INTO THE WOODS

NEW ENGLAND FORESTRY FOUNDATION | **SUMMER 2021**

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CLIMATE SOLUTIONS SPECIAL ISSUE

NEW ENGLAND FORESTRY FOUNDATION

Board of Directors

NEW ENGLAND FORESTRY FOUNDATION

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Dear Members and Friends,

The Boston Celtics have a player they call the Time Lord because of his special relationship to his alarm clock. The nickname ultimately derives from the cult British television series Doctor Who, in which Time Lords are aliens who have cultivated the ability to travel backwards and forwards in time, and use that ability to gather knowledge and care for others.

Foresters are like Time Lords; they need to see the forest as it was a long time ago and imagine what it will be like in the distant future if they apply their management skills. They serve as custodians who aim to ensure that forests provide services to landowners and society.

Out at the New England Forestry Foundation (NEFF) home campus in Littleton, Massachusetts, we installed a forestry learning tool called a Marteloscope at the top of the hill. It's not a device, although it sounds like it. We simply measured and tagged every tree in a two-acre section and entered the data into our computer so we can use software to predict how the future forest would change if we harvested this tree or that tree or left them to grow. We've had veteran foresters and unskilled college students take the Marteloscope challenge and make their own choices. Then we run their selections through our software program and give them an idea of how the forest would change.

I like to watch the foresters' eyes when they are contemplating their choices. I can tell they are seeing something that isn't there; the foresters are time traveling. They see the stone walls and know this section was a pasture at one time. They are calculating how fast the understory white pine can grow and what the forest will look like in 50 years if they remove some of the overstory oaks right now.

I try to teach the college students how to be Time Lords too. I show them a picture book of Littleton historical photographs. One shot is from the Prouty Woods hill where the Marteloscope is installed. There are pastures, long views into the distance toward Boston, and a cow is grazing right where the students are standing under towering pine trees. This picture equips them to start time traveling like a forester.

As we move deeper into a global climate emergency, we all must become Time Lords and envision how our forests can help in the next critical 30 years and beyond; how will our forestry choices today impact the ability of future generations to work with the climate they receive? This special issue of *Into the Woods* presents the results of NEFF's own forestry time traveling. You'll read about a new set of Exemplary Forestry™ standards aimed at the smaller forest parcels of family forest owners in southern New England, the impact of our Acadian Exemplary Forestry standards, and a new investment fund that will access private equity to compete for the huge land transactions up north while using NEFF's Exemplary Forestry to transform the future forest. Most importantly, this issue reveals NEFF's 30 percent solution—our multi-faceted approach that can provide 30 percent of the needed reduction in carbon emissions for the region over the next 30 years.

Robert Perschel
Executive Director

Finding Hope in Climate Solutions

A MESSAGE FROM Tinsley Hunsdorfer, NEFF Communications Manager

The last time you read a newsletter message from me was exactly a year ago, when in the summer 2020 issue of *Into the Woods*, I explained how supporters and friends of New England Forestry Foundation (NEFF) could stay connected with us during the pandemic. Twelve months later, what I wrote at the end of that message still holds true: you are in my thoughts, and the thoughts of all of us at NEFF.

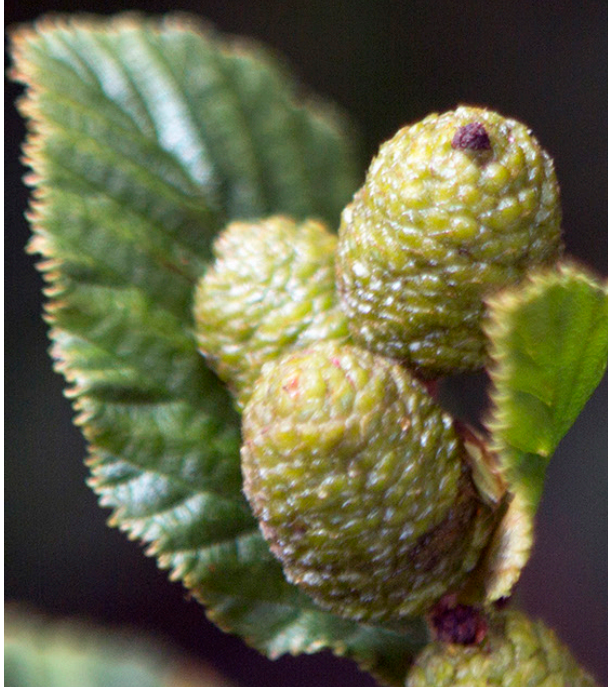
While the United States is making real progress with vaccinations, this nation isn't out of the COVID-19 woods yet, and most other countries aren't faring as well. This lingering pandemic uncertainty interacts with grief from pandemic losses and any number of other critical, painful societal issues to leave people feeling bleak. Given these circumstances, you may be wondering if this is the right moment for NEFF to publish an entire newsletter issue dedicated to climate change, a topic that often proves heartbreaking.

Never fear: this issue is all about NEFF's well-researched climate solutions and their projected impacts. We have good and exciting news to share, news that may even leave you feeling hopeful.

NEFF recently created an Exemplary Forestry Center that brings together our initiatives and partnerships with ties to Exemplary Forestry—NEFF's most powerful climate-mitigation tool—to tackle ambitious new goals and projects, all with the aim of solving the climate crisis. The Center will build on our activities and expertise in forest science, outreach and coalition building, policy, communications, and innovative conservation finance programs; in the last few months, the Center has received major grants from individuals and foundations that are already helping us expand our work, and we expect more growth as fundraising and strategic planning proceed.

Every day, NEFF's creative and dedicated Exemplary Forestry Center staff members put everything they've got into NEFF's climate mitigation strategies and programs—not just because it's the right thing to do, but also because we know that once implemented, they're going to work. Personally, I couldn't be more excited to work for New England Forestry Foundation at a time when we are poised to make a real, measurable impact on the climate crisis. Our thanks to the donors, supporters and partners who have gotten us this far, and to everyone who will join us in the months and years to come.

