The New York Forest Owner

A Publication of The New York Forest Owners Association

For people caring about New York's trees and forests

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Searching for Old-Growth in New York State

Volume 61 Number 6

NYFOA
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In This Issue . . .

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The New York Forest Owner is a bi-monthly publication of The New York Forest Owners Association, PO Box 644, Naples, NY 14512. Materials submitted for publication should be sent to: ***Mary Beth Malmsheimer****, Editor, The New York Forest Owner, 134 Lincklaen Street, Cazenovia, New York 13035; Materials may also be e-mailed to mmalmshe@syr.edu; direct all questions and/or comments to jefffjosephwoodworker@gmail.com. Articles, artwork and photos are invited and if requested, are returned after use.* ***The deadline for submission for the January/February issue is December 1, 2023.***

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Cover: One of New York's Old-Growth Forest Network stands with true old-growth character at the College Lodge Nature Preserve in Brocton, NY, where eastern hemlocks nearly 450 years old have been identified. Photo courtesy of James Hoggard Photography. See story on page 4.

From The Executive Director

In Africa there is a fenced wilderness preserve. I imagine there is more than one, but there is a particular one that is famous for being the home of a large population of elephants. These elephants play an important financial role, as they are the source of revenue produced by ecotourism. This preserve had become a destination for people from all over the world to have the rare opportunity to be among these impressive, awe-inspiring creatures.

Things were going well; the elephants were thriving and business was booming. Over time, the elephants had grown to number around 30,000. A significant number indeed. This did not go unnoticed by the preserve managers, and they began to ask questions about herd management. So, they hired a consultant who was an expert elephant biologist to assess the herd and advise them.

The biologist reported that they had a robust healthy herd, but that the carrying capacity of the preserve was reaching its limit. The biologist explained that the next time they had a severe drought it would impact the landscape and result in significant mortality. The biologist predicted that losses could easily reach 50% or more if they did not take steps to reduce the size of herd. They were advised that through a controlled hunting program they should cull 7,000 elephants from the herd to stabilize it. The managers of the preserve were surprised by this information. After much consideration, they rejected the recommendation, deciding instead to just let nature take its course.

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The mission of the New York Forest Owners Association (NYFOA) is to promote sustainable forestry practices and improved stewardship on privately owned woodlands in New York State. NYFOA is a not-for-profit group of people who care about NYS's trees and forests and are interested in the thoughtful management of private forests for the benefit of current and future generations.

Join!

NYFOA is a not-for-profit group promoting stewardship of private forests for the benefit of current and future generations. Through local chapters and statewide activities, NYFOA helps woodland owners to become responsible stewards and helps the interested public to appreciate the importance of New York's forests.

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Searching for Old-Growth in New York:

A Conversation with Sarah RobbGrieco

By Jeff Joseph

At the time of Henry Hudson's arrival at the mouth of the river that now bears his name in 1609, the lands that would become New York State were almost entirely forested. While native peoples had populated this region for thousands of years prior, and had felled trees for fuel, shelter, tools, and crafts, and practiced understory burning to improve hunting habitat, the landscape had remained near monolithically wooded. Periodic disturbances such as hurricanes, floods, wildfires, and insect/disease outbreaks created only very small patches of regenerating timber in these dense, late-successional woodlands, which were assemblages of trees and associated flora and fauna that had co-evolved to a majestic state of maturity and biological complexity.

Despite the extreme human-wrought changes to this landscape in the succeeding centuries, there have been—by chance, design, or just luck—a small number of forest stands that have remained relatively intact, and so can serve as invaluable reminders of the potential of our woodlands when managed on a truly *long* time scale, and also—sadly—of what has been lost. Put simply, old-growth or 'primary' forests look different, feel different, and function ecologically *very* differently than the second growth forests that make up most of the wooded acreage in New York and throughout the northeastern U.S. today. In order to learn more about our remaining old-growth forest stands, I contacted Sarah RobbGrieco, who is the Northeast Regional Manager of the Old-Growth Forest Network. The following is a lightly edited version of our conversation.

Fischer Old-Growth Forest, Tompkins County, NY. Photo by Gathering Growth Foundation.

Thank you for your willingness to participate in this interview Sarah. To start, when was the Old-Growth Forest Network started, and what is its mission?

The Old-Growth Forest Network (OGFN) was founded in 2012 by Dr. Joan Maloof. Our mission is to connect people with nature by creating a national reserve of protected, mature, publicly accessible, native forests. OGFN's goal is to preserve at least one forest in every county in the United States that can sustain native forests. Our program works to identify forests for the network, ensure their protection from logging, and connect people to these properties to

experience old-growth forests. OGFN also educates about the extraordinary ecological and human wellness benefits of old-growth forests and speaks out regarding immediate threats to specific ancient forests.

What is your specific role as Northeast Regional Manager?

As Northeast Regional Manager, my primary focus is growing our network of forests (and our network of people who care about forests) in New England and in the state of New York. I work with volunteers in my region to identify the best old-growth or high-quality forest in each county for inclusion in the network, and then I work with the owners and managers of each selected forest to ensure its protection from commercial logging. Together we arrange for the forest's induction into the OGFN. I'm fortunate that I often get to travel to these remarkable forests and participate in their induction ceremonies myself.

Why should old-growth forests be protected?

Forests that have grown undisturbed for hundreds of years have a complexity of soil, habitats, and species that only exists in such forests. They are rare and special places where we can experience and learn from the forests of our past. Scientists are still making new discoveries about them today. Old-growth forests have immense capacity to improve air quality and water quality, sequester carbon, and help mitigate climate change. Their beauty and wildness inspire awe. They are vital to the health of our planet and our species and there are very few of them left. (Fewer than 1% of our original forests remain in the eastern U.S.) Once an old-growth forest is cut, it's gone. Even if a new forest is allowed to grow back in its place, it will take hundreds of years to develop that level of complexity again.

How many sites have you identified in New York State to date? What is the total acreage involved, and the average acreage of each site?

20 New York forests in 17 of New York's 62 counties have been inducted into the network so far. They range in size from ten acres (DeVeaux Woods State Park in Niagara County) to almost 3,000 acres (Zoar Valley Unique Area in Cattaraugus

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Fischer Old-Growth Forest, Tompkins County, NY. Photo by Gathering Growth Foundation.

Ask A Professional

Peter Smallidge

Peter Smallidge

Landowner questions are addressed by foresters and other natural resources professionals. Landowners should be careful when interpreting answers and applying this general advice to their property because landowner objectives and property conditions will influence specific management options. When in doubt, check with your regional DEC office or other service providers. Landowners are also encouraged to be active participants in Cornell Cooperative Extension and NYFOA programs to gain additional, often site-specific, answers to questions. To submit a question, email to Peter Smallidge at pjs23@cornell.edu with an explicit mention of "Ask a Professional." Additional reading on various topics is available at www.forestconnect.info

Tree Identification with Phone Apps

Question:

I'm struggling to identify trees and shrubs. Is there a good phone app to help? (A common question from multiple owners throughout the state)

Answer:

Tree identification is a foundational skill for woodlot owners. This skill allows owners to think about the tangible and aesthetic benefits of certain species, which species are most or least suited to thrive in a given soil, and how the owner may want to manage their property to favor certain species.

