INTO THE WOODS

NEW ENGLAND FORESTRY FOUNDATION | **WINTER 2017**

NEW ENGLAND FORESTRY FOUNDATION

Board of Directors

NEW ENGLAND FORESTRY FOUNDATION

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Dear Members and Friends,

"If I know song of Africa... does Africa know a song of me?"

I was a young forester marking timber during a New England winter when I first read "Out of Africa" and discovered Karin Blixen's beautiful short paragraph about relationship to place. The way she shifted the meaning of relationship from person to place intrigued me enough to mimic the paragraph to fit my own experience.

"If I know a song of New England, of the deer and the winter new moon lying on her back, of the cows in the fields and the calls of foresters in the woods, does New England know a song of me? Will the air over the mountains quiver with a color that I have had on, or the children invent a game in which my name was, or the full moon throw a shadow over the gravel of the stream that was like me, or will the eagles of the Connecticut River look out for me?"

New Englanders often say they truly love the change of seasons. Maybe that is because these transitions allow us to experience the same place so differently, and our connection to place becomes more indelibly ingrained in our beings. And the more one knows and loves a place the more one wants to protect it. Is that why the New England land conservation movement is so vibrant?

For foresters working in the woods day after day, the change of each season is gradually and acutely observed, felt, accounted for and adapted to. The first tint of a leaf turning color and it might be time to put the hat and gloves in the pack for the day. The first swirl of snow means hot soup for lunch.

When a forester works in the woods with others, the connections to place and people form even more complex interplays. That specific woodlot now has a richness of meaning and texture that goes far beyond trees.

When I managed small teams of foresters marking timber in the woods we developed a way of orienting ourselves when we couldn't see each other. We would simply yell, "YO." The other foresters would yell "YO" back and that was it—you knew where they were and continued marking. Recently I was in the woods walking with my wife Anne, who is a psychologist, when we became separated. A bit concerned, I yelled "YO." Silence. Now just a little alarmed, I filled my lungs and let out a loud second "YO." A short pause, and then from quite nearby I heard a very sharp and impatient, "what are you yelling about?"

I wish that everyone could be foresters in New England for at least a little while, that I could mark timber with you and we could yell with the joy of knowing a song of a special place.

Bob Perschel

Robert Perschel
Executive Director

Thank you for your continued support!

We hope you will consider NEFF in your year-end giving.
Every donation is important to New England's forests.

Karl Post

WILDLIFE IN WINTER

AN IN-DEPTH LOOK AT FOUR SPECIES FROM NEW ENGLAND'S NORTHERN FORESTS

WRITING BY Tinsley Hunsdorfer
PHOTOGRAPHY BY Larry Master

From frozen lakes to 24-inch snowfalls, New England's powerful winters bring dramatic changes to landscapes and ecosystems across the region.

Wild animals have three main options in the face of the region's legendary winters: migrate to more hospitable climes, find a cozy place to hibernate, or endure the season's often punishing conditions.

Those species that stay and withstand winter have adapted to deep snow, darker days, and extreme cold in fascinating and wondrous ways.

This article explores the seasonal adaptations and behaviors of four species found in New England's winter forests: the Eastern Moose, Canada Lynx, Great Gray Owl and Northern Hawk Owl.

Each winter, these species navigate forest ecosystems very different from summer's peaceful sun-dappled landscape. Tasks like finding a tree to shelter under are impacted by the season, as deciduous forests in winter are often colder than nearby coniferous ones. Wind and snow howl through leafless deciduous trees, while evergreens' dark needles and snow-covered boughs combine to form an insulating blanket.

All four animals grapple with challenges like finding food in these transformed and snow-ridden forests, but they go about the business of enduring the season in very different ways.

Keep reading to learn how the three predators—with their thick fur and feathers, their silent feet and wings—are well equipped for the coldest months of the year, while the herbivorous moose has a harder time coping with winter conditions.

