

About This Guide

The Place You Call Home: A Guide to Caring for Your Land in New York is an "owner's manual" for people who own land in the Empire State. It has been produced by the staff of *Northern Woodlands* magazine with the generous support of the organizations listed inside the back cover.

Its intended audience includes anyone in New York who owns 10 or more acres of land, and anyone who believes that, with careful stewardship, the landscape that makes this state so special can support and sustain us for many generations to come.

For more information, or to request additional copies of this guide, visit www.pych.org



The Place You Call Home: A Guide to Caring for Your Land in New York

A Northern Woodlands Publication



The Place You Call Home

A Guide to Caring for Your Land in New York

A Northern Woodlands Publication



Welcome

Northern Woodlands

The Place You Call Home:
A Guide to Caring for
Your Land in New York
© April 2011

Editor

Stephen Long

Design

Liquid Studio/Lisa Cadieux

Contributors

Joseph Adams, Marian Atkinson,
Virginia Barlow, David Beers,
Jim Block, Madeline Bodin,
Betsy Brigham, Hugh Canham,
Tovar Cerulli, Kindra Clineff,
Andrew Crosier, John Douglas/
Flying Squirrel, Ecophotography,
Steve Faccio, Castle Freeman,
Blake Gardner, Mike Greason,
Bob Henke, Ben Hudson,
Roger Irwin, Kathryn Lund Johnson,
Henry Kernan, Victor S. Lamoureux,
Gale Lawrence, Gerry Lemmo,
Annette Lorraine, Dave Mance III,
MBC Design, Eben McLane,
Krista Muller, Elinor Osborn,
Bryan Pfeiffer, Roy W. Pilcher,
Carrie Sandin, Jeff Schneidermann,
Michael Snyder, John Sullivan,
Ned Therrien, Mary Thill,
Adelaide Tyrol, Charles H. Willey,
Chuck Wooster

ONCE A NEW YORKER, ALWAYS A NEW YORKER. In my first three decades, I lived in four different counties – Onondaga, Hamilton, Cattaraugus, and New York County, otherwise known as Manhattan. That means I've been blessed with experience in both urban and rural New York. Hamilton, in the heart of the Adirondack Park, is the least populated county in the state.

That bifurcated background has helped me edit this publication, which springs from a recognition that many people who now own land in rural reaches of New York come from backgrounds that are more urban or suburban.

Although I no longer live in New York – my wife and I live on 95 acres of forest and pastureland in central Vermont – I share your interest in tending the land. And while I've spent the last 17 years writing about the Northeast's forests, I was a true novice when we bought our land.

The first time my wife and I had logging work done on our land, we made all the classic mistakes: we were away when the work was done; we had no signed contract with the logger; and we didn't have a forester mark the pines to be cut.

When we returned the following summer, we were very discouraged, not having been prepared for what it would look like. Our sole consolation at the time was that we had shipped some of the white pine to a sawmill to be sawn and planed for our own use, and as we built our house, we used the pine for wainscoting, window trim, and our living room floor.

I've learned a lot about our woods over the years – the plants and animals in it, its history, and its potential for wildlife habitat, recreation, and producing income – but the one essential lesson was realizing that we needed the services of a forester. Our land now has a forest management plan, developed by a consulting forester who spent the time to walk in the woods with us and discuss strategies for creating grouse habitat in one stand and growing nice sugar maple in another. Under his supervision, we have since had three more timber harvests, with a fine logger working under the forester's guidance, and we have been thrilled with what's been accomplished. We've made some money, even though most of the trees that have been cut have been those of poorer quality, giving the better trees more room to grow. Because we have diversified the structure of the forest, we now see – or at least hear – all sorts of new songbirds: wood thrush, scarlet tanager, song sparrow, and chestnut-sided warbler, to name a few.

It's been a great learning experience, and along the way I have benefited greatly from the expertise of extension specialists in agriculture and forestry. But I would have been further ahead faster if there had been a publication like this one available to me. *The Place You Call Home: A Guide to Caring for Your Land in New York* is a collection of stories that will provide the information you need about your land and the role it plays in the ecology, economy, and culture of the region.

