emissions, not to mention the loss of a myriad of other forest benefits. These Miyawaki forests have proven to, among other things, sequester carbon dioxide at super high rates. Compared to old forests, younger trees put the bulk of their energy into growth. This means they are grabbing CO₂ out of the air and incorporating the carbon and sequestering it rapidly into their tissues—just what a warming planet needs.

But that's not all. These Miyawaki forests are not ordinary plantings of trees. They are designed to be high in biodiversity, which is accomplished by planting in vertical layers: The base layer is made up of ground cover (maybe mosses, sedges), herbaceous plants, shrubs, understory trees, and at the top, the canopy trees. The formula is taking a cue from nature's pattern of a forest.

How does one go about planting one of these special forests? It is suggested that a space of just 30 sq ft will work to create one of these "pocket forests." Super important is the proper selection of appropriate native species for the site conditions that should be based on a native plant forest community nearby. The plant material? Ideally, the young tree saplings are grown from seeds collected from the local forest trees. If grown from seed, genetic diversity is assured. The local eco-type will have the genetic memory of adapting to local conditions versus trees grown in warmer or wetter climes. If purchased, trees should be locally grown. This is a good tip that applies when selecting plants for any landscape.

Like any garden, knowing the characteristics of the soil is important—what is the pH and the nutrient make-up? With this knowledge the soil can be provided with whatever nutrients it requires but must be from locally sourced organics/mulch. This is critical because it will simulate the natural duff layer of organics that accumulate on a forest floor that are the source of nutrients, moisture retention, and promote mycorrhizal growth—all essential components that are key to the success of this planting method. The symbiotic relationship between plants and soil life is how nature works—a basic tenet often ignored that shouldn't be.

In a Miyawaki forest, the young tree seedlings, called whips, are no taller than three feet and are randomly planted three to five per ten square feet. These will be the canopy trees. Right now, you landscape folks are saying, what? Hold it, that's too close! Shouldn't trees be 15 to 25 feet apart? But remember, this is a forest, not a specimen-focused landscape design. Mother Nature has her own scheme for proven success, one that we should mimic in how we design and care for the land. This dense planting and its rapid rate of growth equates to minimal maintenance. Yes, watering and weeding is required, but only for the first two growing seasons. Then it should be self-sustaining. Wildlife will find these oases that may serve as steppingstones for wildlife between larger forest tracts.

This Miyawaki planting technique is touted as an effective means of jumpstarting a woodland, especially when a degraded area needs restoration. They grow up to ten times faster than natural succession that can take hundreds of years. These carefully curated plant communities are said to reach a stable ecosystem in 20-30 years. Like a garden, because these are forests deliberately created of appropriate native species and not by happenstance, biodiversity is far higher than natural woodlands—as much as 18 times. That's good for ecosystem stability and it means these little forests are more resilient to stressors such as pests, disease, extreme weather events of drought and deluge, and other impacts of climate change.

While somewhat ironic, developers are realizing that providing lush, vegetated areas in and around developments make them more desirable, and that's a good thing. Indeed, more trees and more naturalized vegetation improves real estate values, makes healthier neighborhoods by providing cleaner air and moderating temperature on the land, not to mention the documented improved mental health that green spaces provide. Cambridge employees noted that their first Miyawaki forest offers an opportunity to reestablish healthy forests in urban environments, cool the surrounding areas and mitigate the urban heat island effect, support biodiversity, buffer against flooding and erosion, help balance water cycles to fight drought conditions, and sequester carbon. In addition to the environmental benefits, these forests help build community through involvement in planning and planting and provide a natural gathering place to interact with nature and learn about native ecology.

In 2024, two Miyawaki forests were planted in the city of Worcester, and as of today, there have been over 15 forests planted in 9 cities across the U.S.

Where do you see the next Miyawaki forest being planted?

This article by Kristin Andres, APCC Director for Education, first appeared in The Cape Cod Chronicle in 2022, and has been updated.