Protecting Wildlife and Winter

NEFF's conserved forestlands protect wildlife by providing habitat and by serving as carbon stores, which help mitigate climate change. Climate change threatens northern wildlife like the Great Gray Owl as well as the very season of winter itself. New England would be the poorer for the loss of northern winters' many wonders.

See page 13 for more information about how NEFF is addressing climate change.

Eastern Moose

Scientific Name: *Alces alces americana*

Aquatic plants, or the lack thereof, lie at the heart of the Eastern Moose's winter struggles.

New England-based moose rely heavily on sodium-rich aquatic vegetation and other high-quality forage during warmer months. These resources disappear in winter, and so moose undertake a season-long battle to provide their immense bodies with sufficient energy when only lower quality, woody browse is available.

> Moose undertake a season-long battle to provide their immense bodies with sufficient energy.

In the fall, moose gear up for the lean days ahead by growing a thick winter coat and accumulating as much fat as possible. They metabolize this stored fat throughout the winter—and lose a great deal of weight in the process—to compensate for seasonal malnutrition.

Bull moose also save energy in winter by shedding their antlers, which can weigh up to 40 pounds. Carrying that much extra weight would be a poor use of already taxed energy reserves.

Moose have one more trick up their sleeve: Read about their winter diet below to see how moose's unusual leg movements help them find food in snowy weather.

A Moose's Winter Diet

Writing by Frank Lowenstein

Northern New England's woods in winter form a moose cafeteria. Our largest regional herbivore eats the twigs, buds and small branches of almost any shrub it can reach. One study in Maine that examined oven-dried moose dung found that moose consumed balsam fir, beech, hawthorn, poplar, maple and even poison ivy. Another study about what captive moose would eat when placed in wild settings found they consumed more than 100 different species of plants.

And no matter what is on the menu, moose eat a lot of it. They are estimated to consume anywhere from 20 to 60 pounds of twigs a day in winter. As a result, moose browse can have a major influence on how quickly forests regrow.

In landscapes where moose and North American Beaver are both abundant, moose will often browse extensively in open "beaver meadows," the grassy areas left behind when beavers temporarily abandon a dam after exhausting the food around it. Moose browsing can keep these meadows open for additional years, spacing out the return of beavers to their former pond, and perhaps even limiting beaver populations at a landscape scale.

To consume such vast amounts of food, moose rely on their ability to move around in deep snow. Unique joint construction allows moose to lift their legs straight up out of snow banks, which helps them move swiftly and efficiently even in deep snow. While this ability makes snow less of an obstacle to moose than to deer, they still prefer hard-packed surfaces like snowmobile trails when they can find them.

So, look out for nature's winter lawnmower when you're in the backwoods of northern New England.

Canada Lynx

Scientific Name: *Lynx canadensis*

Facing a fierce New England winter as a kitten is surely a daunting task, so it's a good thing Canada Lynx spend their first 9–10 months with their mothers.

This means that when kittens take their long, lanky legs and enormous feet out onto snow banks and slippery ice for the first time, they do so under parental supervision. This is what the youngsters were born to do, even if their steps are initially a little ungainly—lynx are true winter specialists.

In New England, the federally threatened Canada Lynx is found in the northern forests of Maine, New Hampshire and Vermont. This mid-sized cat primarily hunts Snowshoe Hare, so much so that lynx will only settle in territories that have established hare populations. They stalk and ambush hare and other prey from the ground even when there's deep snow cover; this is also a skill set passed onto juveniles by their mothers.

Several adaptations allow lynx to live in the harshest of conditions, including a dense winter coat and excellent night vision that serves them well when days grow short, but their feet are what really set the cats apart.

In New England, the federally threatened Canada Lynx is found in the northern forests of Maine, New Hampshire and Vermont.

Their snowshoe-like paws have an unusually large surface area relative to the lynx's weight, and they become even broader when the cat is on the move thanks to easily spread toes. Add in some thick fur between the toes, and you've got feet that move smoothly over soft, deep snow.