Historically, tree identification was a task of comparing a specimen to a dichotomous key such as available in the CCE "Know Your Trees" book (*https://blogs.cornell.edu/ccednrepub/category/forestry/*), or comparing the specimen to a series of pictures in a pocket field guide. Both these options still have an important role, but smart phones have the option for phone apps to assist in identification. These apps are specialized search programs that allow the owner to present a digital picture of some part of a tree or shrub and allow the app to search a database of images for the best match.

Because of the interest among many woodland owners, and the opportunity of the apps, a comparison of the apps for their accuracy of identification was warranted. Of multiple options, four phone apps were readily available from the Google Play store. These apps used pictures, while other apps used a key approach (e.g., *Virginia Tech Tree ID*). The test of the apps was conducted mostly in the woods and assessed foliage, bark, and other features of 27 specimens. Other apps will become available through time, and this test isn't definitive.

The apps were tested on a recent model Samsung Android-based phone. These or similar apps are likely available for iPhones. The apps were used with a data/cell connection (Wi-Fi was not available). While the apps allow a direct scan of a specimen, in the comparison the same photo was presented to each app

Photo 1

Photo 2

Photo 3

Photo 4

to ensure consistency. The photo was taken in the field and then uploaded into the app. Both the direct scan and photo upload were easily accomplished for all the apps tested.

The photos included with this article are examples of the types of pictures uploaded to the apps. Specimens were selected to represent what were presumed to be easy and difficult images. They are numbered here so the reader can test themselves against the app; the answers are at the end of this article.

The results of each photo presented to each app were categorized into one of four categories:

- *Correct* – the first or only suggestion provided by the app was the correct identification of the tree. Three of the four apps offered multiple options, and some included a "% match" as an index of the app's certainty of identification (which wasn't always correct). One app, *Picture This*, only provided a single identification and thus no options to consider.
- *Incorrect* – none of the options presented were correct.
- *Listed* – of the options presented, the correct identification was listed, but was not listed first.
- *Close* – of the options provided, at least one option was of the correct genus for the specimen. Sometimes, the species listed within the correct genus was common to a remote geographic location.

A summary of each app follows in Table 1 below. In addition to the four categories, the number of specimens that were uniquely identified correctly by that app is also included. The apps *Picture This* and *Plant Net* had the highest rate of correct identification, the fewest incorrect identifications, and the only apps that were uniquely correct. *Picture This* had the highest occurrence of uniquely correct identifications. *Plant Net* had no incorrect identifications.

Some users might select a tree identification phone app based on factors

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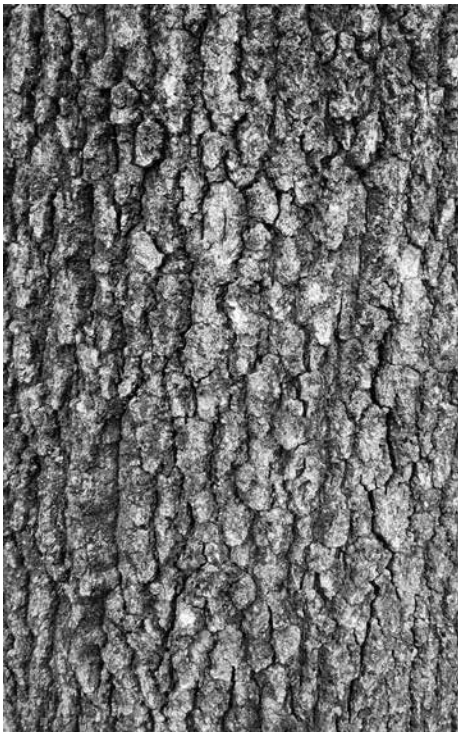

Photo 5

Table 1. Summary of correct identification of trees and shrubs by phone apps. Values in the middle four columns of the table represent a count of the occurrences of that category from 27 specimens.

Phone App Name	Correct	Incorrect	Listed	Close	Uniquely Correct
Leaf Snap	12	7	6	2	0
Picture This	23	3	0	1	4
Plant Net	20	0	6	1	1
Plantum	12	8	4	3	0

Table 2. Other features of tree identification phone apps.

Phone App Name	ID Things Other Than Plants	Store Images (in a paid account)	Share Images	Geographic Pinpoint	Tree Descriptions	Select Plant Part Submitted	Basic Plan Available
Leaf Snap	?	yes	yes	?	yes	yes	yes
Picture This	yes	yes	?	?	yes	no	yes (?)
Plant Net	yes	yes	?	yes	yes	yes	yes
Plantum	yes	yes	?	yes	yes	no	no

other than just correct identification of trees (Table 2). All the apps provided moderate to lengthy descriptions of the trees they suggested. All the apps allowed the user to store pictures, though often only within a premium or paid account. Other than *Plantum*, all the apps could be used in a "basic" mode that was free of charge, and all offered more advanced utilities by purchasing a plan. It is interesting that *Plantum* had the highest rate of incorrect identifications and was the only app without a free, basic plan. Cost varied for the premium package, but usually about $4/month with a cost savings for an annual membership. *Picture This* may have a time or usage limit on their free plan. None of the advanced utilities were evaluated. Two apps asked the user to specify the plant part submitted (e.g., leaf, bark), but all attempted to identify all plant parts. At least two of the apps allowed the user to share their specific location to assist with the identification. *Picture This* also included other features such as a tree ring counter within the premium package. Only *Leaf Snap* offered the option to share a picture from the basic package, but any picture on your phone can be easily sent to others.

These apps and presumably others, especially *Picture This* and *Plant Net*, offer a potentially useful tool to woodland owners. What appeared to be a limitation of all the apps was the lack of information about the distinguishing features of the tree. Knowing those features would facilitate learning and future identification without the use of the app. Owners will want to cross reference the identification provided by the app with other identification resources, but that's also recommended if you use a print copy of a tree identification guide.

The pictures in this article are listed on the following page, with the correct identification and how each app was categorized (Table 3).

Peter Smallidge, NYS Extension Forester and Director, Arnot Teaching and Research Forest, Department of Natural Resources, Cornell University Cooperative Extension, Ithaca, NY 14853. Contact Peter at pjs23@cornell.edu, or (607) 592 – 3640. Visit his website www.ForestConnect.info, and webinar archives at www.youtube.com/ForestConnect. *Support for ForestConnect is provided by the Cornell University College of Agriculture and Life Sciences and USDA NIFA through McIntire-Stennis, Smith-Lever and the Renewable Resources Extension Act.*

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Table 3. Identification of pictures, and categorization by each tree identification app tested.

