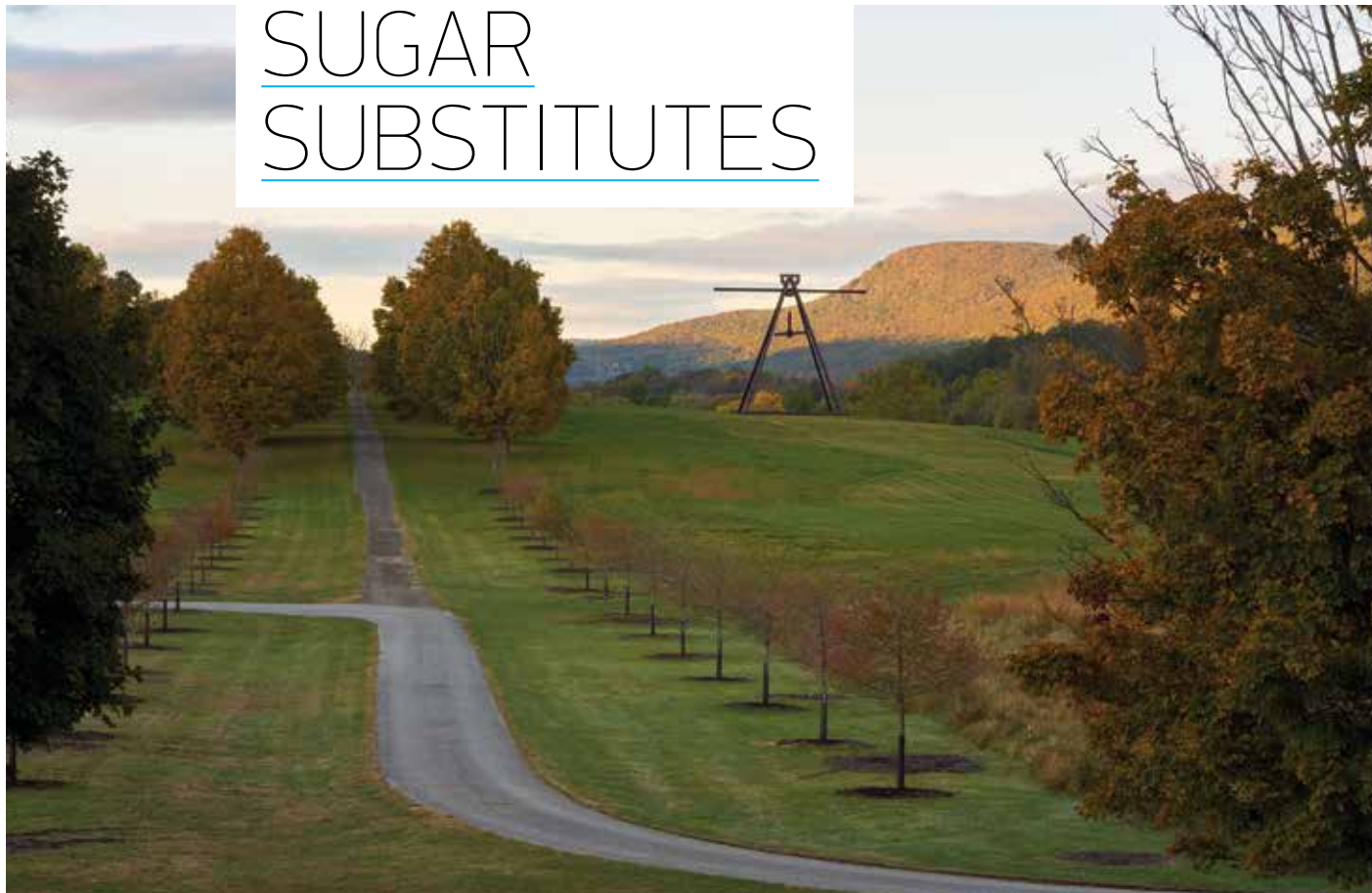


## SUGAR SUBSTITUTES



### **AN ENCHANTING BUT FAILING MAPLE ALLÉE GETS A SECOND LIFE.**

BY JONATHAN LERNER

An allée can dignify an arrival, draw the eye to a focal point, even partition an open space. To do any of these effectively, it must appear linear, uniform, and repetitive. Of course, composed of living trees it can't really be flawless; still, it ought to give the illusion of perfection. So there's a problem if some of an allée's constituent trees fail to thrive, leaving gaps and slumps in an assemblage meant to appear continuous and taut. That's what was happening at Storm King.