Photo by Lauren Owens Lambert.



CLIMATE, NEFF AND THE NEXT FIVE YEARS

WRITING BY NEFF Executive Director Bob Perschel

When the climate emergency fully revealed itself, New England climate scientists and policy makers came to the realization that it wouldn't be enough to drastically reduce emissions; in order to get to the relative safety of "net zero emissions," we would actually have to find ways to remove carbon from the atmosphere. Then they asked themselves, what was the best way to do that? And the obvious answer was trees—the 31.7 billion trees already growing in New England.

That's why New England Forestry Foundation—the organization with the longest history and broadest experience in sustainably managing forests across New England—now has a critical role in helping solve the climate emergency. We've known since our 1944 founding that certain forestry practices make forestland more productive—that is, help the trees to grow more wood on a given acre of land over time. It has always been our mission to bring excellence in forestry to all New England forests to improve wildlife habitat, water quality, air quality, recreational opportunities, and valuable forest products. But what could we accomplish if we applied our mission to climate change? Our first step was to pull the data from decades of management on the more than 150 Community Forests that NEFF owns. This historical data

Photos by Lauren Owens Lambert.

confirmed that over decades, NEFF has increased the timber and carbon stocking in the forest while harvesting valuable, renewable, climate-friendly products. We had already proven the concept; the data is in our files, and the proof is in the woods.

Then we turned to the forestry and wildlife ecology experts to help us codify the practices that have enabled us to achieve these exceptional results. We needed a set of standards that could be easily followed by other landowners and that we could use to model and predict the impact on climate change if they were applied broadly across the region. NEFF calls them Exemplary Forestry standards.

Next, we turned our attention to the sustainable wood products we could harvest from New England forests as they are managed to store more carbon. There aren't that many materials you can use to construct buildings. Wood is one of them, but concrete and steel became the favorites for tall building construction over the last 100 years. Unfortunately, these materials are the bane of climate change mitigation because manufacturing them emits a tremendous amount of carbon pollution. If we continue to build that way, we can never solve the climate problem. There are new techniques in use in other parts of the world that used engineered wood products to build tall buildings. Couldn't we use the same techniques right here in our New England cities, with regionally produced wood? We studied the problem and the answer was: yes, we could.

Then the proverbial light bulb went on: what if we managed New England forests according to Exemplary Forestry standards and used some of the products to build tall wood buildings? Couldn't we improve our forests, perhaps help the affordable housing crisis and contribute to climate mitigation all at the same time?

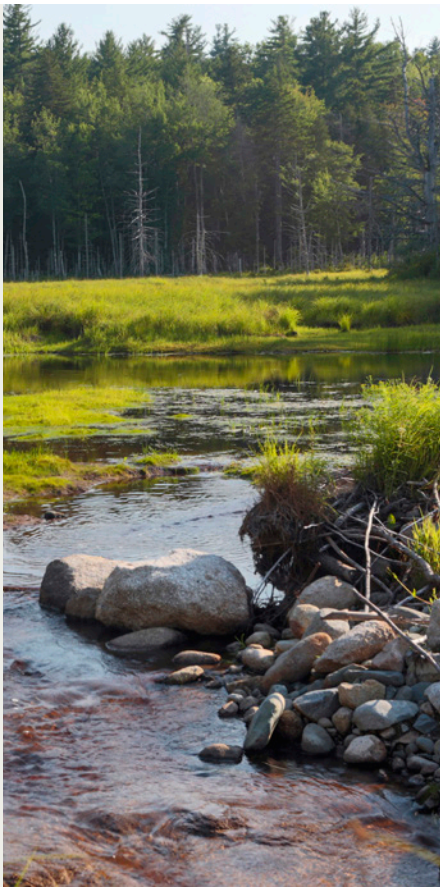
We ran the numbers this year, and the results are stunning. This approach—using local wood grown under Exemplary Forestry to construct tall wood buildings—paired with halting the loss of forests to development could potentially contribute 30 percent of the entire energy-related emissions reductions needed in New England over the next 30 years. It could help the entire region achieve its short-term targets to keep us from frightening climate tipping points and also hit the longer-term target of "net zero" emissions by 2050.

THE "30 PERCENT SOLUTION"

NEFF's suite of Exemplary Forestry and climate initiatives can move forward in tandem with wind, solar and other approaches. It will require cooperation among the New England states, but we have done that before on other issues. There are 215,000 private New England forest landowners who are ready to help. They will need information and financial incentives to make the transition to climate-smart forestry practices. It is as if we have 31.7 billion carbon-eating machines just waiting to be turned on, one after the other. We don't have to wait for a new technology to be invented to suck carbon out of the air. We already have trees, forests and willing landowners. We can start fighting climate change today, in a big way. The ultimate result can be a win for the forests, a win for affordable housing, a win for rural jobs and a win for New England in the battle to fight climate change.

Throughout its history, NEFF has achieved some remarkable milestones, including introducing professional forest management services to landowners, protecting and stewarding the largest working forest conservation easement in the country, and conserving one out of every three acres of New England land protected this century. Putting New England's forests to work to help solve the climate crisis is our next goal, and the stakes have never been higher.

Society needs a clear path to mitigate climate change from our forests in the next five years, and NEFF has launched our new Exemplary Forestry Center to make that happen. It is through the work of the Center and its multiple partnerships with conservationists, landowners, foresters, architects, builders and urban activists that we hope to revitalize our forests and keep the region and planet safe from climate change.



A NEW CLIMATE WEDGE

How much carbon dioxide can New England forests remove from or keep out of the atmosphere?