Even the most committed and effective tenders of the land are not born with a sense of stewardship, which only comes from spending lots of time on a piece of ground. By getting to know the woods in all seasons and in all weather, by walking the trails and tromping off between them, we develop an appreciation for the land's many gifts.

It's very easy to look at land simply as real estate, a certain number of acres, plus or minus, that surround the house. But land is so much more than that – it is a tremendous asset not only to the owner but also to the community. Forestland helps filter and store water so the supply of it remains plentiful and clean. It provides habitat for a stunning array of wildlife species. It serves as the backdrop for our dazzling views. And it provides a supply of wood, the processing of which employs thousands of people in rural communities across the Empire State.

As more and more people are attracted to the woods, the land is at increasing risk of being chopped up into house lots, making it more suburban than rural. Town and state regulations and planning efforts play a role in directing the development to the most appropriate places. But in truth, the future of New York's forests is in the hands of the thousands of individuals who now call that land home. The future is in the hands of people just like you. — STEPHEN LONG

This publication comes to you through the help and support of a number of organizations and businesses, all of which are listed on the inside back cover. Their financial backing has been instrumental in making this publication a reality. We thank them all.

The Place You Call Home: A Guide to Caring for Your Land in New York

was made possible through the generous funding and support of the following partners:

New York Forest Owners Association

American Tree Farm System, New York Tree Farm

Sustainable Forestry Initiative, New York Implementation Committee

Easter Foundation

International Paper Company Foundation

Robert Barnes

Society of American Foresters, New York Chapter

Finch Paper, LLC

Forecon

LandVest

Mike Greason

Cornell University Cooperative Extension

Potter Lumber

Robert H. Wentorf Foundation

NYFOA, Southern Adirondack Chapter

NYFOA, Allegany Foothills Chapter

Cornell University Cooperative Extension, Chenango County

Center for Northern Woodlands Education
Northern Woodlands Magazine, 1776 Center Road,
P.O. Box 471, Corinth, VT 05039-0471
Tel (802) 439-6292 Fax (802) 439-6296
mail@northernwoodlands.org
www.northernwoodlands.org

POSTMASTER: Send address corrections to Northern Woodlands Magazine, P.O. Box 471, Corinth, VT 05039-0471 or to mail@northernwoodlands.org.

All rights reserved. Reproduction in whole or in part without the written consent of the publisher is prohibited.

For Northern Woodlands subscription information call (800) 290-5232

Printed on paper with 10 percent post-consumer recycled content.



Contents

Our Home in New York Forests	Hugh Canham	2
Forgotten Fruit: Apple Trees in the Wild	Michael Snyder	6
What Do Animals Need? And Do Your Woods Provide It?	Stephen Long	10
Property Tax Reduction for Woodland Owners: A Look at Section 480-a	Mike Greason	17
A Celebration of Dead Trees	Gale Lawrence	19
Consulting Foresters: What They Do and Why You Need One	Eben McLane	22
Certification Comes to New York's Family Forests	Tovar Cerulli	26
Fields Among the Forests: Keeping Open Land Open	Chuck Wooster	32
Can Your Woods Be Too Tidy?	Michael Snyder	35
The Gift of a Forest	Henry Kernan	36
Working the Small Woodlot	John Sullivan	40
Building Better Forest Roads	Madeline Bodin	44
Woodland Invasives: Doing Battle with Non-Native Plants	Mary Thill	47
Healthy Rivers are Made in the Shade	Stephen Long	52
Smart Planning: Preparing for the Eventual Transfer of Your Land	Eben McLane & Annette Lorraine	56
Earning Its Keep: Finding Sources of Income from the Land	Stephen Long	60
Tree Girdling Can Improve Your Forest	David Beers	63
Red Oak, Black Cherry, and Great Blue Herons	Bob Henke	66
A Forest in Fragments: Smaller Parcels Can Cause Large Problems	Joseph Adams	70
Deadly Insects: Early Detection Can Save Thousands of Trees		73
Birds in the Brush: The Lowdown on Ground-Nesters	Bryan Pfeiffer	74
Resource Guide		78
A Place in Mind	Castle Freeman	80



