



CARBON CENTRAL

ADVANCING NATURE-BASED WAYS OF CURBING
CLIMATE CHANGE

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by JEFF HARDER

In January, under the golden dome of the Massachusetts State House, state senators unanimously passed the Next Gen Climate bill, a piece of legislation calling for net-zero carbon emissions by 2050. It was a significant moment, not just because the bill ratchets up the Commonwealth's greenhouse gas reduction targets—previously set to curb emissions by 80 percent compared to 1990 levels—but because it spells out a tool to achieve them: **natural climate solutions**.



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The Great Marsh restoration project aims to fortify salt marsh which over time has been compromised by historic ditching, an agricultural practice dating back to early colonial days and used up until the early 1900s. By the late 1930s nearly 94% of New England salt marshes had been ditched, and today the remnants of these ditches continue to disrupt natural tidal flow by destroying draining processes and leaving the area increasingly vulnerable to floods and sea-level rise. In order to ‘heal’ these ditches, The Trustees and partners are using a new, nature-based method which, to date, has only been piloted on a very limited basis on the neighboring Parker River Wildlife Refuge (US Fish & Wildlife Service). Ultimately the full project will involve 330 acres of salt marsh, including Trustees properties in Newbury, Essex, and Ipswich, along with 30 acres within a state-owned Wildlife Management Area.

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Natural climate solutions are ways of harnessing the world’s existing ecosystems—forests, grasslands, wetlands, agricultural soils—to capture and store carbon dioxide from the atmosphere. The techniques themselves are legion, from replanting bare forests and city streets with suitable tree species to restoring wetlands to using less-intensive agricultural practices. They provide holistic, science-backed benefits: fewer land-use-related emissions, improved crop yields, reduced soil erosion, and the fostering of healthy, biodiverse habitats that are resilient to extreme storms and other looming impacts of climate change.

And instead of requiring years of research and millions of dollars to develop and deploy, natural climate solutions are already in service around the world—including across The Trustees’ portfolio of 118 properties. “Natural climate solutions really range from how we manage 3,000 acres at Notchview, to how we manage barrens habitats, salt marshes, and grasslands, to green infrastructure solutions for cities and towns,” says Julie Richburg, The Trustees’ Lead Ecologist for Inland Natural Resources.

Now, Trustees has become an advocate for incorporating natural and working lands into the state’s climate approach. Thanks to a coalition led by The Nature Conservancy, Mass Audubon, and The Trustees, lawmakers included language calling for several provisions related to natural climate solutions in the Next Gen Climate bill—most importantly, gathering

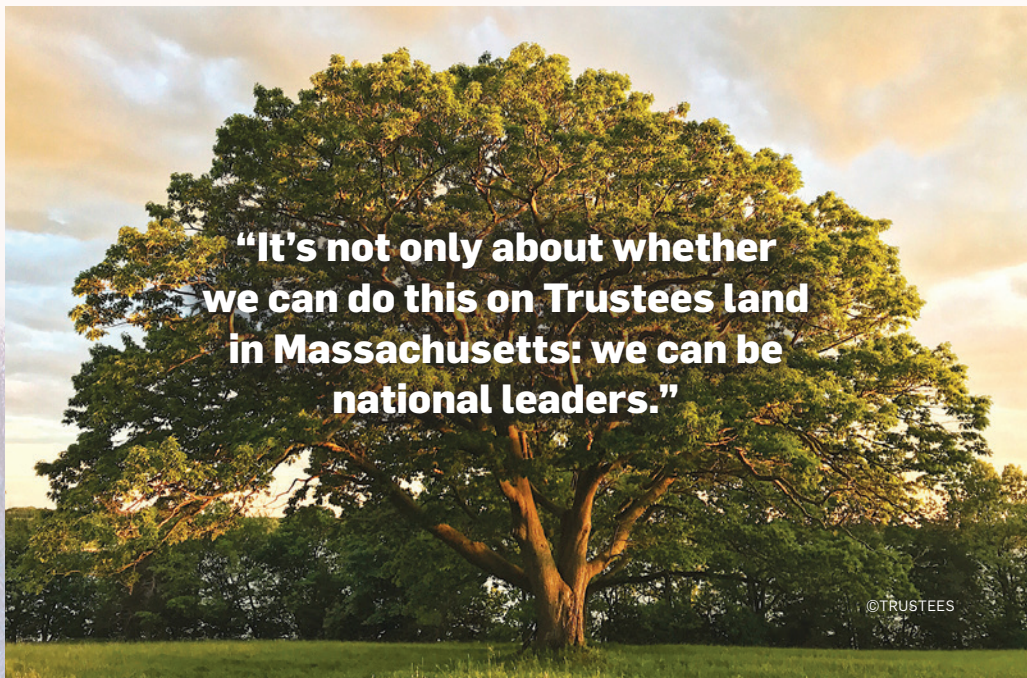
baseline measurements of the carbon currently sequestered in Massachusetts lands and finding new strategies to increase that carbon storage. As the bill moves forward, land conservation, conscientious forest management, rotational grazing, cover crops, salt marsh restoration, and other natural climate solutions in use across Trustees properties showcase the promise of these practices, demonstrating to landowners in New England and beyond that simple, thoughtful, nature-based approaches to curbing climate change are worth adopting.