The Storm King Art Center occupies 500 acres of rolling terrain about 50 miles north of Manhattan in the Hudson Highlands, a region of lushly vegetated, softly eroded low mountains. More than 100 monumental works by renowned artists are sited permanently throughout Storm King's woods and meadows. There's plenty of space between them, and room for seasonal installations as well. "That to me is breathtaking," says Gary Hilderbrand, FASLA. "You experience almost every work of sculpture on its own."

Storm King is arguably America's most important sculpture park, though it's not the largest. That distinction probably belongs to the Tippet Rise Art Center, on 12,000 considerably starker, rougher Montana acres (see "The Major Scale," *LAM*, June 2018), which won a 2018 ASLA Professional Honor Award in the General Design category. There visitors are invited to explore by hiking, mountain biking, or taking a two-and-a-half-hour van tour. At Storm King, you may rent a bike or hop

**ABOVE**  
Young *Nyssa* and mature maples with Mark di Suvero's sculpture *Pyramidian*.

© COURTESY STORM KING ART CENTER/PHOTOGRAPH BY JERRY L. THOMPSON

REGIONAL ECOSYSTEM—  
SURROUNDING LANDSCAPE



on a tram that circles through the grounds, but the principal method of locomotion is walking—strolling, actually, which differs from hiking or mountain biking both energetically and emotionally.

There are sinuous footpaths at Storm King. People are also encouraged to wander freely among the trees and across the fields, or through the sweeps of native grasses that have become something of a landscape signature for the institution. There are also several allées that beg to be entered and strolled down—and who can resist the touch of elegance doing

so conveys to simply walking? The shortest one, lined with true sugar maples, is along Museum Road, which leads to an imposing hilltop house built in 1935 in the manner of a Norman chateau, now containing the park's offices and galleries. Cars also use Museum Road, though, so it's less alluring for a promenade on foot.

Another allée is planted in pin oaks. It runs for more than a mile along the bottom of a shallow valley—

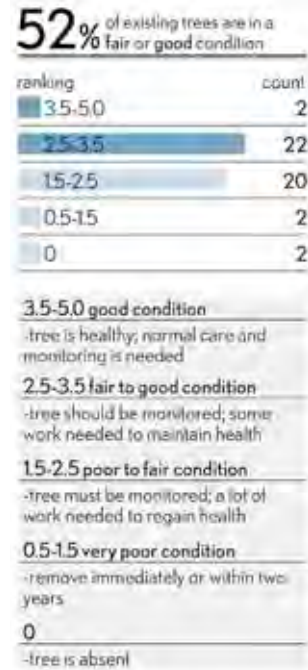
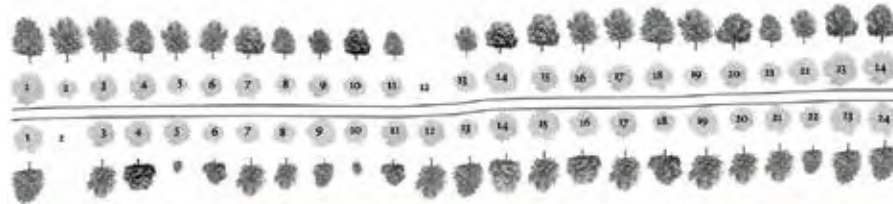
leading past Andy Goldsworthy's *Storm King Wall* and Maya Lin's *Storm King Wavefield*, perhaps the two

most famous works in the park. This allée is near, and parallel to, the park's western boundary, which happens to be the New York State Thruway. The third allée, called Maple Allée, is shorter than that, but more prominent. On axis with a pair of French doors that open from a gallery in the museum building, it cuts diagonally across the expansive former farm fields at the heart of the park. Remarkably, aside from the Thruway, which is pretty well