ANDREW CROSER



NORTHERN WOODLANDS



NORTHERN WOODLANDS



BEN HUDSON



MARIAN J. ATKINSON

Our Home in New York Forests

BY HUGH O. CANHAM

The soft whisper of pines as skiers take to the trails; a fine cherry cabinet adding character and value to a home; clean sparkling water flowing almost endlessly; the brilliant colors that splash across the crisp October landscape: New York State's forests, parks, and woodlands provide so much to all the citizens of the Empire State. Each acre of forest land is important, whether it's owned casually as part of a home site, for hunting or summer recreation, or to produce wood products on a commercial scale.

The forests of New York State have been providing people with dependable shelter, food, water, and recreation since the dawn of humans. Within the State's borders are a rich diversity of tree species, thousands of forest owners, and a multitude of uses of the forests. It's a dynamic system and the Empire State's forests continue to evolve. The responsibility for maintaining this rich diversity, dependability, and dynamic aspect of the forests rests with the people who own and manage these lands. Even though New York is home to significant public lands such as the Adirondack Park, the Catskill Park, and many others, it is still the case that individuals, families, and other private non-industrial owners control the great bulk of the forests: 15 million acres, or 85 percent of the total forest area is privately held. Their actions (or inactions) and plans for the future affect all New Yorkers from New York City to the villages of the Adirondack Mountains.

The forests of the Empire State are extremely diverse in trees, other plants, and animals. Red maple (*Acer rubrum*) and sugar maple (*Acer saccharum*) are the most prevalent tree species, followed by white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), and red oak (*Quercus rubra*). The size, density, and overall condition of the forest vary from place to place.

On eastern Long Island, pitch pine and oak are located both in small isolated tree-covered patches and in a few larger tracts. Throughout the Hudson Valley and stretching across the State from Albany to Buffalo along Lake Ontario and the Finger Lakes, forests exist in scattered woodlots where farming, commercial development, or home sites are not feasible. Across the broad sweep of the Southern Tier, through Central and Western New York, forests cover over half of the landscape, interspersed with

open spaces. This is the area where forest regrowth following the decline of farming has been most prominent. In northern New York (the Adirondacks and Tug Hill regions) the boreal forest mixes with the northern hardwoods.

European settlers found almost all of New York covered with dense forests. Large land grants and small freeholdings quickly took place. Following the Revolutionary War, settlement moved up the Hudson River, into the Catskills, and across the Southern Tier. In the Adirondacks, large ownership blocks remained. On into the 1800s, these Adirondack forests were the source of lumber to build an empire. Indeed, the Port of Albany led the nation in lumber shipments in the mid 1800s. Many of the present-day Forest Preserve lands that comprise over 3 million acres in the Adirondacks were harvested prior to state acquisition in the early 1900s but remained in forest cover. In this region, forests cover over 80 percent of the land and form an important component of the local economy. Across the remainder of the State, land was being cleared for agriculture, and by 1920 only 20 percent of New York remained in forest cover. As more productive lands opened in the Midwest and the technology of farming changed, farming in New York became less profitable. The 20th century saw a decline in farmland with a concurrent regrowth of forests. Forests are the natural dominant land cover here in the temperate northeastern United States, so on the recently abandoned farmlands, young trees found an ideal site on which to grow. Today, forests cover 18.6 million acres, 65 percent of New York's land area.

Following World War II and accelerating through the 1970s and beyond, the abandoned farms, by then largely forest covered, were purchased by a wide variety of people. These "family forests," as they are often called, stretch across the State. Drive the New York State Thruway from New York City to Buffalo, or Route 17 from Harriman to Binghamton and on to Jamestown and Lake Erie, and virtually all the forestlands you see are privately owned. Even in northern New York, where public ownership is prominent within the Adirondack Park, half the forests are privately owned. Who owns these lands? What do they do with the land? How do their actions affect the economy and environment of New York?