Balancing Lynx and Marten Habitat

Snowshoe Hares' preferred habitat is young and dense softwood forests, and where Snowshoe Hares go, Canada Lynx follow. In northern New England, this type of forest forms primarily as regeneration following harvests or large-scale natural disturbances. Young forests, with their abundant sunshine and generally higher summer temperatures, also provide foraging habitat for some insect-eating birds, including some that prefer to nest in mature closed-canopy forests.

These young forests and the harvesting that often precedes them are not ideal for all species, however. In an effort to protect habitat for a broad array of wildlife, NEFF and other regional organizations are focusing on developing a prescription for exemplary forestry. Exemplary forestry will continue to deliver the wood products society needs, while also providing a balance of forest management strategies to support the very different habitat needs of two key species: the Canada Lynx and the American Marten.

In contrast to lynx, marten need large tracts of mature forest and a latticework of tree cover, and their preferred habitat combined with that of the lynx represents a wide range of forest ecosystems. Forests that are managed to protect the habitat of both species will collectively benefit more than 75 percent of other forest mammals, birds, reptiles, and amphibians.

Owls of the Far North

Imagine walking at night on a solid crust of snow—one of those "bulletproof" crusts that will hold full-grown adults. Suddenly your flashlight catches a hint of movement, and a huge owl plunges down from above and punches through the crust to grab a mouse.

> What a remarkable sight Great Gray Owls and Northern Hawk Owls make when they spend the winter in local forests.

The Great Gray Owl, which employs this powerful hunting technique, and the Northern Hawk Owl are both adept at surviving incredibly harsh winters.

They live year-round in the boreal forests of Canada and Alaska, and their ranges extend as far north as the tree line—the very top of the forested world. They also have populations in the forests of Northern Eurasia, and in the case of the Great Gray Owl, the Pacific Northwest.

While they don't migrate to escape winter weather, they are known to wander and will sometimes relocate within their usual ranges in search of food.

Periodically, groups of these raptors go even further afield into the northern United States in wintertime movements known as irruptions or invasions that are triggered by food shortages. New England is a common touchdown point in these years, and what a remarkable sight Great Gray Owls and Northern Hawk Owls make when they spend the winter in local forests.

Great Gray Owl

Scientific Name: *Strix nebulosa*

Great Gray Owls are one of North America's tallest owls, reaching nearly three feet in height, but a great deal of their bulk is made up of feathers and they weigh less than the shorter but less-feathered Great Horned Owl. This added insulation, which can stand up to bitter cold, is just one of their several seasonal adaptations.

These birds' asymmetrical ear openings—the left is higher on the head than the right—help them hunt by sound alone, even if their prey is scurrying around under a thick layer of crusted snow.

When they make their move to grab prey with needle-sharp talons, they can reach rodents and other small mammals more than 15 inches below the snow.

Great Gray Owls have one other interesting way of interacting with hard snow. While they rarely walk on bare ground, they walk and even run easily on solid snow crusts.

Maxime Légaré-Vézina

Northern Hawk Owl **Scientific Name: *Surnia ulula***

Northern Hawk Owls illustrate one of the realities of researching species well suited to harsh conditions and remote wilderness: Scientists sometimes struggle to reach the animals in question, let alone study them.

Northern Hawk Owls' low population density in their usual range provides an additional challenge, and very few studies have been conducted about their breeding biology in the spring and summer in the far north. This means their southward irruptions provide a useful opportunity to observe the birds, though many questions remain.

One aspect of the species that is well documented is the reason for its name. Their behavior, flight profile and body structure are unusual for North American owls, and resemble those of some hawk species like the Cooper's Hawk—another forest raptor.

For example, Northern Hawk Owls have similar diets and hunting habitat to Great Gray Owls, but they depend more on eyesight than hearing for hunting, and hunt primarily in daylight. Their ability to spot prey up to half a mile away is beneficial in any season.