Photo Number	**Species**	**Plant Part**	***Leaf Snap***	***Picture This***	***Plant Net***	***Plantum***
1	northern-white cedar	bark	incorrect	correct	correct	incorrect
2	sugar maple	bark	listed	incorrect	listed	incorrect
3	European buckthorn	foliage	correct	correct	correct	correct
4	black cherry	foliage	correct	correct	correct	correct
5	black oak	bark	close	correct	listed	correct
6	black oak	foliage	listed	incorrect	correct	close
7	choke cherry	foliage	correct	correct	correct	correct
8	eastern white pine	foliage	incorrect	close	listed	incorrect
9	autumn olive	foliage	listed	correct	correct	correct
10	white ash	bark	correct	correct	listed	incorrect
11	eastern white pine	cone	listed	correct	listed	correct

Wild Things in Your Woodlands

By Kristi Sullivan

Ruffed Grouse (*Bonasa umbellus*)

The ruffed grouse is a heavy-bodied, medium-size game bird, about 17 inches in length from the beak to the tip of the tail. Males and females are similar in color, which varies among individuals from a dark gray phase to a chocolate brown or red phase, or a variety of shades in between. In a given area, the population may consist primarily of individuals of either the gray phase or the red phase, with the red phase being more common in milder climates and the gray phase occurring most often in coniferous areas and regions where winters are more severe. Both male and female birds have a black patch of feathers on each side of the lower neck, and a wide black band across the tip of the tail. On average, males weigh about 23 ounces and females weigh about 21 ounces.

A year-round resident, the ruffed grouse is a thrill to encounter in any season. As you pause to catch your breath while walking in the woods, a grouse can leave your heart racing as it explodes into the air. The startling noise created by sudden, rapid wingbeats provides an excellent mode of escape from would-be predators.

Another characteristic sound made by the ruffed grouse is the familiar, bass-like drumming sound males make during the breeding season, from late March to early May. A male chooses a favorite displaying site, typically a large log with a birds-eye view of the surrounding area, to be the center of his territory. Here he struts and drums to attract females and stake claim to his territory. With his back straight up and tail braced against the log, he cups his wings and moves them sharply forward and back in a horizontal, slightly circular motion. The drumming sound that is produced starts with a few evenly spaced thumps that increase in frequency to a whir.

After mating, the hen selects a nest site at the base of a stump or a tree, and lays a clutch of 10-12 eggs. The chicks are able to move about and feed soon after hatching, searching for insects in forest openings and edges. Grouse eggs and chicks are vulnerable to predation by a variety of animals including snakes, weasels, mink, fishers, house cats, red and gray foxes, coyotes, squirrels, bobcats, skunks, opossums, raccoons, barred and great horned owls, and several species of hawks. Cold, wet, spring weather can also affect chick survival. Grouse numbers peak and bottom out in eight- to 10-year cycles, and wildlife biologists have different theories about what causes these population fluctuations. Potential factors include the weather, food supply, predation, habitat changes, or a combination of these.

The ruffed grouse occurs across New York State in areas of suitable habitat and is generally more abundant in forests of higher elevations (above 1,000 ft). It is most common in extensive forests or wooded hillsides and ravines, especially those with young, early-successional stage forest, or scattered clearings. The grouse also inhabits abandoned farmlands and pastures that are reverting to brush and forest. Specific habitat features attractive to this bird include brush heaps, fallen timber, grapevine tangles, and conifers.

The adult grouse eats a mostly vegetarian diet. Adults consume large quantities of buds and catkins of aspen, birch, and hop-hornbeam as they appear in the spring. In the summer, they eat the leaves, fruits, and seeds of aspen, cherry, sedges, strawberry, blackberry, and raspberry. In the fall, they feed on fruits of hawthorn,

continued on next page

apple, cherry, viburnum, sumac, and dogwood, as well as beechnuts and the buds of apple, birch, cherry, and hop-hornbeam. During the winter, grouse depend on cherry, aspen, birch, hop-hornbeam, and serviceberry buds.

The ruffed grouse is well adapted to living in cold, snowy climates. Small feathers grow on its feet and serve as snowshoes, enabling it to walk on top of snow. A grouse may keep warm at night by burrowing into soft snow, where it is covered and protected from the wind-chilled air above. If the snow is too hard, a grouse will often roost in conifers, where it finds protection from the wind and cold.

Landowners can provide a number of habitat features to benefit the ruffed grouse. If you have enough acreage, you can create and maintain patches of young, sapling stage forest in close proximity to 10 to 25 year-old pole stands for wintering and breeding cover, and 25 to 40 year-old mature aspen for winter food resources. Having all of these forest stages present within a 6 to 10-acre area is ideal. You can also maintain patches of conifers to provide winter cover, and leave large logs on forest floor to serve as drumming logs, nesting sites, and escape cover. Encourage a diversity of food-producing shrub and understory species including grapevines, blackberries, hop-hornbeam, serviceberry, dogwood, sumac, viburnum, hawthorn, and apple trees. In the overstory of the forest, encourage aspen growth and black cherry for winter food. When cutting trees for firewood or when having a timber harvest, consider leaving the tops of trees to provide cover. Then revisit the area to enjoy your success and the surprises that the ruffed grouse promises to deliver!

Kristi Sullivan is a wildlife biologist in the Department of Natural Resources and the Environment, Cornell University. She directs the New York Master Naturalist Volunteer Program. For additional resources about wildlife and their habitats, visit https://blogs.cornell.edu/nymasternaturalist/

Would you like to see an article about a particular topic we haven't covered?

Please send your suggestions to:
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Jeff Joseph, managing editor at jeffjosephwoodworker@gmail.com

Would you like to receive an electronic version of future editions of *The New York Forest Owner*? If so, please send Claire an email (ckenney@nyfoa.org).

You will receive an email every two months that includes a PDF file of the publication. While being convenient for you – read *The Forest Owner* anytime, any place; this will also help to save the Association money as the cost of printing and postage continues to rise with each edition.

Farewell and Congratulations!

NYFOA President Stacy Kazacos presents Liana Gooding with an appreciation plaque. "Farewell Liana. Thanks for all the years of service. Enjoy your retirement."

Hugh Canham helped support NYFOA from its earliest years as an organization and became a member in the early 1990's. He currently serves on the board of directors and chairs the legislative affairs committee. Congratulations Hugh. It is our pleasure to recognize your contributions to NYFOA with this Lifetime Achievement Award.

Homestead Woodlot: Weeding with a String Trimmer

By Jeff Joseph

As anyone who has spent any time working in a woodlot knows, a chainsaw is truly a marvelous tool. Simple, portable, durable, and stunningly effective at felling trees. I've had my primary saw—a Husqvarna 372 with countless hours on it—for nearly 25 years and, with some basic, periodic maintenance over the years, it is still running as strong as ever. While using a chainsaw can certainly be strenuous work, if you've ever attempted to fell even a small diameter tree with either a crosscut saw or an ax, you truly appreciate the aggressive efficiency with which a well-tuned saw with a freshly sharpened chain makes chips fly.