WRITING BY NEFF Chief Operating Officer Frank Lowenstein, and NEFF Climate-Forest Specialist Jen Shakun

NEFF conservation and stewardship staff members explore a new NEFF Downeast Maine property. Photo by Lauren Owens Lambert.

One hundred and seven years ago this spring, the Titanic sank after hitting an iceberg. The story of the sinking shows the consequence of too much inertia and action taken too late. If we have the Titanic stand in for the planet, what does this scenario reveal about climate change?

Society's lookouts—the scientists who have studied the world's climate—are warning us daily of the danger dead ahead from unchecked climate change. But on the bridge of the ship, corporate and government policymakers who shape the economy have been slow to act and turn away from danger, and momentum in both the economy and the global climate system itself will carry us closer to danger even once decisive action begins. NEFF's work offers an opportunity to change direction quickly and put our region's forests to work on perhaps their most important mission ever—maintaining a safe and healthful climate.

NEFF recognizes the biggest climate benefits will come from a holistic approach that combines land conservation and climate-friendly forestry with the substitution of wood products for materials that would require larger carbon emissions to produce. The Exemplary Forestry Center expands on NEFF's historic legacy of forest conservation and Exemplary Forest management to include new programs that promote regionally-grown wood as the foundation of an economy that does not require continual mining and burning of new raw materials. Use of bio-based materials in place of non-renewable materials like steel and concrete can enable a healthy, rewarding lifestyle for New England residents for centuries to come, creating what is called a circular economy. For example, NEFF's Build It With Wood program focuses on reducing carbon dioxide pollution by replacing concrete and steel construction with mass timber in the Northeast, while the Forest-to-Cities Climate Challenge aims to develop the partnerships that will link this new timber construction with climate-friendly forestry.

NEFF is expanding its efforts to implement forest-based climate solutions, and this raises the questions: How much carbon pollution could New England save by fully leveraging the

power of the region's forests in this way? And how far would that get the region toward the emission reduction targets needed to avoid the worst consequences of a changing climate?

NEFF staff recently completed an analysis of these critical questions. Answering them involved taking previous studies conducted by NEFF and others, and synthesizing them to create new insights, as no one had yet quantified the total carbon benefit that could be achieved by combining four key approaches across all of New England: no net loss of forests, spreading Exemplary Forestry, replacing steel and concrete with low-carbon construction, and storing carbon in wood buildings.

All told, our analysis of both the in-forest and building sector components suggests NEFF's holistic approach to addressing climate change could keep more than 646 million metric tons (0.65 gigatons) of CO2 out of the atmosphere over the next thirty years, with the practice of Exemplary Forestry contributing the lion's share of the savings. So how big is that relative to the total pollution reduction we need to achieve in New England by 2050? The answer is: It's big! It represents nearly one-third of the total energy-related CO2 emissions—meaning, emissions from the combustion of fossil fuels—we need to eliminate over the next several decades, an impressive contribution from a single sector. And it would simultaneously improve wildlife habitat, help protect air and water quality, allow continued forest recreation on treasured landscapes, and improve the quality and affordability of urban housing. Nice!