**ABOVE**  
The Hudson River near Storm King Art Center is nearly two miles wide.

REED HILDERBRAND

MAPLE ALLÉE



screened by a border of trees, there is virtually no other intrusion of the developed world in the long vistas you get at Storm King. Beyond the property itself your eyes travel toward the mostly forested and protected surrounding hills. Topography hides even the near-adjacent Hudson River town of Cornwall. It hides the river itself, too, though the viewshed encompasses ridges on its far shore. The unseen river, almost two miles wide here, does make itself present, but reflectively, in the distinctive clear light for which the Hudson Valley is celebrated. In this vast, seemingly natural setting,

Storm King's three allées provide a suggestion of structure and balance. Crisply and simply rectilinear, they contrast with both the artworks' complex geometric and biomorphic forms and the seemingly limitless contours of the land. But Maple Allée was in trouble.

Maple Allée was designed and planted in 1968, eight years after Storm King opened, by the sculpture park's landscape architect, William Rutherford. Its trees were also sugar maples, but a cultivar called Green Mountain. "They were still relatively new trees, bred to be broad

and bright and flashy, quickly," says Anthony Davidowitz, Storm King's deputy director of operations, administration, and legal affairs. "They hadn't gone through a full life cycle," so some problems inherent to the variety weren't yet understood. They tend to develop girdling roots, for example. And then there were issues with how they were planted, with their root balls wrapped in burlap, in unprepared soil—which at one end of the allée stays too moist.

"Sugar maples don't like the wet. And in age, the [cultivar's] branches compete with each other for space.