But trees come in all different sizes, not all of which are suitable for even a small chainsaw. And lots of stuff other than sawtimber grows in a woodlot, like grasses, forbs, ferns, and shrubs, many of which despite their small size can become major problems due to their invasive growth habits. So in addition to felling, many of us need to periodically prioritize doing some *weeding* in our woodlots. This is especially true in areas where disturbance--such as harvesting timber--has opened the canopy to allow light to reach the forest floor, which invariably triggers a frenzy of growth of all sorts of plants, many of which are decidedly NOT welcome. It is also commonly needed at the margins of timber stands, where early-successional plant species can take advantage of high light levels to proliferate at the expense of more desirable growth. For me this list includes multiflora rose, hay-scented fern, sumac, honeysuckle, wild parsnip, striped maple, and especially root- and stump-sprouted beech. But as you likely know from your own circumstances there are many others, each of which can be a challenge to keep in check.

In dealing with this aggressive, weedy onslaught, for reasons of safety, or just expediency when covering large areas, a chainsaw is often simply not the right tool for the job. A prime example of this can be found in a woodlot like mine where there are many acres of dense, weedy beech thickets, as trying to cut thousands of small diameter root-sprouted beech stems with a chainsaw would: 1) take forever; 2) drastically increase the chance of kickback due to the close proximity of the small stems; 3) give you an aching back from bending over for so long trying to cut the stems close to ground level; 4) make you want to give up and find something more rewarding/less seemingly impossible to do with your time.

Thankfully, there are other tools in the toolkit. Chemical treatment is a common option, but for those like myself who choose to forego that route, there is another very effective mechanical means of control of invasive or interfering plants, and one that you likely already possess—the lowly string trimmer.

String or line trimmers, also known colloquially as "weed-whackers," are a far more versatile, efficient, and effective woodlot tool than one might think—certainly more than I thought until very recently. The key is in moving beyond the common 'string' or 'line' to the variety of circular blades that have become available in recent years.

While I am probably late to the party (or perhaps just a slow learner), prior to this year I had only used my trimmer for basic yard work, and occasionally on trails and trail edges. Equipped with the ubiquitous monofilament nylon 'string,' which comes in gauges ranging from 0.065" to upward of 0.110", a trimmer excels at cutting

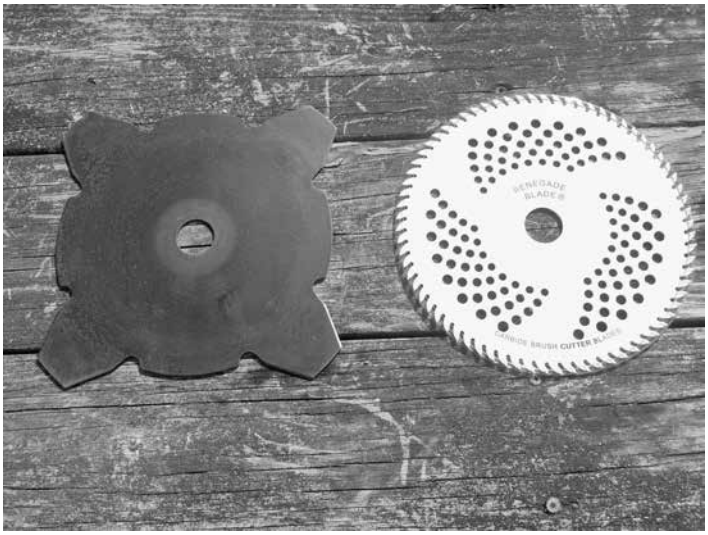

Figure 1: Trimmer blades come in many sizes and styles, and are designed to cut everything from grass (left) to thick/dense wood (right).

Figure 2: To install a trimmer blade, first remove the bump feed head (left) and use the appropriate adapter kit designed for the purpose (right).

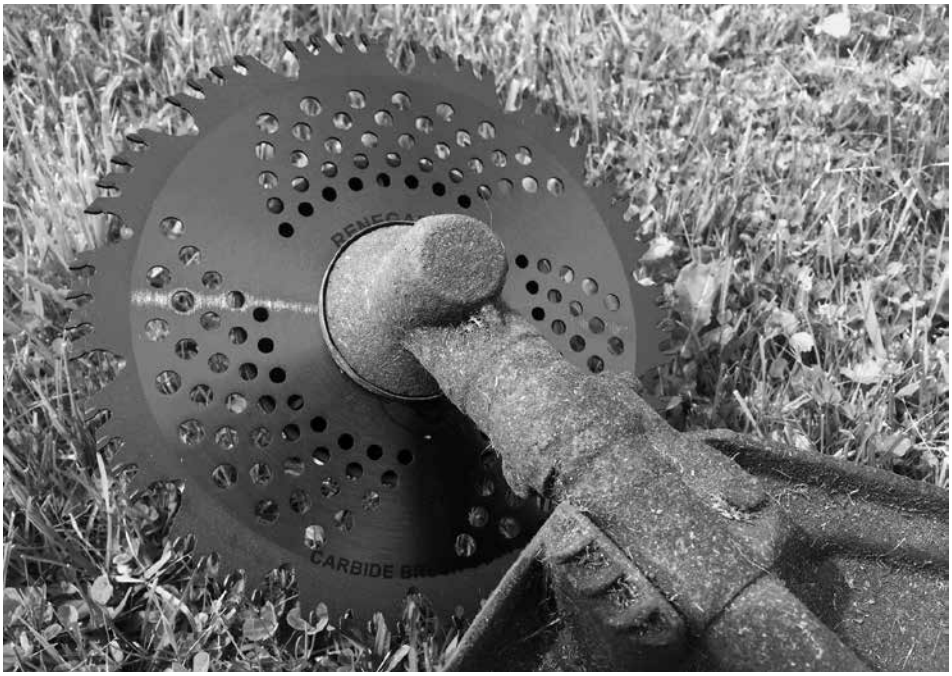

Figure 3: Renegade hybrid blade installed with the teeth in the correct orientation.

thin, wispy stuff like grasses and ferns, but when trying to cut anything thicker in diameter, or at all woody, the use of even the heavy gauge string is largely ineffective. So the trickier area is when you need to cut the 'in-between' stuff: too thick and/or woody for string line, too thin and wispy (or numerous) for a chainsaw. Such was my dilemma until recently, when I happened upon a YouTube video evaluating and comparing circular brush cutting blades specifically designed for use with a string trimmer, which ended up being a revelation.

The YouTube channel is called *Project Farm*, and the video in question is entitled "Best Brush Cutter Blade: Let's Find Out!," in which the creator evaluates the specs, pricing, and performance of eight different brands and styles of these blades. He packs an impressive amount of information in the short video, including comparisons of the blades cutting grass, one-, two-, and three-inch diameter hardwood stems, as well as how they fare when contacting a steel pipe and a cinderblock, after which he again tests their wood cutting efficiency. Based upon his comparisons, I chose what he determined to be the best overall value among the blades in the test, the Renegade Hybrid, which I found on Ebay (current price for a 2 pack is $36.50, with free shipping at *https://www.ebay.com/itm/313445296251*. FYI there is lot of additional information within the Renegade Blade/bg-intl Ebay listings that I found helpful).