“We can serve as proof of concept and say we’ve done these things with our farms, our salt marshes, our forests—it’s working really well,” says Linda Orel, Trustees Director of Policy, who drafted legislative language and lobbied lawmakers to include the natural

climate solutions policy. “And it’s not only about whether we can do this on Trustees land in Massachusetts: we can be national leaders.”

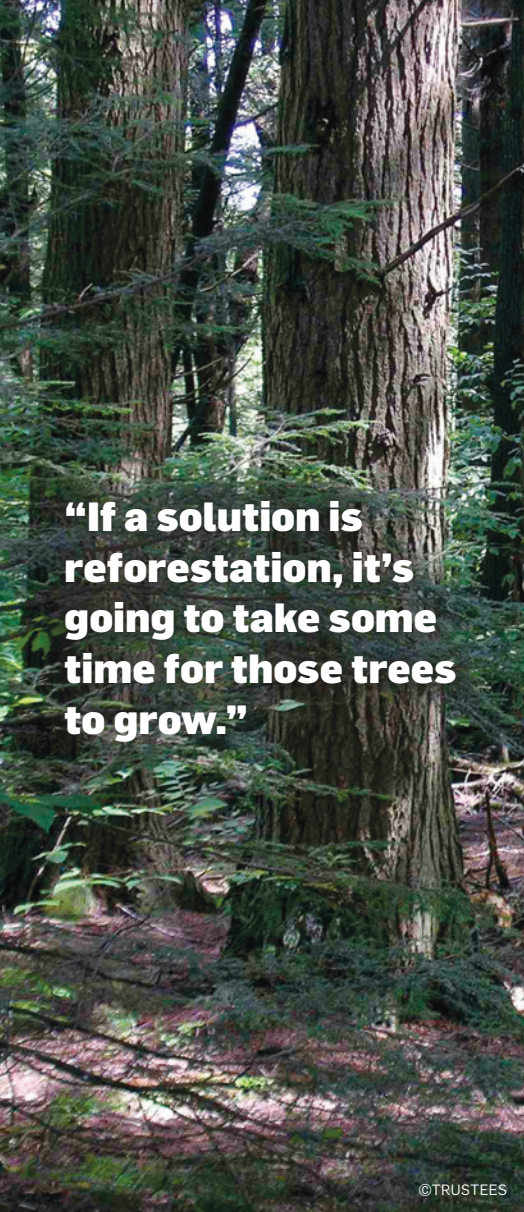
INTO THE WOODS

Trees are among the most powerful carbon sinks in Massachusetts, and the reason why is straight from middle-school science class. “We can think of natural climate solutions as just leveraging the power of photosynthesis, the basic biological function of how plants work,” says Maria Janowiak, Deputy Director of the U.S. Forest Service’s Northern Institute of Applied Climate Science (NIACS), who has helped Trustees analyze forest vulnerabilities as well as resilience-building interventions. Plants absorb carbon dioxide through their



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The Trustees restoration of a floodplain forest at Bartholomew’s Cobble in Sheffield is a prime example. Nineteenth-century farmers cleared trees for pasture and hayfields right up to the banks of the Housatonic River, but without trees to stabilize the soil, frequent storms and heavy rains produced critical levels of erosion. “That was one of the first projects where we had that climate focus and an eye toward improving a priority natural community,” Richburg says. “We thought, how can we help hold some of those soils in place and provide more habitat for species that use floodplain forest?” In 2016, Trustees completed a restoration of the floodplain, planting 1,700 trees—mostly silver maple and species like boxelder, sycamore, and cottonwood—across ten acres while controlling for invasive species, efforts intended to grow a forest over time, stabilize soil, mitigate flooding, and sequester carbon.