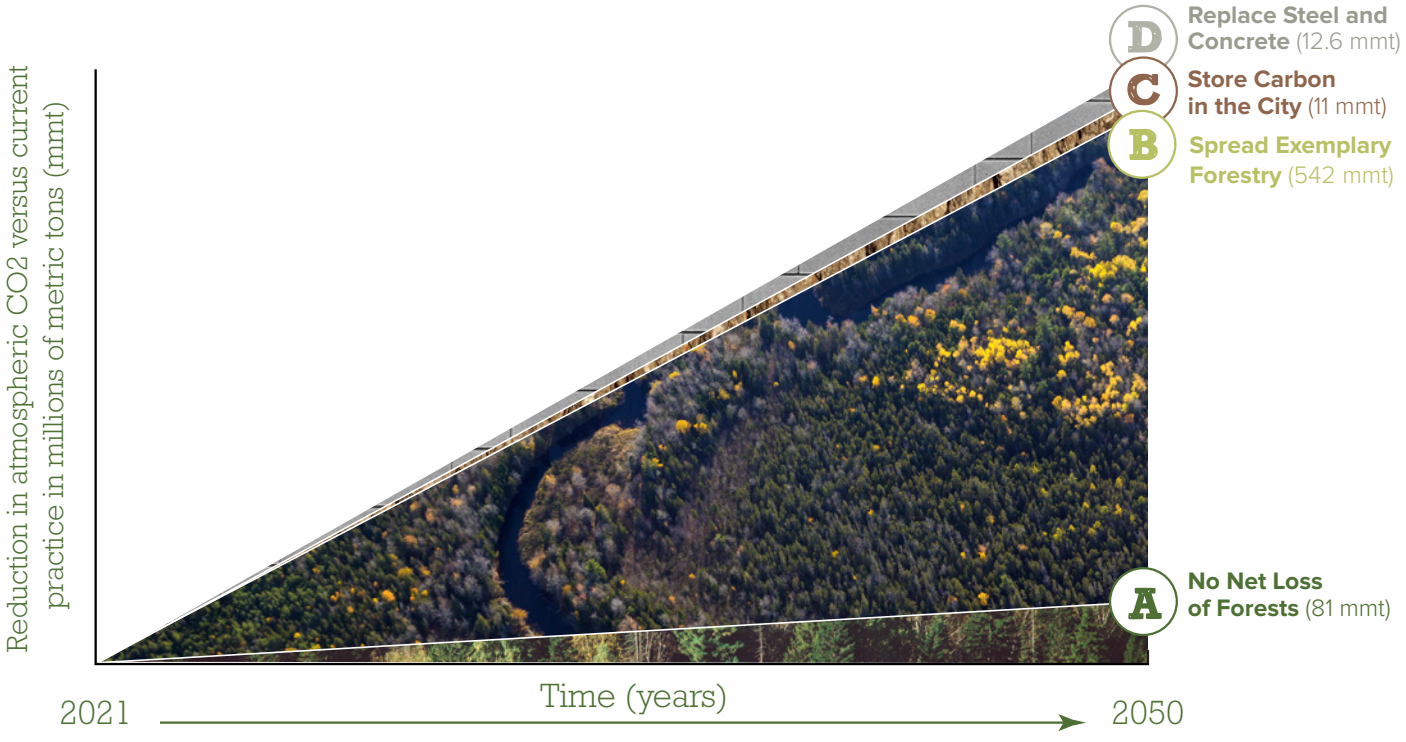
The Science Behind the Wedge

NO NET LOSS OF FORESTS

We first considered the carbon emissions prevented by keeping forests as forests and curbing the on-going loss to development, which is the biggest threat to forests in our region. Each year, more than 28,000 acres of forest are converted to solar fields, homes, commercial complexes, or some other use. When that happens, most but not all of the trees are lost and roughly 60 percent of the carbon dioxide stored in the plants and soil of the forest is released into the air, when root systems, trunks, branches, dead wood, and the litter on the forest floor begin to rot. Since, on average, each acre of New England forest stores 160 metric tons of carbon dioxide (not including carbon dioxide stored in soils), preventing clearing of forests for development could save 81 million metric tons of emissions over thirty years. Loss of forests to development not only causes these direct carbon emissions, but it also destroys the potential for the forests lost to development to store carbon into the future. This future potential of the forest is not included in the 81-million-ton estimate.

SPREAD EXEMPLARY FORESTRY

Next, we examined the working forest landscape and considered how much more carbon our forests could store, if forest management improved to reflect Exemplary Forestry standards, while maintaining harvest levels in order to



avoid simply forcing our harvests to some other part of the planet, a process called carbon "leakage."

NEFF's Exemplary Forestry standards call for an average stocking of approximately 25 cords of merchantable wood per acre on managed forest lands, based on extensive modeling for the Northern Hardwood and spruce-fir forest types in the Acadian Forest and preliminary analysis for the Central and Transition Hardwood forests of southern New England. Using Forest Inventory and Analysis (FIA) data—a long-standing forest monitoring effort led by the US Forest Service—NEFF staff identified a handful of northern New England counties with approximately this stocking condition that can be used as a proxy for Exemplary Forestry. They found that the average acre of state forestland owned and managed by the State of Maine in these counties contains approximately 167 metric tons of CO2e (not including soil organic carbon). Also using the FIA data, NEFF found that in sixteen New England counties, the average stocking across privately owned forest land is less than this Exemplary Forestry benchmark. The difference between existing carbon storage in these counties and the ideal benchmark condition reveals the carbon storage opportunity, which amounts to roughly 542 million metric tons of carbon dioxide that could be stored in living forests by implementing these standards.

REPLACE STEEL AND CONCRETE WITH LOW-CARBON CONSTRUCTION, STORE CARBON IN WOOD BUILDINGS

Finally, we turned our attention from the forest to the built environment to consider the potential carbon benefit from replacing energy-intensive concrete and steel construction with mass timber buildings. The benefit will depend on how much new construction happens over the next thirty years, how much of that new construction will be steel and concrete that could instead be mass timber (which depends on building codes, common building typologies, cost, and other trends in the building sector), and the carbon emissions of these different building sector trajectories. There is inherently some uncertainty in future economic and population trends, and NEFF is attempting to synthesize many different factors into one analysis, which creates further potential complications. However, NEFF staff members were able to generate an initial, conservative estimate of the potential by relying on recently published data and making some necessary simplifying assumptions.

To determine how much new construction we might anticipate over the next thirty years, we first turned to the Building Sector Technical Report of the *Massachusetts 2050 Decarbonization Roadmap Study,* which includes estimates of future residential and commercial square footage by decade through 2050. By narrowing to the relevant building types, we generated an estimate of the total square footage of residential and commercial building space that is unlikely to be made with wood in Massachusetts under a business-as-usual scenario, but that potentially could be made with mass timber.

Total carbon emissions and carbon storage for new construction were calculated following the methodology of a global study published in 2020 by researchers from Yale University, Potsdam Institute for Climate Impact Research and Tsinghau University (Churkina et al. 2020; Buildings as a global carbon sink. *Nature Sustainability*. 3:269-276.). This study provides estimates of the amounts of different materials that are used per square foot to build steel and concrete and mass timber buildings, as well as the associated emissions for those materials.

The carbon storage provided by wood buildings is most climate-beneficial when the material is sourced from harvests that predominantly remove trees that would otherwise have died in the near-term and released a portion of their carbon back to the atmosphere through decomposition. Otherwise, a portion of this storage represents simply

NEFF's Acadian Exemplary Forestry standards call for management of specific proportions of the landscape for two umbrella wildlife species—the American Marten and Canada Lynx (pictured)—whose habitat needs encompass the needs of many other species.

From top to bottom: UMass Amherst's John W. Olver design building exterior, photo by Alex Schreyer. Olver lobby, photo by Albert Vecerka/Esto.

a transfer of carbon from the stump to the city rather than an increase in the total amount of carbon stored safely out of the atmosphere. It is likely that current and future harvest activity will be capturing potential forest mortality in this way because there is evidence that the level of disturbance-related forest mortality has increased globally over the last several decades and this trend is likely to continue as the climate warms (Seidl et al. 2017; Forest disturbances under climate change. *Nature Climate Change*. 7:395-402.), including disturbance from extreme heat, drought, wildfire, and changes in pest and disease outbreak frequency and severity. These trends put some portion of the carbon stored in forests today at risk, making our ability to capture carbon in harvested wood products an especially useful climate mitigation tool.