Their reliance on eyesight doesn't hold them back in winter. Their hearing is still sharp, and Northern Hawk Owls are able to locate and catch prey hidden up to about 10 inches under snow.

One major concern for wild animals that remain in winter-bound habitat is the absence of liquid water, and this is another area where Northern Hawk Owls have demonstrated season-specific skills. They have been observed eating snow after consuming prey and taking snow baths, two useful workarounds.

Avian Adaptations

Birds' bodies employ a variety of strategies to cope with cold. Here are a few examples that aren't specific to owls:

- Feathers provide better insulation than mammalian hair, and birds fluff them to create heat-retaining air pockets.
- Birds can reduce heat loss by constricting the flow of blood to their feet and legs, which aren't generally protected by plumage.
- A hibernation-like state called torpor allows some birds to conserve energy by lowering their core body temperature. Birds are inactive during torpor and only employ it for short time periods like cold nights rather than an entire season.

Karl Post

FEATURED COMMUNITY FOREST

HERSEY MOUNTAIN COMMUNITY FOREST

LOCATION

New Hampton / Sanbornton, NH

SIZE

3,256 acres

AMENITIES

Trails

Senic Vista

Nestled between the Pemigewasset River and the towns of New Hampton and Sanbornton, NH, Hersey Mountain's 3,256 acres of forestland are a mecca for wildlife, and its network of trails is a haven for hikers and naturalists alike.

In June 2007, the Northeast Wilderness Trust (NWT) and New England Forestry Foundation established a conservation easement that marked the completion of a decades-long endeavor to piece together what is now NEFF's largest community forest—Hersey Mountain.

A rigorous ecological survey completed in 2003 by Rick Van de Poll, Ph.D., found more than 20 natural communities and 42 vernal pools on Hersey Mountain. Including 68 acres of old growth forest and 513 acres of Significant Ecological Areas, this diverse habitat supports an incredible array of wildlife in addition to 419 plants species and over 330 species of fungi.

With these unique characteristics of the forestland in mind, NEFF worked with NWT and Sweetwater Trust to designate roughly 1,100 acres of Hersey Mountain as a working forest, and 2,100 acres as the Hersey Mountain Wilderness. This diverse management plan would protect and conserve the forest for future generations.

NEFF built on this management plan by completing its first-ever carbon

Kari Post

project in February 2016, when forest carbon offset developer Finite Carbon registered carbon offsets on Hersey Mountain Wilderness.

Individuals and companies can purchase offsets to compensate for activities that release carbon dioxide. The offsets recognize the climate benefits that trees and forests provide by capturing and storing carbon and thus reducing greenhouse gases.

"Part of our mission is to provide tools and resources for landowners throughout New England," explains Bob Perschel, NEFF's Executive Director. "Now that we've gone through the process of setting up carbon offsets, NEFF is better equipped to help landowners and land trusts incorporate this new revenue stream within their own management plans."

Just as working forests can provide a financial motivation to keep land forested, carbon offsets provide a similar incentive by helping relieve the financial burden of owning land. And at Hersey Mountain, carbon credits are a perfect compliment to the wilderness area.

31
Species of Mammals

5
Species of Reptiles

13
Species of Amphibians

5
Species of Fish

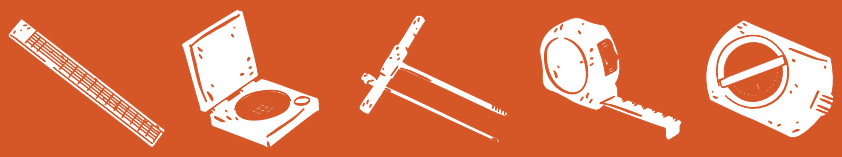
Visit Hersey Mountain

Visiting NEFF Community Forests like Hersey Mountain has never been easier. With our online Forest Finder Tool, you can navigate right to the trailhead using your mobile device. Go to **newenglandforestry.org/explore/explore-our-forests**, click on the forest you want to explore, and click "Get Directions." See you on the trail!