Whatever brand you buy, you will still have some additional choices to make: chief among these are blade diameter and tooth configuration. According to Renegade, blade diameter should be selected based upon the power of your trimmer's engine, with 28cc the minimum displacement for their 9" diameter blade, and 35cc the minimum for their 10" blade. As my homeowner-grade trimmer has a modest 24.5cc engine, I chose to err on the side of caution and went with an 8" blade. While this smaller blade limits the cutting capacity of my trimmer to about 1¾" (or 3 ½" with the cut approached from opposing sides), it allows for more power and blade speed for each cut, and much less strain on the tool.

As for the tooth configuration, the simple rule of thumb is that less teeth equals better grab, and higher suitability for cutting thin wispy material like grasses and ferns, while more teeth equals cleaner, faster cuts without seizing in dense, hard woody materials (Figure 1). Attempting to cut hardwoods with a low tooth count blade results in a slow and very rough cut with lots of chatter and vibration; on the other end of the spectrum, a high tooth blade is very ineffective in cutting and mulching thin material like grass, as it mainly just pushes it around instead of cutting it. As I would mostly, but not exclusively be cutting 1-3" diameter hardwood, the blade I started with (the 'Hybrid Red Razor') has 56 teeth, and is described by Renegade as being most appropriate for "medium wood limbs & firm bushes."

You may ask yourself at this point, why not just use a circular saw or tablesaw blade on your trimmer? The short answer is that for most trimmers the arbor hole size needed will be 1", whereas the standard hole on these woodworking blades is 5/8", and that even if somehow made to work, this type of blade would not be safe to use, they are made of a more brittle/less malleable steel, and are designed to spin at much lower RPMs than a trimmer typically runs at, so in use the blades could shatter, or the teeth could become high speed projectiles. In short, stick with a blade designed for this purpose.

To install a circular blade on your trimmer, it is necessary to remove the bump feed head and to mount the blade to the arbor with an adapter kit, some of which are universal and readily available, others that may be specific to your brand of trimmer only (Figure 2). And while this may be stating the obvious, be sure to mount the blade so that the teeth are spinning *into* the cut—I had to double check to confirm that my trimmer cuts in a counterclockwise direction, so I had to be sure to mount the blade with the teeth pointing toward the left (Figure 3).

In terms of safety, I would highly recommend that you wear protective gear while cutting, especially a face shield and a good pair of work boots, and maybe some chaps (Figure 4). While using the blade on my trimmer for the first time felt treacherous at the outset, I was fully comfortable with it within just a few minutes. As the blade spins at the end of a pole, it would really be very difficult to cut oneself with it unless doing something very inadvisable. That being said, one important thing to keep in mind is that you should approach your cuts from the sides of the blade only, as if you attempt start a cut at the far end of the blade, the rotation can cause it to kick to the side, sometimes violently if you are not careful. With this in mind, the #1 safety recommendation I would offer with this tool would be to make sure that you work well away from

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others; I would advise making a firm rule that all others be a *bare minimum* of 15 feet or so away to be extra safe, as the user can develop tunnel vision when cutting and thus be unaware of others in the vicinity, and keeping in mind that a sharp blade can cut through a 3+" hardwood stem in a matter of seconds—you can imagine the rest.

The first time I used this 'new' tool was around the perimeter of a 21"DBH cucumber magnolia, which is the *one and only* representative of this species in my woodlot. Thankfully, magnolias are monoecious, with both male and female flowers on the same tree, so all I need is one for seed production. That, along with a seedbed, some sun reaching the forest floor, and protection from deer (which is of course another challenge). This lone stem was surrounded by an impenetrable beech thicket so it was a choice spot to start (Figure 5).

Figure 4: Putting the new blade to the test—note the thick patches of beech brush and ferns. Be sure to use appropriate safety gear.

Figure 5: An attempt at encouraging cucumber magnolia regeneration—note the freshly cut beech slash in the foreground and the dense thicket remaining behind the cucumbertree.

Amazingly enough, before I had run through one tank of fuel I felt like I had already gotten my money's worth from the blade, as the work was quick, efficient, and as you run a trimmer while in an upright position, easy on my back. Standing back to admire my work, I could see what my woodlot might look like without so much weedy beech, could identify crop trees more readily, and could imagine for the first time having at least a fighting chance to keep beech under control in select areas where I want to encourage regeneration, or where I would simply like to walk freely without fighting through heavy understory brush. Being careful to avoid rocks (not so easy in a flaggy loam like mine!), I probably got about 20 hours of use out of the first blade before the cuts had slowed enough to warrant replacing. For the amount of work accomplished, at less than $1 per hour of use this is an incredible bargain, and I will undoubtedly be buying more of these blades next year.

While weeding a woodlot may seem to be a tall order (I believe that it was Pete Smallidge who once said that cutting beech just 'makes it mad'), from this experience I can say that the use of a trimmer with a brush blade makes it both feasible and quite satisfying to find and encourage regenerating seedlings of desired species that were totally overrun by invasive or interfering plant species. The persistence of beech suckering may require multiple rounds of trimming, but with the efficiency of this tool I am (perhaps naively) not deterred.

An additional benefit in this case is that the slash from cutting the beech brush helps to shield any seedlings in the area from deer, and I even made a point of piling it around the most promising seedlings and saplings to discourage their voracious browsing. With the increasing number of challenges to growing and tending healthy stands of timber, we will all have to be more innovative, and persistent, and in that struggle, the more tools in our tool kits the better.

Jeff Joseph is the managing editor of this magazine. He has been waging war with beech thickets in his Tioga county woodlot for 20 years running, with mixed success.

Welcome New Members

We welcome the following new members (who joined since the publishing of the last issue) to NYFOA and thank them for their interest in, and support of, the organization:

Name	Chapter	Name	Chapter
Jase Baese	SFL	Tim Gleba	WFL
Olga Boudker	CDC	Henry S. Kernan Trust	CDC
Pendell Brayton	SAC	Brian Kerrigan	NAC
Randy Burkard	AFC	Albright Kurtis	CDC
Drew Caprood	SAC	Paul Lesefske	AFC
Edward Crowley	AFC	Donn Norton	AFC
Knoll Denise	WFL	Theresa Perotti	WFL
Dolores Elliott	SOT	Corey Redditt	WFL
Brian Fitzgerald	NFC	Bruce Vande	WFL
Tim Gleba	NFC	Matthew Webster	NAC

Boria Sax is author of many books and a Master Forest Owner in New York State.

Enchanted Forests is distributed by the University of Chicago Press starting December 2023.