To determine the potential carbon benefit we could achieve by substituting mass timber for steel and concrete in future construction, we compared the carbon emissions and storage under a business-as-usual scenario where mass timber remains relatively uncommon (only 0.5 percent of new building stock) versus a future in which mass timber is the go-to material of choice for mid- and high-rise construction (90 percent of new building stock). These estimates were based on growth projections specific to Massachusetts, so the final step was to extrapolate these results to the rest of New England. This was accomplished by using relative state Gross Domestic Product (GDP) as a proxy—making a simplifying assumption that future growth will be proportional to present-day GDP in each state. This preliminary analysis suggests that over the next thirty years in New England, 11 million metric tons of CO2e could be stored in wood buildings and another 12.6 million metric tons of CO2e would be saved by avoiding emissions from the production of steel and concrete.

It All Comes Back to the Woods

Most of the benefits represented by NEFF's climate wedge come about through improving the quality of forest management. Currently, particularly in northern New England, there are substantial areas of forest that are "understocked." This means there are not enough tree leaves (or needles for conifers) hung out to take advantage of the sunlight reaching the land. Some portion of the trees' remarkable ability to suck carbon dioxide out of the air and combine it with water to create wood is going to waste. Exemplary Forestry aims to ensure full stocking of high-quality growing stock at the landscape scale, so that we can maximize the amount of solar energy captured and turned into wood, and ensure that the wood that grows is as useful as possible for climate mitigation. It simultaneously aims to ensure other important societal goals are met—like protecting soil, providing wildlife habitat, and cleaning air and water for use by people and wildlife. It's an important solution to a wickedly difficult problem, and without NEFF's three-quarters of a century perfecting the approach, we would not be able to offer it to society.

NEFF's work offers an opportunity to change direction quickly and put our region's forests to work on maintaining a safe and healthful climate for the good of all. NEFF's new Exemplary Forestry Center will ensure this holistic approach takes hold. Want to get involved? Start by signing NEFF's Forest-to-Cities Climate Challenge pledge at **foresttocities.org/pledge** and help us halt the climate crisis.

Pioneering Climate-smart EXEMPLARY FORESTRY in New England

WRITING BY NEFF Senior Forest Science and Policy Fellow Alec Giffen, NEFF Communications Manager Tinsley Hunsdorfer, NEFF Chief Operating Officer Frank Lowenstein, and NEFF Executive Director Bob Perschel

New England Forestry Foundation has set a bold goal for its Exemplary Forestry Center: provide 30 percent of the carbon dioxide emissions reductions needed in New England. Good thing NEFF also has a bold solution to bring to the table: Exemplary Forestry, the gold standard of sustainable forest management and the strategy that distinguishes NEFF's climate-solutions work from related approaches.

While improved forest management is gaining recognition as a way to increase forests' climate mitigation impact, NEFF is the only organization to actually chart a path forward by producing climate-smart forestry standards for the entire New England region.

NEFF's forest management delivers high carbon stocking, forest productivity, wildlife habitat and other benefits. Articulating these practices as a set of standards allows us to apply them to the climate crisis by offering an easily understood approach that assures short-term climate performance; it also allows us to model the climate benefits that could be achieved if policy and incentives were aligned with landowners' needs to help address the climate crisis.

In addition to protecting the ecosystem services forests provide—like soil conservation and clean water—Exemplary Forestry is designed to accomplish three goals: mitigate climate change, improve wildlife habitat and biodiversity, and grow and harvest more sustainably produced wood.

Exemplary Forestry outlines the highest standards of sustainability currently available to New England forest owners for these critical goals, which is just one of five ways the approach distinguishes itself. Unlike all other sustainable forest management approaches, Exemplary Forestry aims for specific, quantitative outcomes in terms of forest productivity, stocking and size-class distribution; its standards are direct and easy to understand; it takes the wider landscape into account when determining how to manage specific land parcels; and it maintains or increases managed forests' carbon stocking over time.

HOW THE STANDARDS WORK

NEFF's Acadian Forest Exemplary Forestry standards were published in 2018, and the Central and Transition Hardwood standards will be fully ready this summer. Both sets are built around one to two pages of measurable outcomes backed up by references to best practices and manuals for how to achieve those outcomes. For example, the standards specify:

- Annually growing at least a half-cord/acre, and harvesting an average of at least a half-cord/acre per year*
- Continuously improving the quality of forest stands
- Achieving a stand size class distribution optimized for the combination of timber production and protection of biodiversity
- Growing tree species well suited to each site
- Management of specific proportions of the landscape for umbrella wildlife species whose habitat needs encompass the needs of many other species

Exemplary Forestry balances a given forest tract's management with that of nearby lands, so as to create an entire landscape that meets Exemplary Forestry's habitat goals. This means that as a landowner makes decisions about when and where to harvest, for example, they would consider the overall availability of certain habitat types and corridors in their region.

REDEFINING SUSTAINABLE FORESTRY

The concept of sustainable forestry has evolved over time, from an early focus on sustained wood production to a modern approach that encompasses the management of forests for a broad array of values, from ecosystem services to biodiversity, ecological resilience, and equity of access to forest resources. The climate emergency demands an expanded definition of sustainable forestry that includes a new and robust set of goals and outcomes that ensures forests play as large a role as possible in mitigating climate change. Look for NEFF's paper on this topic—and our proposed definition—by fall 2021 on our website.

As noted on page 7 of this newsletter, detailed modeling of the Acadian standards' results shows Exemplary Forestry management can, over time, dramatically improve the quality of residual stands, increase both the volume and value of harvests, and dramatically increase in-forest carbon stocks.