**TOP**  
Aerial views help reveal the gaps in Maple Allée.

**RIGHT**  
Virtually no traces of development mar the views from the park.

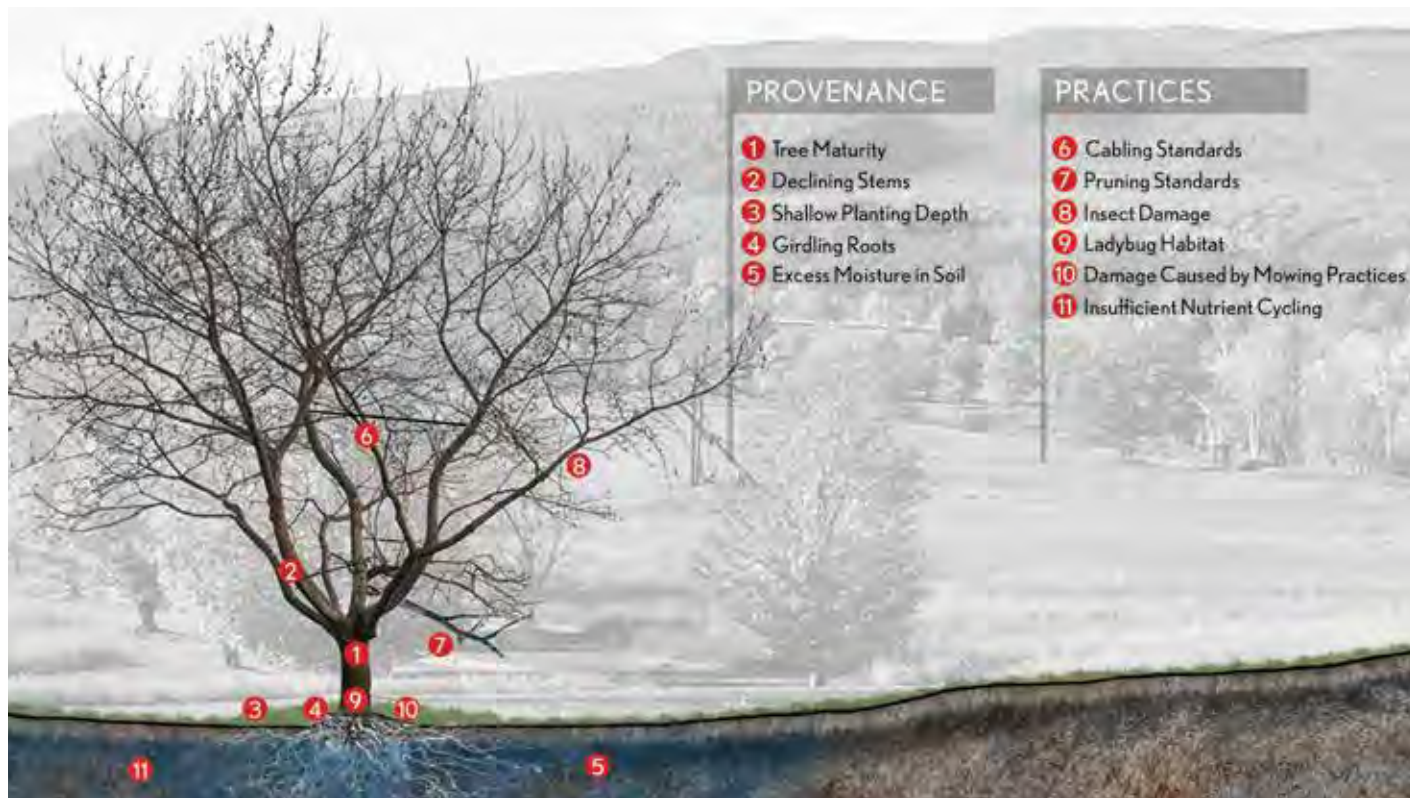


**STORM KING ART CENTER**

- 1 MUSEUM ROAD ALLÉE
- 2 OAK ALLÉE
- 3 MAPLE ALLÉE
- 4 MUSEUM BUILDING
- 5 NEW YORK STATE THRUWAY
- 6 MOODNA CREEK

REED HILDERBRAND, TOP; © COURTESY STORM KING ART CENTER/PHOTOGRAPH BY JERRY L. THOMPSON, BOTTOM

REED HILDERBRAND



The problems we were seeing were persistent,” says Hilderbrand, whose firm Reed Hilderbrand was brought in to find a solution. The design team included Rebekah Sturges, ASLA, and Meg Griscom, ASLA. “We took the position that ‘you probably need to cut down a lot of trees—but if you cut them down you’re going to have to put them back. We can reform your practices, improve the soil, and change the species, but Storm King’s *métier* really is sculpture and land, and that includes these plantations.”

The pin oak allée sustained some storm injuries a few years ago, but overall is in decent shape. A few of the sugar maples on Museum Road would be replaced; they were failing “because of girdling roots, soil issues, and a wind storm that caused quite a bit of damage,” the park’s director of facilities and conservation specialist Mike Seaman says. More critically, at the damp lower end of

Maple Allée, the Green Mountain cultivars were puny and dying.

The first issues in addressing the problems of that allée were in the realms of design and horticulture. For the staff and board, “the interesting journey was getting from ‘something needs to happen’ to ‘this is what’s going to happen.’ There were so many variations, from ‘chop it all down’ to ‘let’s have a much more complex, broader planting, with an S curve through it,’” Davidowitz recalls. “Then going through the tree material, and asking what’s important from that line of trees, which is different from the Museum Road Allée, where the species of sugar maples with their higher branching” allow less obstructed through views. Maple Allée, however, had served more as a line of demarcation across a huge open space; less transparency was desirable. “We dismissed a bunch of species because the branching would be too high. We talked about flowering, nonflowering,

about litter. And then looking at the future: Are they necessarily good trees for what the climate and environment will be in 40 years’ time?” The plan that emerged is to replant the allée as the straight line it has always been. The species finally selected was black gum (*Nyssa sylvatica*).

In 2017, 20 standing Green Mountain maples and two stumps were removed and replaced with 34 black gums; 24 more maples will be taken out in 2019, with 42 black gums put in their place. “The spacing’s a bit different,” Seaman explains, because the black gums have a more compact habit. “The sugar maples were approximately 70 feet apart and these are about 40. To have the same effect it was necessary to increase the number of trees and narrow the allée itself.”