In 2018, Trustees worked with NIACS and others to create a ten-year forest stewardship plan for its largest property, Notchview Reservation in the Berkshires, with an emphasis on climate adaptation and forest resilience. Based on a forest inventory of the more than 3,000 acres at Notchview, the plan outlines a path to resiliency amidst a changing climate and its expected impacts on forest ecosystems. By assessing and addressing current and coming threats like future loss of tree species, the plan offers a roadmap for where The Trustees should be

active and deliberate, and where existing forests should remain diverse and resilient without substantial intervention.

Other properties might require far different efforts. “It’s very situationally dependent,” Richburg says. “It comes down to your goal for an individual property, and how you manage carbon while addressing its native biodiversity.” Proper management, in fact, can create a range of fortuitous consequences. Harvesting trees for house framing or furniture—instead of paper or firewood—can store carbon for decades or centuries. Those harvests can also promote complexity and resilience within forests: when older trees disappear, younger specimens, which tend to absorb carbon more quickly and benefit native wildlife, grow to take their place. “There’s a growing recognition that these actions don’t need to conflict,” Janowiak says, “and that there are lot of opportunities to sequester carbon while providing a lot of other benefits.”

GRAZING THE SURFACE

While trees are front and center, natural climate solutions demand an all-encompassing strategy. In Ipswich, Trustees is in the midst of a massive restoration at the 20,000-acre Great Marsh, the largest contiguous salt marsh in New England. (For an in-depth look at this work, see the Spring 2019 issue of *Special Places*.) And while grasslands and agricultural properties comprise a much smaller portion of the state’s natural landscapes—and, ultimately, play minor roles with regard to natural climate solutions—rethinking how farmers

leaves; sequester it in their roots, trunks, and underlying soil; and bear fruit and release oxygen in exchange.

Forests already capture about 15 percent of U.S. emissions each year, according to The Nature Conservancy. But amplifying that carbon-capturing potential requires site-specific approaches, not simply letting every forest run wild. “That’s where we can look at our conservation and management practices, and allow the natural succession of these forests to occur [either] without additional management, or with a more hands-on approach to address threats that negatively impact the health and resiliency of our forests,” says Richburg.

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Robert's Meadow Brook runs through a portion of 1,000 acres of forest in Westhampton and neighboring towns that was recently conserved by a consortium of seven conservation groups including The Trustees—which is all part of the largest contiguous forested area in Massachusetts. Protecting contiguous forest is a critical way to maintain optimal carbon sequestration effectiveness, and efforts are ongoing to conserve more of this important forested acreage in the Pioneer Valley and Hilltowns area.

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YOU CAN ACTUALLY SEQUESTER MORE CARBON.”

work the land could also enhance the terrain's carbon-capture power.

Alongside planting cover crops and employing no- or reduced-till agricultural practices, rotational grazing—regularly moving livestock to different pastures as opposed to turning animals out onto a single patch of land for an extended period of time—is getting a fresh look at Trustees farms. “It's all a matter of surface area: if you keep vegetative grasses higher, you can actually sequester more carbon,” says Kevin Channell, Trustees' Director of Agricultural Operations.