FORESTRY GADGETS

WRITING AND PHOTOGRAPHY BY Charlie Reinertsen

Smudges of blue paint, an orange vest, and a clipboard—the forester's uniform is a familiar sight for many New Englanders. But how many are well versed in the gadgets that help foresters do their job? From the increment borer to the clinometer, each instrument has been specifically crafted to learn more about every forester's greatest obsession: trees.



Here are a few of the tools you might find in a forester's vest, and how foresters use them in the field.

Clinometer

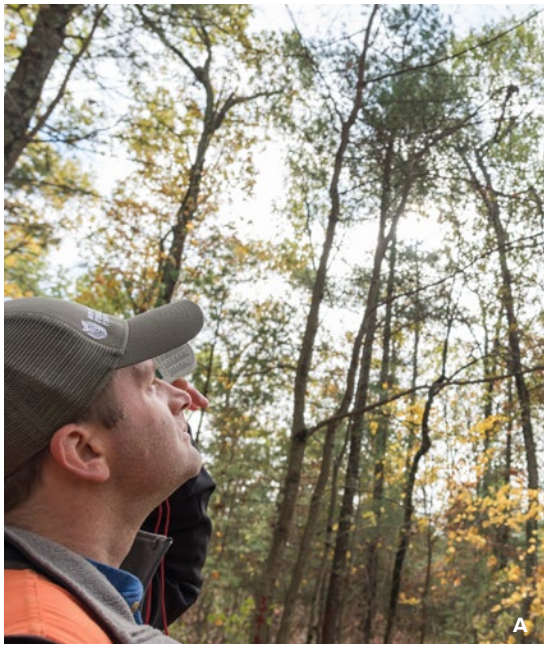
Short of chopping a tree down or climbing to the top with tape measure in hand, foresters must rely on indirect methods of measurement to approximate a tree's height. A clinometer, or device that measures angles, allows foresters to do just that. Clinometers vary in their design and sophistication—some are glorified compasses and simply measure angles that can be used to calculate tree height through applied trigonometry, while others instantaneously produce an estimate of tree height with advanced laser technology. Clinometers can also be used to measure the slope of a hillside, which can be useful when planning skid trails or management strategies.

Densiometer

How enclosed or open a tree canopy is will influence what tree or plant species will flourish on the forest floor, and how quickly it will grow. The less dense a canopy, the more light will hit the forest floor and encourage growth. Foresters use densiometers to estimate tree canopy percent cover. Simple in design, a densitometer is a convex or concave mirror that is divided into a grid. By holding the pocket-sized densiometer at arm's length, a forester can count the number of boxes in the grid that contain canopy, and then divide this number by the total number of boxes. This procedure is repeated multiple times in a given area, and the percentages are averaged together for an approximation of the canopy cover.

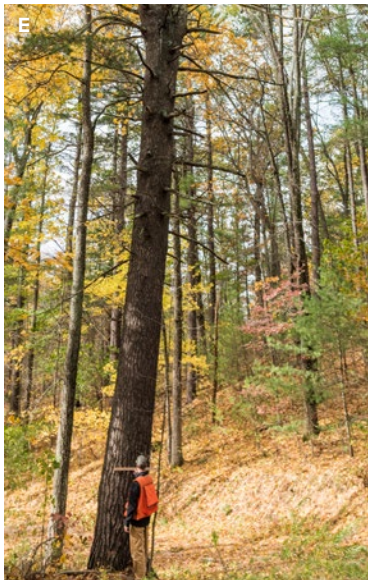
Biltmore Stick

While it might not fit in a forester's vest, the Biltmore stick continues to be a valuable tool in the forester's arsenal. This instrument allows a forester to produce a rough estimate of the board feet of lumber that a tree might produce. A forester simply holds the stick against a tree trunk at arm's length, and takes a reading from the calibrated numbers. While the Biltmore stick has its limitations, it provides a useful reference for what a forester can expect from a tree's harvest.