Hilderbrand says, “We would never recommend a single-species allée today, except in this circumstance—it’s a legacy condition. The *Nyssa* was

**ABOVE**  
A schematic illustrates the sources of stress on the existing trees.

REED HILDERBRAND

**“WE WOULD NEVER RECOMMEND A SINGLE-SPECIES ALLÉE TODAY, EXCEPT IN THIS CIRCUMSTANCE—IT’S A LEGACY CONDITION.”**

—GARY HILDERBRAND, FASLA



chosen as the only hardwood that would be well adapted to the varied moisture and exposure conditions that the original maples couldn’t ultimately survive.”

The other major challenge was how to amend and continue to nourish the soil. “We did some serious soil forensics,” Hilderbrand says. For that, Eric T. Fleisher of F2 Environmental Design was brought onto the team. “We found the natural nutrient cycling capacity in the soils to be very low. We were getting less than 25 pounds of available nitrogen [per acre] from microbial activity,” Fleisher says. There were high bacterial counts and bacterial diversity, but low predatory protozoan populations. Ideally, the compost used to restore these soils would produce a minimum of 200 pounds of nitrogen per acre “coming from the living microorganisms,” that is, from the interaction among bacteria, fungi, and predatory activity, “tapping into the natural nitrogen supply that’s in the soil but that’s locked up in bacteria.” The means of applying

these amendments would be through vertical composting and biological infusions.

Vertical composting sometimes describes the design of backyard composting devices. Here it’s something else. To renovate the soil around standing trees whose vigor could be restored—following years during which leaf litter had been removed, thus interrupting the natural process of nutrient replenishment—“you go in with an augur, down about 12 inches into the root zone in a specific pattern around each tree,” Fleisher explains, using straight compost with amendments such as biochar or pelletized humate where needed.

Biological infusions are more commonly called compost tea, a liquid amendment that home gardeners might simply drip around their plants. At Storm King it is engineered with different characteristics for application around specific trees, and injected by wand into the top 10 inches of the soil. Anyway, “com-

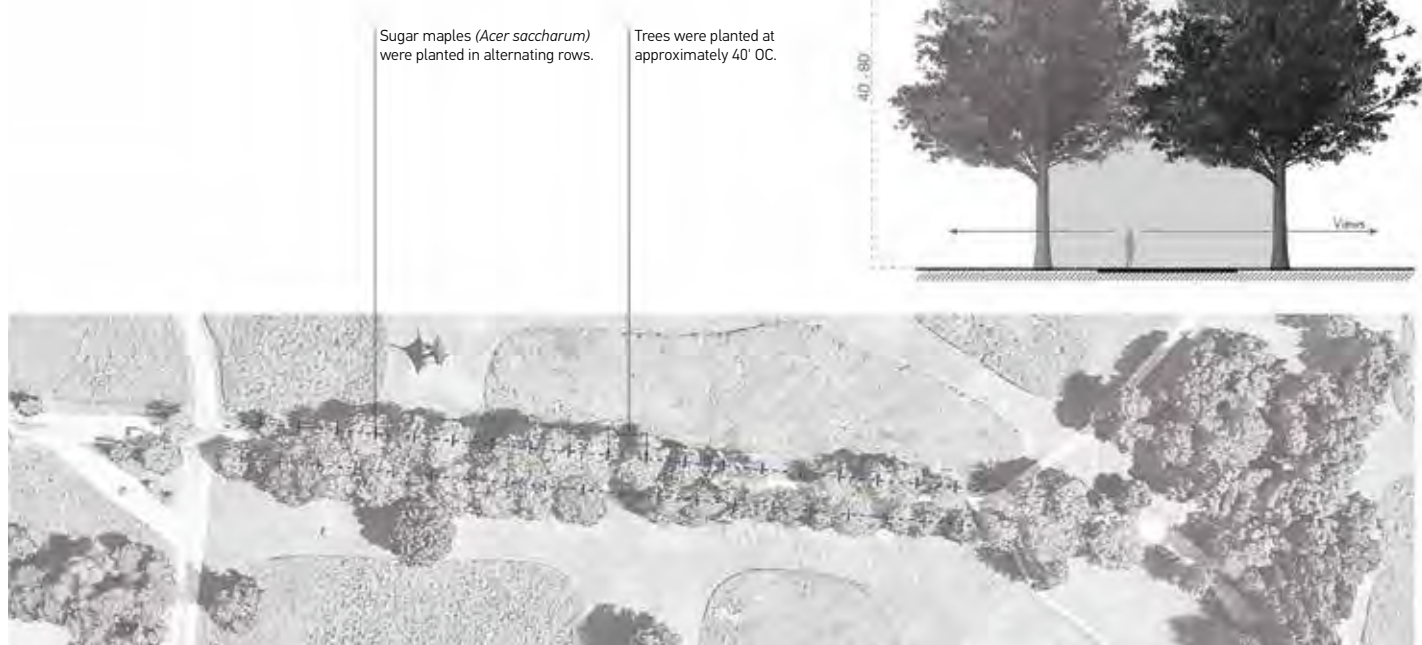
post tea is a generic name,” he says. “There’s no such thing as an off-the-shelf compost tea. Those are nothing more than the foods you would put *into* a compost tea—it might be humic acid, kelp, or fish hydrolysate—but these do not include the microorganisms that can only be found in a high-quality compost.”