Farmers once held most of the private forests of New York; however, today they only hold about 25 percent. Forest industry and other corporate ownerships collectively hold about 12 percent. The remaining 63 percent, some 9 million acres, are owned by every



MARRIAN J. ATKINSON



NORTHERN WOODLANDS



NORTHERN WOODLANDS



NORTHERN WOODLANDS

kind of person from white collar to blue collar to retired. Lawyers, doctors, bankers, nurses, factory workers, teachers, mechanics: all own some of the Empire State's forests. Surprisingly, the single largest group of owners today is retirees; some purchased their land while working and others have obtained it following retirement with a desire to live in the country or to have a place for their families to use for recreation or a summer home.

Most of New York's forests are relatively small parcels. The average size of an ownership is less than 50 acres with the bulk of all the private forests in tracts between 10 and 500 acres. Half of the almost 500,000 private owners own less than 10 acres. Collectively, these small owners hold only about 900,000 acres, but some of these strategically located tracts play a particularly important part in sustaining a healthy New York.

Ownership objectives, in some cases mirroring the diversity of forest types, vary across the State. Timber production ranks much higher as an ownership reason in and around the Adirondacks and Tug Hill. Forests as part of the backdrop of a residence or the farm woodlot are a dominant reason across the Erie-Ontario Lake Plain and down the Hudson Valley where small scattered forests are interspersed with farm fields and houses. The overarching reason for ownership across all regions, however, is recreation and enjoyment of spending time on the land.

Most people don't own land solely to contribute to the nation's "wood basket." On the other hand, most owners are not averse to harvesting timber – they might just not have thought of it until approached by a logger or until they see a neighbor's woodlot being harvested. When an owner's financial situation changes, such as needing to pay a child's college tuition or medical expenses, the woodlands may be looked at as a source of revenue. In this way, most private forests will see some timber harvesting, even though harvests might be 20 or 30 years apart. On the other hand, some owners manage their lands more intensively so more frequent sustainable harvests take place. On these forests, ranging from a few acres up to hundreds of acres, owners are managing for timber, wildlife habitat, and aesthetics as outlined in a sustainable long-term management plan prepared by a professional consulting forester.

Economic impact

The economic benefits and contributions that forests make to the State are tremendous. Collectively, the annual direct contribution of wood-based manufacturing and forest-related recreation and tourism to the New York economy is over \$8.8 billion. In 2005 (the last date for which data are available), wood harvesting and processing by sawmills, furniture plants, paper mills, and other operations in New York produced \$6.9 billion in value of shipments. The wood-using industry employed over 57,000 people with annual payrolls of over \$2.1 billion.

Wood products is the sixth largest manufacturing sector in the state. During the last 100 years the mix of wood products and paper manufacturing has changed. Once the leading state in softwood lumber (pine and spruce) production, New York now ranks as a leading hardwood lumber and furniture producing state. The paper industry in New York started with the International Paper Co. mill at Corinth, New York. During the 20th century the

industry grew and New York was a leading paper producing state, but more recently our paper industry has shrunk. Other uses for pulp-quality wood, particularly biomass for energy, are evolving. Although the wood-based economy of New York faces changes, it remains an important part in both rural and urban areas.

The economic benefits of forests include outdoor recreation as well, and many pursuits depend entirely or partly on the forest. Camping, hiking, hunting, skiing, snowmobiling, and fall foliage and wildlife viewing wouldn't happen without our forests, nor would the 14,000 recreation-related jobs and payrolls of over \$300 million. Each 1,000 acres of forestland in New York supports almost four timber and forest recreation related jobs. Even more importantly, these direct financial contributions often occur in rural areas otherwise lacking economic opportunities for the residents.