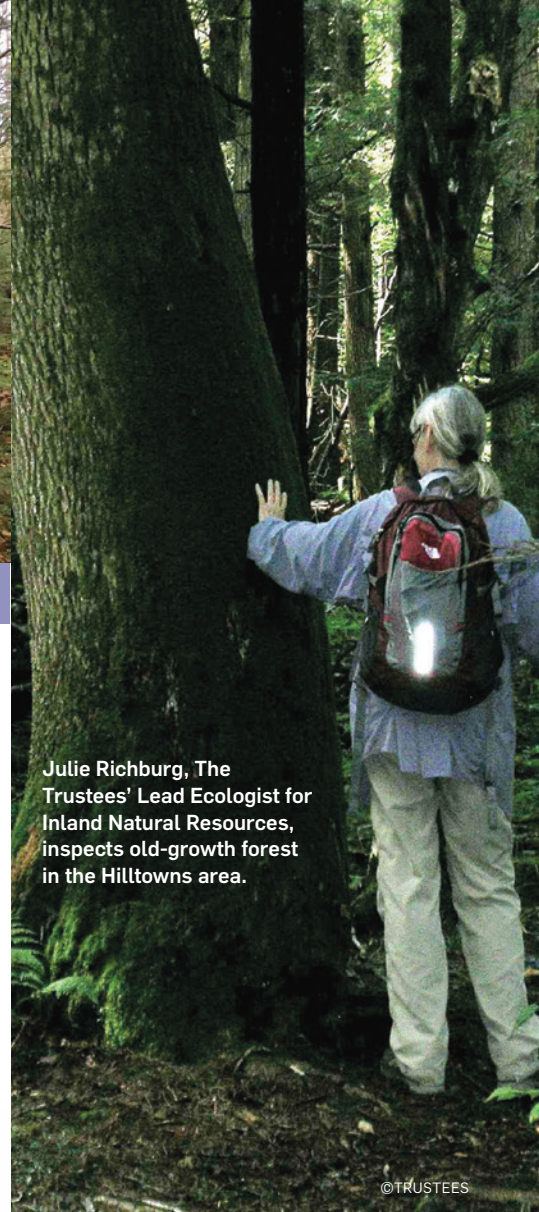
Trustees employs rotational grazing practices on some 500 acres of agricultural properties across Massachusetts: Moose Hill Farm in Sharon, Powisset Farm in Dover, Chestnut Hill Farm in Southborough, and Appleton Farms in Ipswich. Cows, sheep, and goats visit new grasslands at least once a week and as often as once a day, lending each parcel a roughly 30-day “rest period” between grazings. At Appleton Farms, temporary fencing subdivides a 140-acre paddock into smaller sections, which multiply in size based on how often the animals are relocated: 50 head of cattle that move to a new pasture each day require 1.4 acres, and 14 acres if they move each week. In general, Channell says, staff aim to leave behind roughly four to five inches of residual grass. Rotational grazing provides a range of co-benefits: the costs associated with mowing go down, while fresh grass translates to healthier animals and, ultimately, higher-quality meat and dairy products. “We're convinced that this is a better life for a cow,” Channell says.

At the same time, Trustees is putting rotational grazing under a microscope. After establishing a baseline of organic carbon stored in the soil at Appleton Farms, staff will take samples over the coming growing seasons to gauge the true effects of rotational grazing; Channell expects Appleton's soils to have absorbed twice as much carbon as a continuously grazed landscape. He hopes the research persuades farmers that these agro-ecology techniques are worthwhile—and helps lawmakers create tax benefits and other incentives to keep working farmlands intact while performing a valuable sustainability service.

A PATH FORWARD

It's hard to overstate the role of natural climate solutions in curbing greenhouse gas emissions. Even in a world that's gone all-in on clean power, staving off warmest-year-on-record declarations requires removing greenhouse gases from an already-saturated atmosphere. “Right now, the only feasible way to remove carbon pollution from the air is to enhance and improve our reliance on critical natural resources,” says Linda Orel.

As the Senate's climate bill winds toward the Massachusetts legislature's second chamber—and, perhaps, the desk of Governor Charlie Baker—The Trustees is suited for a variety of roles, Orel adds. The organization would work with the Executive Office of Energy and Environmental Affairs to create policies and incentives for private landowners to adopt nature-based methods of carbon capture and sequestration. Trustees staff can



Julie Richburg, The Trustees' Lead Ecologist for Inland Natural Resources, inspects old-growth forest in the Hilltowns area.

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offer input on how to balance conservation and development, and develop strategies that pair greenhouse gas sequestration with resiliency—natural extensions of The Trustees' core mission.

But while natural climate solutions are ready to be put to work, implementing them as part of a broader climate strategy comes with a degree of urgency. “If a solution is reforestation, it's going to take some time for those trees to grow,” Orel says. On the long march toward a resilient future, in other words, the first steps must come today. The Trustees is working to help plot the course.

Jeff Harder is a freelance writer and editor who lives in New England.