NEW ENGLAND FORESTRY FOUNDATION

NEFF's forestry experts have distilled the Acadian Forest Exemplary Forestry practices into an overview that describes how they should be implemented and lists standards and metrics. Most of this overview is included below, but the complete document and its citations are available at **newenglandforestry.org/learn/initiatives/exemplary-forestry**

DEFINING EXEMPLARY FOREST MANAGEMENT IN THE ACADIAN REGION

These guidelines are intended to be implemented in the context of the landscapes where NEFF's lands occur. Thus, for example, one kind of habitat may be missing in a particular landscape and quite a different habitat in another landscape. Likewise, maintaining connectivity between habitats across the landscape is also important and will influence implementation on any given parcel. In addition to implementing these standards, NEFF intends to maintain dual third-party certification of its lands. With these understandings, Exemplary Forestry includes:

IMPLEMENTING ADVANCED SILVICULTURE
Practicing forestry which results in:

a. Continuously improving forest stands over time in terms of both quality and quantity.

b. Conditions which are well suited to the umbrella wildlife species known to be representative of the habitat needs of more than 75% of native species.

Umbrella Wildlife Species	Percent of Landscape	Forest Stand Condition Described
American Marten	16%	Blocks of at least 640 acres that are at least 80% stocked at over 80 ft² of basal area per acre (approximately 16 cords/acre)
Canada Lynx	27%	Even-aged blocks ≥15 acres in size, which are regenerated to spruce and fir on a revolving schedule.

c. A diverse size class distribution of 5-15% of stands in seedlings, 30-40% in saplings and poles, 40-50% sawtimber (including 10% of the total area in large diameter multi-storied stands—note 9% of NEFF's existing lands are, or will become, such stands over time).

IMPLEMENTING BEST MANAGEMENT PRACTICES
Employing accepted "Best Management Practices" to protect soils, riparian and aquatic habitat, special habitats, wildlife trees, and more.

CLIMATE CHANGE
Addressing climate change as the knowledge base becomes available, and increasing the resistance and resilience to, adaptation for, and mitigation of, climate change. This includes but is not limited to using forests and forest products to sequester more carbon, and substituting forest products for steel and concrete, thereby reducing greenhouse gas emissions.

DIVERSIFYING MANAGEMENT APPROACHES
To the extent that site conditions and the landscape context allow, NEFF intends to manage significant portions of its properties using both the even- and uneven-aged management approaches.

AESTHETICS

UMBRELLA WILDLIFE SPECIES

NEFF's Acadian Exemplary Forestry standards are based on the habitat needs of two wide-ranging Acadian Forest species—the American Marten, which needs blocks of mature forest of at least 640 acres, and the Canada Lynx, which needs smaller blocks of regenerating forest. They are deemed umbrella species because forests managed to protect their habitat will collectively benefit more than 75 percent of other vertebrate wildlife.

To meet the habitat needs of the full range of native species, the Central and Transition Hardwood standards call for the protection or creation of three habitat types: relatively mature interior forest, early successional forest, and edge and transition-stage forest. As we examined the scientific information available about this region, we discovered that instead of one umbrella species per habitat type, a group of species would function more consistently across the region. For example, for mature interior forest, we plan to manage for the habitat needs of Scarlet Tanager, Wood Thrush, Black-throated Blue Warbler and tree-dwelling bats.

*Most of NEFF's Exemplary Forestry management strategies schedule harvests on average every 15-25 years.

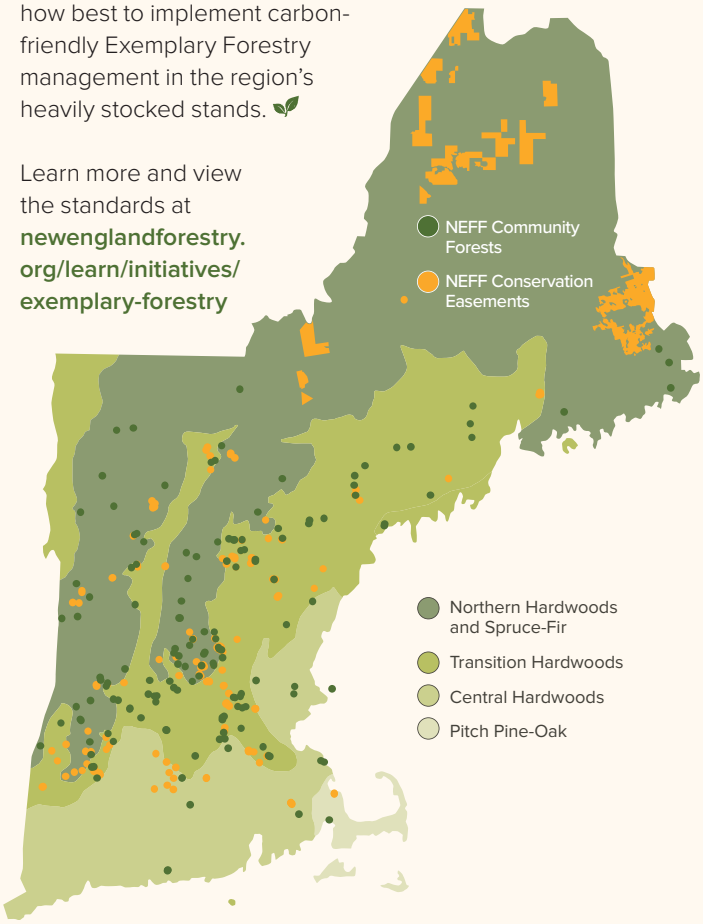
EXEMPLARY FORESTRY HEADS SOUTH

NEFF's second set of Exemplary Forestry standards is tailored to Central and Transition Hardwood forests, which dominate southern and central portions of New England.

Transition Hardwood forests are found between Acadian Forest types—spruce-fir and Northern Hardwoods—and Central Hardwood forests, which are common through West Virginia, Pennsylvania and other Appalachian states and reach the northernmost point of their range in New England. Climbing Mount Mansfield in northern Vermont, near NEFF's Morrison Memorial Forest, demonstrates Acadian types: hikers head up through Northern Hardwood forests and then reach spruce-fir before emerging above the tree line. The Wapack Trail, which crosses NEFF's Lincoln Davis Memorial Forest in southern New Hampshire, runs almost exclusively through Central and Transition Hardwoods.