So, some of the benefits are readily measurable in financial terms. Others, those that have come to be known as "ecosystem services" – clean air, clean water, wildlife habitat, and the like – are harder to quantify but are still vital to the health of the environment, the economy, and quality of life for New Yorkers. For instance, we have some of the finest drinking water in the world and most of it starts its journey to the tap on forest land somewhere in the State. Indeed, life for the 8 million people living and working in New York City would be impossible without the clean abundant water from the watersheds both east and west of the Hudson in the Catskills. Careful forest management by the thousands of owners of these forests helps ensure the quantity and quality of this vital water supply. The mix of forest and open field that is a hallmark of many parts of the Empire State presents a pastoral landscape that is not to be taken lightly. It is a reason many of us choose to live and work here.

The biodiversity of New York's forests is also important, made possible largely because each forest owner manages his or her lands differently from the neighbors. The type and timing of timber harvests varies from owner to owner, creating a mosaic of habitats that benefit a wide variety of wildlife. In addition, forests offer some of the best buffering against global warming.

When we think of forests, we usually think of rural forests, but the urban forest is also very important. Street trees, isolated patches of tree-covered islands in our cities, and backyard shrubs and trees enrich the urban landscape.

It's important that New Yorkers not take all of these benefits for granted, because our forests exist only within a very complex social structure: forest owners have many diverse interests, major forest policies are being debated in local and state governments, urban populations are far removed from the land. The challenges facing the continuation of sustainable and viable forest resources will require all the interested parties to actively work together. It's up to the private forest owners, conservationists, the wood-using industries, and local and state governments, to ensure that the Empire State will maintain healthy forests long into the future.

HUGH CANHAM IS EMERITUS PROFESSOR OF FOREST AND RESOURCE ECONOMICS AT THE STATE UNIVERSITY OF NEW YORK COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY. HE LIVES IN NORTH SYRACUSE, NEW YORK.



NEOTHEMAREN

Forgotten Fruit: Apple Trees in the Wild

BY MICHAEL SNYDER

Far from forbidden – but often forsaken – wild apple trees are an unmistakable sight on almost any woods walk in New York.

Regardless of whether the old apple grove is an abandoned farm orchard or a collection of seed grown mavericks, the look is similar: a few scraggly and struggling survivors just barely hanging on under the stifling shade of red maples, white pines, or any of the other species that outpace the naturally rotund apple tree.

You know the type. They have multiple stems of twisted, mostly rotten wood covered by loose, sapsucker riddled bark. Their branches are mottled with moss and lichens, and they appear thorny for all the broken wood and dead spur shoots. What used to be a glorious spreading crown is now a pathetic collection of disproportionately long shoots desperately seeking a break in the canopy. And there atop those slender whips are a few sad leaves, eking out a living from whatever light the foliage of other species grudgingly lets through.

These are the apple trees that Thoreau described as the kind “you expect nothing but lichens to fall from.” To stumble upon a collection of them in the woods is an arresting experience. There is a certain tension about the scene. They are obviously not orchard trees, but they’re not quite forest trees either. They’re in suspension, somewhere between cultured and wild.

When apple trees are in such limbo, it is easy to see them as decrepit has beens, to focus on the decay and death. Throw in their usual associates – the remains of the collapsed barn, the cellar hole, the rock heap, and the bottle dump, all growing up to brush – and it can be downright depressing. What would Johnny Appleseed think?

Of course, many wild apple trees are in far better shape. Still, even in the best cases, it is easy to see wild apple trees as suppressed, to focus on the lack of leaves, the knobby stems and spur shoots of deadwood.

But look more closely at that scene. And consider it more broadly. See the vigor and vitality, the vibrancy. This much is certain: things happen around apple trees. You don’t need a wildlife degree to know how popular apple trees are with animals of all kinds.

The active apple

A friend of mine is fond of describing forests more as verbs than as nouns. He likes to emphasize the activity of the forest – the living, breathing, dying, and rotting – and not just the stuff. It’s an intriguing concept, and when applied at a slightly smaller scale, it is particularly apropos of apple trees in the wild. Sure, it’s a tree or a group of trees, but to see them as active players in the

Some apple trees hold onto their fruits well into winter, a boon for wildlife when food is scarce.

life of the forest is to fully appreciate their value. Wild apple trees don’t just exist; they grow and give, fight and feed. They emerge, they succumb, they sprout, they break. They engender life. And through it all, wild apple trees are remarkably productive. It may not be board feet or bushels, but they put out nonetheless – and they do so in countless ways.