Storm King obtained its own compost brewing equipment, plus a microscope and training so that staff can monitor and adjust the amendment. “When you work with these institutions, it has to be done in-house, extremely scientifically, which contractors really aren’t set up to do,” Fleisher explains. You are “looking at exactly where the imbalances are and then specifically engineering these biological infusions to correct that. We look at them under a scope every 24 hours. When you’re getting to the point where the protozoans have developed fully and are extremely active, and the bacteria is almost depleted or has gone down significantly, we

**ABOVE**  
Storm King’s original sugar maples were planted some 70 feet apart; the black gums replacing them are being spaced much closer together.

© COURTESY STORM KING ART CENTER/PHOTOGRAPH BY JERRY L. THOMPSON

**MUSEUM ROAD ALLÉE—INTENT**



feel ‘OK, the material’s ready.’ These are living organisms that absolutely don’t have a shelf life, and have to be applied within six hours of having been brewed.”

At that end of Maple Allée with problematic drainage, as trees are replanted, the soil is restored more aggressively, using a combination of compost and sand. “We create, in a sense, a lower horizon and upper horizon of soils. We mix more sand into the bottom, and if we find a real problem with drainage we go farther and do what are in effect dry wells with sand,” Fleisher explains. Beyond drainage management, the goal of the dual horizons is to promote “most of the microbial activity at 10 to 12 inches, where the feeder roots generally are.”

In the near term, visitors to Storm King will notice the difference between the smaller new trees and the mature ones in Maple Allée. An interpretive signboard nicely encapsulates the history and on-going renovation. Eventually, the

entire allée will be replanted. “We liked staging this for didactic reasons. People are attached to these maples, especially to the fall color,” Hilderbrand says. “There’s a good story about longevity by comparison to the new trees, about planting practices old and current, and about managing living collections in the face of dynamic climate and environmental conditions.”

Especially for Storm King’s staff and community of donors and members, says Davidowitz, repairing the allées has been “another element

of understanding the broader ecological dynamics of this place. You see a row of trees, you don’t think, ‘Oh, that tree over there that’s taller is having a completely different life experience than one planted a few yards away.’ It helps people to think holistically. It helps to see photos of Mike standing by the truck with that big brewer on the back. It’s made things as complex as soil health accessible. It’s been a great educational experience.” ●

JONATHAN LERNER IS A WRITER BASED IN NEW YORK STATE.

**TOP**  
An aerial rendering aided site analysis of Museum Allée.

**RIGHT**  
Strolling and cycling are the preferred ways to experience the park.



REED HILDERBRAND, TOP. © COURTESY STORM KING ART CENTER/PHOTOGRAPH BY JERRY L. THOMPSON, BOTTOM