'Beauty and wisdom flash out at us on every page of this captivating volume.'
– Maria Tatar, author of *The Heroine with 1,001 Faces*

'*Enchanted Forests* is a book that will take the reader through the deep, dark woods and yet enlighten, entertain and enthrall . . . It is a must-read for all those who love forests.'
– Sadhana Naithani, Jawaharlal Nehru University

'Sax's graceful analysis guides us through all kinds of enchanted forests throughout history that need more respect than they have received.'
– Jack Zipes, author of *The Brothers Grimm: From Enchanted Forests to the Modern World*

Woodland Health

A column focusing on topics that might limit the health, vigor and productivity of our private or public woodlands

Coordinated by Mark Whitmore

Hunting for Red October: Leaf Colors Indicate Maple Distress

By Paul Hetzler

The dearth of red fall color in sugar maples, a broad regional trend first noted around 2018, is unrelated to fall weather or to the growing conditions in a given season. It's a troubling sign that sugar maples as a species may have entered a long-term and perhaps irreversible decline.

Although every fall is beautiful, some years are notably vibrant, while others, like 2023, are more subdued. We know that weather is the main factor that determines the brilliance of the autumn leaf display.

An unusually wet spring /early summer will favour the growth of leaf pathogens like shot-hole fungi, anthracnose, and bacterial leaf spot, all of which cause brown patches on leaves. Conversely, in drought years, trees are starved for water and nutrients, and overall pigment production is down. Even after a strong growing season, protracted fall rains can tone-down color intensity, and an early hard frost or a violent windstorm will truncate the "leaf peeper" season.

Plants make yellow- colored molecules, called xanthophylls, as well as orange ones, known as carotenoids, to aid with photosynthesis and to protect cells from oxidative stress. As we know, these pigments are always present in leaves, but are masked by green chlorophyll all summer.

However, the red and purple range, brought to us by a class of chemicals known as anthocyanins, are definitely not cached under chlorophyll's cloak. These large, polycyclic organic compounds cost plants a lot of energy to make. While relatively few species color their leaves red in the fall, sugar maples and soft (red) maples are famous for their rosy foliage. Some oaks produce deep scarlets, and dogwood and ash often make red-purple hues. Many genera of shrubs, including *Viburnum*, *Aronia*, and *Amelanchier*, flaunt their mélange of anthocyanins; salmon, coral, crimson, raspberry, ruby, and burgundy (I may have missed a few variants).

Yellow sugar maple foliage in fall. Indiana Nature LLC.

Plants invest in anthocyanins in spring to protect young leaves, as chlorophyll is prone to UV-light damage in cool conditions. Think of red pigment as suntan lotion for baby leaves. As the weather warms and leaves mature and harden-off, plants quit making these pricey compounds.

Early-season red makes sense. But why some trees splurge on anthocyanins in the fall when they should be hoarding energy for next spring is a mystery. As daylight dwindles in autumn, hardwood trees begin to rob their leaves of sugars and other goodies, clawing back roughly half the nitrogen, phosphorous, potassium,

Fall foliage of sugar maple at top, red maple in lower left, and red oak in lower right. Audubon Vermont.

iron, and other nutrients for safekeeping in trunk and root tissues. While they drain the leaves, they also deposit wax (suberin) between twigs and leaves to plug the vessels that supplied water and nutrients to their leaves all season.

As a result of this self-vandalism, chlorophyll breaks down, which lets the hidden yellow and orange colors to make their debut.

Notorious for being frugal and pragmatic, trees don't dip into their savings accounts — stored starches in woody tissues — without good cause. Few hypotheses exist as to why trees make red. Among those brave or foolish enough to say they know the answer for sure, the "fall suntan lotion" notion is a favourite, since cool nights and sunny days trigger red production. However, it seems odd to claim trees use precious starch reserves to shield chlorophyll from UV rays while they're hard at work making waxy abscission layers to kill said chlorophyll. By the time a leaf turns red, there's generally not much left to protect.

Another idea is that when red leaves of a given species fall to the ground, they change soil conditions in a way that favours it and suppresses other kinds of trees. There are myriad plant-made chemicals known to inhibit the growth rates and /or seed germination of competitors, a process known as allelopathy. Typically, roots give off allelopathic chemicals — it's why you don't want your garden near a black walnut tree — the juglone released by walnut roots kills tomatoes and potatoes. The problem with this rationale for red is that anthocyanins in fallen leaves have a very weak allelopathic effect.

In the end, though, an explanation for red autumn leaves matters little.

What's significant to bear in mind is that the making of anthocyanins in fall is optional. In a very real sense, it's a sign of a tree's disposable income. When a species once renowned for its ruddy fall foliage suddenly goes on an anthocyanin strike and looks more like silver or Norway maples, it's a cause for concern.

This phenomenon hit me right between the eyes starting in the fall of 2018. Not surprisingly, it came on the heels of unprecedented (in terms of low soil moisture) droughts in 2012, 2016, and 2018. Plant Pathologist Dr. George Hudler of Cornell University says it can take two to three years of normal soil moisture for a tree to recover from moderate dry periods, let alone these mega-droughts.

continued on next page

Furthermore, in 2013 and 2017, sugar maples used large amounts of energy to put out massive distress crops of samaras after two of the worst droughts.

Waves of tent caterpillars, which do not touch red maples, stripped sugar maples of their leaves for two or more consecutive years from 2015 through 2019. This was followed by outbreaks of spongy-moth (formerly gypsy or LDD moth) caterpillars that swept across southern Canada and parts of New England between 2019 and 2022.

Among all my forester and arborist contacts in northern New York State and southeastern Canada, as well as colleagues from Cornell Cooperative Extension, not one could find a red sugar maple in 2018. The same went for 2019 through 2022 (this year, I have noticed a tiny proportion of sugar maples, none of which are over 30 cm in diameter, showing a minimal amount of anthocyanin in their leaves).

Yet even prior to the change in sugar maple's color regime, scientists were concerned about this species. In October 2015, the alarming results of a study which documented forty years of maple growth rings in the NY's Adirondack region came out of the State University of New York College of Environmental Science and Forestry in Syracuse. One of the study's co-authors, Dr. Neil Pederson, an expert on tree rings and climate change, wrote these chilling lines in the report:

"Outside of studies of red spruce in the 1970s, I have never seen anything quite like this. Most tree-ring studies of canopy trees in the region do not show a decline like what we see in these sugar maple. Combined with evidence of reduced natural regeneration of sugar maple in the region, it is a concern."

Sugar maples are in uncharted territory. Scientists at the US Forest Service believe that by the end of the century, sugar maple will exist almost exclusively in Canada. But in what kind of condition?

It's possible that enclaves of sugar maples will survive in isolated nooks and crannies in the Adirondack, Green, and White Mountains and other similar terrain. Variation of slope and aspect in the mountains creates "climate refugia," micro-habitats favourable to a sensitive species. These refugia resist change, but are not immune to it.

Luckily, we do have agency in determining our future. According to the Canadian Association for Educational Resources, "By 2100 the atmospheric CO_2 concentration (the gas responsible for most temperature change) will be between 540 and 970 ppm," depending how much carbon dioxide we pump into the air.