It is often said that apple trees are “good for wildlife.” That’s a little like saying water is good for fish; it’s the height of understatement. You’d be hard pressed to find a tree species that is more variably giving of itself than an apple tree.

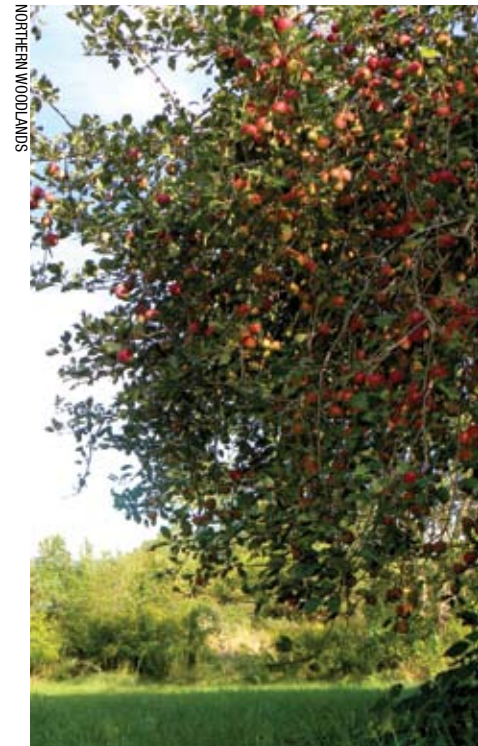
Foremost among an apple tree’s many gifts to wildlife are its fruits, the apples themselves. Their importance as a food source to game species like white tailed deer, black bear, foxes, coyotes, and ruffed grouse is well documented. But there’s more to wildlife than those high profile species, and there’s far more to the value of apple trees than their fleshy fruits.

First, the fruits are eaten by many more species than just the so called “charismatic megafauna.” Look carefully at a fallen apple in the woods and you might see evidence of tampering by all manner of critters – from squirrels and jays to worms and snails.

Then there are the other kinds of food and cover the apple trees provide. Buds and twigs are browsed by deer, ruffed grouse, cottontail rabbits, and numerous others. Voles, rabbits, and mice seem to savor the inner bark of the trunk, especially in winter.

And even though some of the wood on those apple trees may be dead, it’s not without life. It provides excellent cavities for nesting and roosting sites for a variety of birds. Flycatchers, for example, use such trees if they’re growing in the woods, and bluebirds will nest in them if they grow near openings.

Mammals and birds not your thing? Don’t despair; the apple tree provides plenty for insects too. Yellow jackets swarm wind-fallen apples in the autumn, and apple blossoms are abuzz with honeybees in the spring. Throughout the year a great variety of other, less obvious insects make a good living on apple trees too.



This apple tree is truly prolific.



Ten Slow Steps to Apple Tree Restoration

The longevity, vigor, and yield of your wild or abandoned apple trees can be enhanced greatly by using some simple but pleasing cultural techniques. There is as much art as there is science to the improvement of apple trees, and no two situations are exactly alike, so there is no standardized prescription to follow. However, there are a few basic principles that you can adapt to your particular circumstances and style.

Apple tree improvement involves two phases: release and restoration. Release work focuses on removing competing vegetation from around your apples, and restoration involves pruning and caring for the apple trees themselves. Both phases can be outlined in ten simple and purposefully slow steps.

Step 1: Carefully examine your tree(s). If you have several in various stages of vigor or decline, identify the ones with the best hope for rejuvenation and focus your attention on them. Mark these trees. Identify their competitors – all the other shrubs and trees from the apple stem out at least to the drip line of the crown – and mark them too.

Step 2: Slow down. Eat an apple.