Forest type isn't the only major difference between NEFF's two sets of Exemplary Forestry standards: Many southern New England stands have twice as much timber volume per acre as those in portions of northern New England. NEFF is now determining how best to implement carbon-friendly Exemplary Forestry management in the region's heavily stocked stands.

Learn more and view the standards at **newenglandforestry.org/learn/initiatives/exemplary-forestry**



PUTTING NEW ENGLAND'S WOODS TO WORK

WRITING BY Maine Mountain Collaborative Executive Director Bryan Wentzell (Exemplary Forestry Investment Fund) and Alec Giffen, Tinsley Hunsdorfer, and NEFF Landowner Outreach Manager Lisa Hayden

Photo by Lauren Owens Lambert.

NEFF has completed one set of Exemplary Forestry standards, and has a second nearly ready for publication. Learn how we're beginning to put them to work across the region, while also championing the sustainable wood these standards produce as a replacement for other more energy-intensive building materials.

Now that we've examined Exemplary Forestry itself, we'll be taking a close look at how it ties into the Center's new Exemplary Forestry Investment Fund, as well as with several other interesting projects, one each from four of the Center's key program areas: innovative conservation finance, policy, science, and outreach and coalition building.

Communications, our fifth key program area, has been making progress through projects like Prince Charles' RE:TV video platform, which featured Exemplary Forestry as an example of sustainability innovation (**re-tv.org/rebalance/restoring-woodlands**), but we won't be highlighting a Center communications project below, as you are already holding one in your hands.

A number of our Center's initiatives are already well-known to NEFF readers, but visit **newenglandforestry.org/learn/initiatives** if you'd like to learn more about our Forest-to-Cities Climate Challenge, Build It With Wood, Pooled Timber Income Fund, Western Maine Habitat Restoration, and Landowner Outreach initiatives. They all have a crucial part to play in spreading the implementation of Exemplary Forestry and building support for sustainable tall wood buildings.

Exemplary Forestry Investment Fund

INNOVATIVE CONSERVATION FINANCE

NEFF's Exemplary Forestry management practices are a fundamental tool, but how do we take them to scale across a landscape that is largely privately owned? For many large private landowners in the industrial forests of New England, financial constraints limit their ability to shift their forest management approach. Enter the Exemplary Forestry Investment Fund (EFIF), which is slated to launch in early 2022. Focused initially in the Mountains of the Dawn region of western Maine, the EFIF will be a new, privately held long-term timber investment fund that applies Exemplary Forestry standards on large tracts of forests. Initially conceived of by NEFF alongside its early work on the Exemplary Forestry standards, the EFIF is now being jointly developed by NEFF, the Maine Mountain Collaborative (MMC), and Quantified Ventures to attract investors who are interested in both long term, stable investment, and quantifiable environmental results.

The goal of the EFIF is to attract private "impact" investment funding to improve Maine's forests and achieve conservation

outcomes. “Impact investing” refers to investing that seeks positive social and environmental outcomes and also a financial return. While large public land acquisition or changing Maine’s forest practices laws are two ways to alter management practices across a landscape, the economic, cultural and political history of this landscape leans heavily toward private land ownership and away from government intervention. The EFIF is a tool that relies on private investment and private land ownership.

Trees in New England take a long time to mature—whether to become valuable saw logs, provide quality habitat for wildlife, or sequester large amounts of carbon—and patience and careful management are needed to realize the full suite of financial and environmental benefits Maine’s forests can provide. Starting from today’s average forest condition in western Maine, the timeline needed to increase forest growth rates and timber quality are simply not profitable for short-term investors. Unfortunately, some forests in northern New England are seeing the results of forest management that has prioritized short-term financial return, which has produced poor age class diversity, poor stand quality, and stocking below the regional average; the regional average is 15 cords per acre, and NEFF’s standards increase stocking to 25 cords per acre.

NEFF’s intent from the beginning has been to create a forest investment strategy that is attractive to patient investors and ensures forest management that realizes the potential of Maine’s forests for long-term benefits, including climate mitigation. The EFIF seeks to create the necessary financial incentives to allow the landowner and foresters to make long-term management decisions.

The model relies on private philanthropy supporting the goals of the Exemplary Forestry Investment Fund through purchase of conservation easements on lands acquired by the Fund. The revenue received by the Fund for the sale of the easements, along with sale of carbon credits, will provide a return to investors in the initial decade or more while the forest is restored to the point where it can produce more than usual amounts of high-quality timber on an ongoing basis.

EFIF GOALS FOR BUILDING A CONSERVATION & CLIMATE LEGACY:

- Create a for-profit long-term timber investment fund
- Conserve 100,000 acres under Exemplary Forestry management in the largest intact temperate forest in eastern U.S.
- Reach the landscape’s potential for timber productivity, volume, and quality
- Sequester upwards of 30 MtCO2e per acre more than present levels, producing third-party verified carbon credits that can be sold for additional revenue
- Increase timber stocking to 25 cords per acre or almost 50 percent more than current levels
- Access new sources of capital by connecting project outcomes to a wider network of stakeholders

The EFIF will be managed by investment and forestry professionals, with the on-the-ground operations handled by a highly respected forest management company. Adherence to the Exemplary Forestry standards will be assured through the oversight of a Board of Managers that will include representation from the Maine Mountain Collaborative along with forestry, conservation and investment experts.

The Exemplary Forestry Investment Fund is particularly well suited for investors with a long-term perspective for at least a component of their portfolio; who want to see their dollars bring about substantial and measurable environmental benefits in a globally significant forest and mountain region; who are interested in addressing climate change, particularly those that can use the carbon storage benefits derived from the EFIF’s forest holdings to benefit their own objectives; and who value the stability and countercyclical nature of forest investments.