The huge discrepancy between those numbers offers us a chance to slow the rate at which tree species' ranges march northward. It's hard to feel motivated when we know our decisions are a drop in the pool. Well, drops matter. It takes something like 50 billion drops to fill an Olympic-size pool. If each Earthling coughed up (figuratively, please) 6.4 drops, it would be full.

No matter where we live, everyone has access to a dropper of some sort. Maybe it's planting a tree. Or biking to work, or changing to LED bulbs. Every drop makes it less likely the next generation will ask "Hey Grandma (or Grandpa), tell me that story about when maples grew here."

Paul Hetzler has been an ISA Certified Arborist since 1996. His three volumes of nature essays, including his latest one, Birds of Happiness Aren't Blue, are available on amazon.com. https://www.amazon.com/dp/B0CCZSY8N9.

Mark Whitmore is a forest entomologist in the Cornell University Department of Natural Resources and the chair of the NY Forest Health Advisory Council.

From the Executive Director (continued)

Soon after this assessment and recommendation, the region was struck by a severe drought. As predicted by the biologist, the vegetation across the region suffered, struggling to keep pace with the elephants' feeding. Consequently, the 30,000 elephants consumed most of the vegetation that was available. They had effectively "eaten themselves out of house and home." Starvation ensued, followed by a huge death toll. Sadly, their numbers dropped quickly by nearly two thirds.

Eventually the rains came, and the drought ended. The land began to recover. That was not the case for the vegetation inside the preserve, however; it was still struggling to rebound. Had you walked along the perimeter fence at this point in the story, you would've witnessed that the vegetation outside the fence was vibrant, lush, and green, having recovered fully, whereas the vegetation inside the fence was sparse, desiccated, and brown, barely any green, barely recovering — a stark contrast for sure. The compounding impact of the elephants feeding during the drought and the continued feeding after, despite their lower numbers, damaged the vegetation badly enough to slow its recovery. The struggle of the surviving elephants lingered. The decline in ecotourism was precipitous and so too was the revenue the preserve depended so heavily on. After all, who wants to take a tour of a barren apocalyptic landscape littered with the remains of thousands of elephants.

As intriguing as this might be, you are probably wondering why such a graphic story about an incident in Africa is relevant to us, the owners of forestlands on the other side of the world? Did the preserve managers make a bad decision to let nature take its course? Doesn't nature take its course all the time? How is this situation any different from all those other times? What, if anything, did the managers miss in their decision making? Well, they overlooked one critical piece of this puzzle: **Nature DOESN'T have a fence around it**. Were it not for the fence, the elephants would have had the freedom to spread out over a larger area and thus spread out their impact on the vegetation during the drought.

The take home message from this story, and the reason it is relevant to us as forest owners in NY, is to understand that our landscape here has been culturally influenced by man for so long that we are left with no choice but to manage it; we cannot afford to let nature "take its course." There are too many (proverbial) fences around it — globalization, introduction of invasive pests, introduction of invasive plants, fragmentation, parcelization, exploitation, development, etc. These "fences" cause voids to form. Nature abhors a vacuum, and in the absence of management, the course it takes is to fill the void with something. The ultimate question, therefore, is whether that course will fill the void with something that is desirable, or not.

For example, the emerald ash borer has decimated our native ash tree population — it created a void. What will nature fill that void with? In the lower Hudson region, and elsewhere, the hemlock woolly adelgid has decimated our hemlock forests — it created a void. What will nature fill that void with? Over the last century our practices across the landscape have created habitat and sanctuaries helping deer spread and prosper (our elephants?); as they feed in such great numbers on our native trees they are decimating the forest understory (and your tulips) — it created a void. What will nature fill that void with? I imagine that many of you can testify that nature is filling these voids with some other invasive or undesirable vegetation — multiflora rose, honeysuckle, grape vine, buckthorn, barberry, Japanese knotweed, beech; the list is long.

Whether your goals are timber oriented, or recreation oriented, or habitat oriented, as NYFOA members we are the consummate stewards of the land. But are our actions alone enough? Probably not. Where it is our mission to promote sustainable forest management and enhanced stewardship, it is critical that every one of us do what we can to engage with and encourage other forest owners to learn how to be good stewards as we have by joining NYFOA. Easy to say? Yes. Easy to do? No. But if every one of us attempts to find and recruit new members, we grow our organization exponentially; we expand our influence exponentially; we improve our forests exponentially; and we are exponentially closer to mitigating the impact of the "fences." So, keep on keeping on as a good steward. Be an ambassador for NYFOA. Help it fulfill its mission. It is the collective effort that compounds the success of our mission.

–Craig Vollmer
NYFOA Executive Director

Welcome Claire Kenney

By Craig Vollmer

Please welcome our new office administrator, Claire Kenney to NYFOA.

As we say farewell to Liana Gooding, our Office Administrator for the last 18 years, and wish her well as she enters retirement, we are excited to welcome and introduce Claire, who brings several skills, a great personality, and a motivated spirit to this position. We are pleased to have her on board to help us fulfill our mission and support you.

Claire assumed her duties on September 1st. Please note that with this change, NYFOA's phone number and address will also change. We are in the process of updating various documents and the website with the new information, and those updates will be completed soon. The address for our new base of operations is PO Box 644, Naples, NY, 14512 and our new phone number is 607-365-2214.

In the meantime, we asked Claire to introduce herself to all of you in the message below. Please join us in welcoming her into our NYFOA family.

"Every day I step outside the door of my Ontario County home and into the forest south of Honeoye. This is my home in the Bristol Hills; the forest here extends into Hi Tor and Urbana and far beyond and is my place of refuge and recreation, the source of firewood and shelter from summer heat and driving snow, the place my children grew up and found their love of the outdoors, and where we walk our dogs and ride our horses.

Recently I had the privilege of sweeping the first ten miles of the inaugural Great Hill Ultra trail run, a 100 kilometer race through the forests and hills around Naples NY. It's a slow pace, running up and down these hills, about three hours and 1,500' elevation gain for ten miles following the last runner in the pack, ensuring the course is clear after that first section of the race. But what an opportunity to spend time on the trail surrounded by trees and all their glory, winding in and out, up and down; and having time to really reflect on how truly essential our forests are. In this time of land being gobbled up for so many uses, the health of our forests is not an accident, but a result of careful planning and care. I want you to know that I am joining this organization, the New York Forest Owners Association as administrator, but also as a fellow lover of our forest spaces; I crave the wave-like sound of wind in the trees on winter evenings, the music of frogs and birds that mark the breaking of spring, the wave of cool shade in the summer, and the distinctive crunch and smell of leaves on the forest floor as fall leads into winter.

Before I had kids and taught English at Finger Lakes Community College, Penn Yan Middle School, and Naples High School so I could be on my kids' schedule, I spent ten years working as administrator at the Greater Rochester Metro Chamber of Commerce and a small but mighty IT firm called The Rochester Group, Inc. I was blessed with many opportunities in those roles and had experiences as HR assistant, billing administrator, program director for the Chamber's corporate training program, manager for a DOD program assisting small businesses gain government contracts, writing grant applications, and organizing logistics for Chamber member events.