A. Chris Pryor, Director of Forest Stewardship, uses a clinometer to measure the height of a tree at 89 ft. **B.** Pryor uses D-tape to find the tree's diameter: 33.7 in. **C.** Pryor extracts a tree core using an increment borer. **D.** Pryor uses a Biltmore stick to estimate the volume of timber the tree would produce (roughly 1,400 board ft). **E.** Pryor inspects a white pine on Prouty Woods.

While this list of gadgets is by no means comprehensive (and some of these tools are used less frequently today than in the past), it does offer a window into the types of information foresters collect when surveying a forest. Using this information, foresters are able to write a management plan, prescribe harvests, and monitor forests over time to ensure the forest remains healthy and productive.



Diameter Measuring Tape (D-Tape)

To avoid time-consuming calculations in the field, D-Tape is designed to directly measure the diameter of a cylindrical object—in the forester's case, trees. With standard measurements of length on one side of the tape and diameter conversions on the other, D-Tape serves as the forester's cheat-sheet for obtaining a fairly accurate estimate of the tree's diameter. Combined with the tree's height, foresters can estimate the volume of wood in a given tree.

Increment Borer

Tree rings hold valuable information about the age of a tree and growth rates over time. An entire scientific field of study, dendrochronology, is dedicated to dating and analyzing tree rings. Until the late 1800s, tree rings could only be studied after harvesting a tree and preparing a cross section of its trunk. With the invention of the increment borer, foresters and scientists were given the ability to extract core samples from living trees, with little harm to the tree.

How does it work? The borer is made up of a hollow drill bit, typically 1/5" in diameter. The bit is connected to a long, hollow, metal shaft, which connects to a steel t-bar handle. Rotating the handle clockwise turns the bit and drives the borer into the tree. Once the borer reaches just past half of the tree's diameter, a "spoon" is inserted into the hollow shaft to help cut and remove the cylindrical core. After the core is removed, the bit is promptly reversed out of the tree to avoid binding.

Foresters study tree cores to age trees accurately, and to better understand how quickly trees are growing. This information can help the forester understand a site's growing conditions, which helps inform a more precise management plan for the forest.

NEFF TAKES ON CLIMATE CHANGE

WRITING BY Frank Lowenstein

Massive fires across the west. Three major hurricanes striking the United States in quick succession, including the most powerful Atlantic storm ever recorded. The first of the three—Hurricane Harvey—dropped 19 trillion gallons of water on Texas. To give a sense of scale, that would be enough water to raise the level of all of the Great Lakes by a foot.

As scientists have long predicted, climate change is driving greater extremes in our weather. And trees, a symbol of stability due to their long lives and durability, are both vulnerable in the face of climate change, and help to protect New Englanders from its worst impacts at the same time.

New England Forestry Foundation is working to address climate change with a three-pronged, tree-friendly effort:

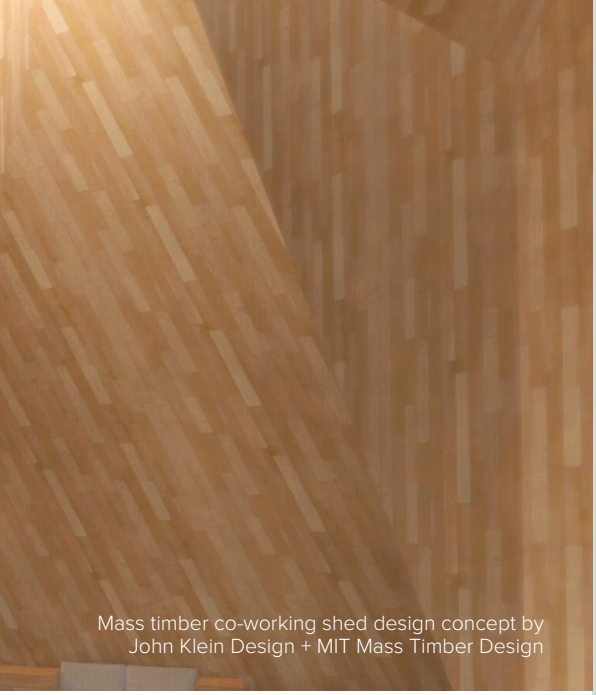
1. We're working to make sure that forests are put to work in the best possible way to minimize the extent and impacts of climate change,
2. We're working to pilot the best approaches to addressing climate change on our own lands, and
3. We're trying to make sure forest landowners have the information they need to manage their forests well in the face of climate change.

Forests play a critical role in the climate system, a fact long recognized by climate scientists. All plants draw carbon dioxide out of the atmosphere and convert it to carbohydrates. Trees are unique, however, in storing large quantities of carbohydrates, and therefore carbon dioxide, as wood. The carbon dioxide stored in the wood of two medium-sized trees is about as much as is emitted annually by a typical car.

Sustainable Timber

NEFF helps counteract climate change simply by conserving forests—and their carbon-storing trees—but we also want to ensure the wood harvested from forests is used effectively to reduce climate change. To this end, our Build It With Wood program aims to increase the amount of wood used in construction. Using new engineered wood products like cross-laminated timber (CLT) instead of steel and concrete reduces carbon emissions in construction by about three fourths. Additionally, tall buildings made from CLT are just as strong, just as fire resistant, and just as resilient in earthquakes as buildings made with steel and concrete.

Build It With Wood staff members are working with other experts to make a strong scientific case for using wood, are partnering with innovative architects and developers to consider using wood in specific New England buildings, and are encouraging investment in new CLT mills here in New England. Curious about what CLT looks like? If you're ever in the neighborhood of NEFF's Prouty Woods headquarters, you can come see two small residences constructed out of CLT by Harvard Graduate School of Design students.



Mass timber co-working shed design concept by John Klein Design + MIT Mass Timber Design

Landowner Collaboration and Outreach

NEFF is working with the conservation non-profit Manomet as part of their Climate Smart Land Network. The network is an alliance of landowners and managers working together to respond to the challenges posed by climate change. Manomet provides members with a monthly synthesis of up-to-date climate science research and information about how it applies to forests and forest management. Members meet periodically to share techniques and learn from each other's experience.

NEFF also partners with the USDA Forest Service, the MassConn Regional Conservation Partnership, American Forest Foundation, and others to bring information about climate change to the families and individuals who own most of the region's forests. We've trained foresters on climate impacts, developed outreach tools for landowners, and are now connecting these specially trained foresters with owners for woodland visits. These efforts are helping landowners in the MassConn region to practice climate-smart forestry. In the next twelve months, we'll be carrying these approaches to new landscapes of New England.

Create a Forest Legacy with New England Forestry Foundation

Your generous support has helped NEFF conserve 1.2 million acres of forestland and advance its conservation and exemplary forestry work.

Through legacy giving, you can extend that support even further while providing tax or other benefits to you and your loved ones. You can choose from many giving options, ranging from including NEFF in your will to more complex trust arrangements.

Over the last 24 months, NEFF has developed a new conservation option for landowners interested in legacy giving: **The Pooled Timber Income Fund (PTIF)**. The PTIF enables New England landowners to conserve their woodlands while receiving lifetime income, as well as tax benefits. Participation in the PTIF guarantees that a donor's woodlands would be protected and managed to NEFF's exemplary forestry standards. Not only would the forests be protected, but so too the environmental, social, and economic benefits they provide.

For more information, please contact Development Manager Penny Flynn:
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Ken Macgray

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