The EFIF has begun seeking impact investment capital for forestland acquisition up to 100,000 acres, and raising the corresponding philanthropic funds to acquire conservation easements across this acreage. Once this proof-of-concept acquisition is in place, the fund could be expanded to a larger portion of the landscape.

Last year, the EFIF received a boost with a two-year grant from the Innovative Finance for National Forests Program. This program—a partnership of US Forest Service National Partnership Office, National Forest Foundation, and the US Endowment for Forestry and Communities—funds innovative private investment approaches that can tackle the critical restoration work needed to keep both public and private forests healthy and productive. NEFF and MMC also partnered with Quantified Ventures—an impact investing firm that seeks innovative ways to fill capital needs for high-impact environmental, social, and health projects—to bring the fund to launch.

Rhode Island School of Design's North Hall, the first cross-laminated timber-steel hybrid residence hall in New England. Photo by John Horner, courtesy of Rhode Island School of Design.

State Climate Councils

POLICY

To help state governments meet their climate goals by using forests to help mitigate climate change, NEFF has been actively involved with both the Maine Climate Council (MCC) and the companion effort in Governor's Council on Climate Change (GC3) in Connecticut, and when appropriate, has brought Exemplary Forestry to the table as an example of a workable model for climate-smart forestry and a potential path forward.

In Maine, NEFF advocated for a program to encourage private landowners to increase carbon stocking on their lands while maintaining harvest. As follow-up, the Governor formed a task force specifically to address the issue of how to interest small landowners in increasing the carbon stored on their lands while maintaining harvest, and NEFF serves on this committee. NEFF also advocated for including recommendations to lower the emissions from new building construction over time, and this concept is included in a number of places in the report of the MCC. To review the report, visit **climatecouncil.maine.gov**

The Governor's Council on Climate Change (GC3) in Connecticut is vetting mitigation and adaptation policy recommendations. NEFF supported recommendations from the GC3's Forests Sub-Group for enhanced funding to conserve forests, a "no net-loss of forests policy" for Connecticut, and mitigation-focused forestry and production of "local, long-lived forest products."

The report references NEFF's redefinition of sustainable forestry as, "forest management that prioritizes mitigating and adapting to climate change in the next 30 years as a critical aspect of meeting the social, economic, ecological, and spiritual needs of current and future generations."

NEFF aims to ensure Connecticut—and all New England states—implement a systems approach to using forests in climate solutions. Forest conservation, Exemplary Forestry and substitution of mass timber for steel and concrete in building construction should be building blocks that will help the states meet climate goals in the crucial coming decade.

New Criteria for Life Cycle Analysis of Mass Timber Buildings

SCIENCE

Life cycle assessment (LCA) is a tool to examine the comparative benefit to the atmosphere of different materials or products. Most life cycle assessments of mass timber construction to date ignore the loss of carbon in the forest when some of the trees are harvested. NEFF is conducting a new type of LCA that includes the in-forest impacts of harvesting the buildings' wood supply (e.g., reduced carbon storage in the forest) as part of the results. This new analysis is only possible if there are measurable, replicable forestry standards like our Exemplary Forestry standards. The results will not only help better understand the potential of mass timber construction as a climate mitigation tool, but also should shed light on the potential benefits of manufacturing cross-laminated timber (CLT) or other forms of mass timber in Massachusetts. The results will also shape our efforts to get regional wood grown under Exemplary Forestry standards to be used to make local mass timber products.

The Mass Timber Dialogue

OUTREACH AND COALITION BUILDING

New England Forestry Foundation has participated in the Mass Timber Dialogue since it began in fall 2020; this collaborative effort is convened by the State of Massachusetts, the Climate and Land Use Alliance, and ClimateWorks Foundation, and is facilitated by the Meridian Institute. It investigates how mass timber construction, including but not limited to CLT, could be effectively increased across the New England region to help mitigate climate change. Collaborators include people from state governments, experts in forestry, representatives of the conservation community, architects and mass timber experts.

The group has developed a report that acknowledges full optimization of climate benefits depends on the implementation of climate-smart forestry practices like NEFF's Exemplary Forestry standards. The report explains the benefits of mass timber, its current status, obstacles to increasing its use, and policy recommendations for actions that could be taken to increase its use. The essence of the report has been presented to Commissioners of key state agencies across the region and has been favorably received. NEFF and partners will now begin advocating for implementation of its recommendations.

HELP NEFF SOLVE THE CLIMATE CRISIS

NEFF's Exemplary Forestry standards are at the heart of our powerful 30-percent climate solution that can help avert climate disaster, but we need more voices and people in support of this approach, and we need to continue to build a coalition of individuals and organizations that support putting forests to work for the climate. NEFF's 30-percent approach is this generation's chance to use forests to save the planet.

You can help. We need your financial support—and we hope you will make a donation today—but we also need you to talk to your family, friends, and neighbors about the 30-percent solution, Exemplary Forestry and building with mass timber. If you believe in NEFF's mission and approach, please share your enthusiasm for our work with others. We need people to understand that conserving land is necessary and not enough. By putting forests to work and building with wood, we can do so much more to help the earth. And in the process, we can revive rural economies and provide improved habitat for wildlife.

The Scarlet Tanager is an umbrella species for NEFF's new Central and Transition Hardwood Exemplary Forestry standards.

Legacy giving can allow your support to extend even further.

Please also consider including New England's forests and NEFF in your estate planning. There are many ways that you can help protect forests and advance NEFF's mission while meeting your own financial and family succession goals, including through NEFF's Pooled Timber Income Fund. Contact Penny Flynn for more information: **pflynn@newenglandforestry.org**

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