I am thrilled to have been selected for this position and am looking forward to supporting you, our members and staff, as you care for, and develop each of your parts of our great forests here in New York. I'm looking forward to meeting you soon."

County). So far, our New York forests total approximately 10,000 acres.

Have you done any core sampling or used other means to determine the actual age of the old-growth at any of the sites in New York?

Although core sampling and other methods for determining age provide useful information for us, we do not require it for a forest to be included in the network. Age is certainly an important criterion, but it's only one of a number of factors that we look at when assessing a forest. Because we are selecting at least one forest per county, each forest is assessed only in comparison to the other forests within its county. Some counties have a number of old-growth forests to choose from, while others may have none. In the case of a county with no old-growth forests, we look for one that is as old as possible and high quality or special in some way. We think of these younger forests as the old-growth forests of the future. If we protect them now, they will eventually become old-growth.

What are some of the other criteria that you look at when you are assessing a forest for inclusion in the Old-Growth Forest Network?

When assessing a public forest for inclusion in the network, in addition to its age and quality we look at its protection from logging, its accessibility, its size, and its feeling of wildness. Every forest can't meet every ideal, but here's what we reach for:

Protection: Every forest included in the network MUST be protected from logging. Some forests already have protections in place before we approach them for inclusion. For forests that don't, we offer to assist them in bolstering their protections in order that they may qualify for inclusion.

Accessibility: Network forests MUST be open to the public. Ideally, network forest trails should be reasonably accessible to the average family with no extreme athleticism required. We prefer easy or moderately difficult hikes on well-marked trails with no vast rock scrambles or challenging stream crossings. We prefer trailheads with parking areas for at least a few cars. We love it when a trail provides an inspiring old forest experience within the first quarter mile.

Size: If everything else is equal, bigger is better. Ideally, we are looking for forests that are at least 20 acres as we don't want our network forests to be in danger of blowing down in their entirety in a single storm. That said, in very special circumstances, when a forest was perfect in every other possible way, we have pursued smaller acreages.

A Feeling of Wildness: Some forests feel wilder than others. We want people who visit our network forests to feel that special, wild feeling that comes from being in a truly old or magnificent forest. We want people to feel inspired and to care that these forests remain protected. So the feeling of the forest is an important factor.

How can people find a network forest near them?

Directions to all of our network forests are included by state and county on our website at *www.oldgrowthforest.net/network-forests*.

Is there any way for private forests to become a part of the Old-Growth Forest Network?

Yes! In addition to our network forest program, OGFN has a Private Forest Registry which celebrates woodland stewardship of private lands. So, if any of your readers have a forest of their own (of any age) that they intend to set aside from logging, they can enter it into the Old-Growth Forest Network's Private Forest Registry and be celebrated for their commitment to creating or sustaining an old-growth forest for generations to come. Interested landowners can contact me directly or go to *www.oldgrowthforest.net/private-forests*.

Do you anticipate finding more sites containing old-growth stands in New York?

Yes. We maintain a database of network-eligible old-growth forests and we are constantly updating it. We're always on the lookout for publicly accessible old-growth forests that are new to us. Sometimes previously unknown old forests become known and sometimes previously private old forests become public. If any of your readers are aware of a special forest that they think might qualify for the network, they can nominate a forest for the Old-Growth Forest Network at *www.oldgrowthforest.net/nominate-a-forest*.

Are you concerned exclusively with forests, or are you also interested in documenting individual trees that may meet the criteria to be classified as old-growth?

Although we certainly love old trees, the Old-Growth Forest Network's mission focuses on forests rather than individual trees. The Eastern Native Tree Society (ENTS) is an excellent resource for those wishing to document or classify individual trees in New York.

Fischer Old-Growth Forest, Tompkins County, NY. Photo by Gathering Growth Foundation.

Do you host any events, and are there any volunteer opportunities for those who are interested in contributing to your work?

We host public forest induction ceremonies with guided hikes to welcome new forests into the network. We also partner with other organizations on informational talks, educational events, and book signings by our founder, Dr. Joan Maloof. All of our public events are posted on the *Upcoming Events* page of our website *www.oldgrowthforest.net/upcoming-events*, and email invitations are sent out to nearby members of our mailing list.

Volunteers are at the heart of our work. Our volunteer County Coordinators get out onto the forest trails to help us identify the best candidate forest in their counties. No special expertise is necessary, just a love of forests and a willingness to learn. If folks are interested in volunteering, they can learn more at *www.oldgrowthforest.net/volunteer*.

What are some general characteristics of old-growth trees and stands that woodland owners in New York should be on the lookout for?

Large tree size can certainly be an indicator of an old forest, but it is not the only one. And in places where soils are sandy or rocky, or where winds are high, old trees don't grow to be very big, so here are some of the other indicators we can look for:

Big, Dead Trees: Large, standing, dead trees, called snags, as well as large, fallen dead trees and branches lying on the ground are common in old-growth forests, as are nurse logs, downed logs with trees growing out of the decayed wood. Dead trees left undisturbed provide important habitat for wildlife and nutrients to support the growth of new trees.

"Ugly" Trees: Very old trees are survivors and have the scars to show for it. If a big tree has grown especially lopsided and gnarled, it has likely survived damage from wind, lightning, insects, or any number of injuries over a long period of time. As a tree ages, it sometimes compensates structurally for lost or damaged parts by growing in peculiar directions. Its structure can become quite dramatically odd and interesting. Ugly to some, beautiful to others!

Light and Diversity: As trees grow old and die, they open up gaps in the forest canopy providing sunlight for the nearby younger trees to flourish and grow. This cycle, if left undisturbed, intersperses trees of different ages, heights, and species. You will see young, old, short, tall and everything in between, with a mix of conifers and deciduous trees that don't mind shady conditions. Look for diversity in tree ages and species as well as for visible, small openings in the canopy.

Pits and Mounds: When a tree blows over, its roots are torn from the ground and remain standing sideways, upright at the base of the fallen trunk. Where the roots used to be, a depression or "pit" is left in the ground. Over time, the tree and its roots decay, creating "mounds" next to that pit. This is called pit and mound topography and is common in old-growth forests where downed trees are left undisturbed, allowing their nutrients to return to the soil. This process, repeated over hundreds of years, creates a soil quality that cannot be achieved any other way.

If someone has questions, or may have leads on finding undocumented old-growth stands in New York, who should they contact? Where on the internet can they look for more information?

I can be reached at *sarahrg@oldgrowthforest.net*. Please feel free to contact me anytime with questions, leads on forests, interest in volunteering, or interest in entering a forest in our Private Forest Registry. You can do all of those things through our website, too, *www.oldgrowthforest.net* which also contains plenty of resources on forest science, forest protection, and much more.

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