Step 3: Remove the competitors. Cut out all those trees that you identified as shading or interfering with the growth of your target apple trees. At a minimum, remove the overtopping trees on at least three sides, especially those on the south side of the apple tree.

Step 4: Slow down. Go have some cider.

Step 5: Look more closely at your target trees with an eye toward improving them through pruning. On each tree, look for the presence of multiple stems. Choose the largest and most vigorous one and save it. Cut out the others – including basal sprouts – as close to

the ground as possible. Remember, it's quality that counts. If the largest stem on a tree is not the best, remove it and work with the next biggest but healthiest stem.

Step 6: Slow down. Make an apple pie.

Step 7: Look for broken, diseased, or dead wood and remove all of it.

Step 8: Slow down. Eat your pie.

Step 9: Inspect the remaining live crown. Don't be too eager to hack away. Try to leave healthy branches growing in a horizontal plane. Don't remove the spur shoots that grow on the sides of main branches – that's where the fruits grow. Focus your cutting efforts on crisscrossing branches that rub together and on water sprouts – those zillions of rapidly growing vertical shoots that sprout from the tree top. Try to reduce the spread of the upper limbs to allow more sunlight to reach the interior and lower limbs. This will encourage their fruitfulness.

Step 10: Step back and admire your work. Wait till next year, reevaluating the condition of your trees. Watch the wildlife move in from your neighbors' neglected trees.

A few cautions and comments. Did I mention going slowly? It's important. Don't try to remake the whole tree in one outing. The first annual pruning in particular should always be light. There is also a distinct possibility of shocking the tree with too severe a release. This is especially true of trees that have been under heavy shade for a long time. Releasing them too much and too fast can bring strange and unwanted responses from the tree – like death.

One way to ease into the release is to leave standing

any other soft or hard mast-producing trees. If you've got, say, serviceberry or oaks around your apples, consider leaving them. Another way is to kill – but not fell – the competitors by girdling them. Cut a ring through the bark completely around the stem of the unwanted tree, and it will die and open the canopy a bit more gradually. This is especially useful when removing large trees that might otherwise trash your apple trees upon felling.

When it comes to removing dead apple wood, you can hardly go wrong. But, you may want to leave some of those large, hollow, and often horizontal branch segments. These make excellent nest sites for a variety of birds.

Always use good technique. Make clean cuts with sharp tools. Leave no stubs, nicks, tears, or splits.

Timing counts. Pruning apple trees is best done only when the tree is dormant – when there are no leaves. Late winter and early spring are best, from February to mid-April. You can cut out competitors at any time, but for best results, try to cut the hardwood competition just after they've broken bud or when they are stressed – during a drought or insect attack, for example.

What to do with all that brush and slash that you've cut? One idea is to pile it for wildlife cover. Cottontail rabbits are particularly fond of brush piles. The most effective piles are those that are made over rocks or stumps or the like.

A few helpful tools are all you need: short- and long-handled pruning saw and loppers, nursery shears, and maybe a sturdy ladder and a lightweight chainsaw. Go to it. Slowly.

There are aphids and ants, maggots and mites, borers and beetles, scales and skeletonizers.

Microbes you ask? Sure. The bacteria that cause fire blight disease have quite a time for themselves moving from blossoms to leaves to stems. Not to be outdone, the fungi are also well represented: frog eye leaf spot, cedar apple rust, and apple scab are all common apple diseases caused by fungi.

When it comes to illustrating the finer points of biotic diversity and species interactions, the Discovery Channel has nothing on forest dwelling apple trees.

Where did they come from?

As valuable and important as apple trees are for wildlife, they have had a similarly long history with people. Indeed, the apple overcame a decidedly inauspicious start in the Garden of Eden to enjoy a long and storied relationship with human civilization. The apple, if not the apple tree, has become a powerful icon of Americana.

And so it has been in New York. Curiously, though, the apple is not native here – this despite its long history and widespread presence. There are a couple of species of wild crabs thought to be native to North America, but domesticated apple trees originated in Eurasia.

When European immigrants settled in North America, they brought with them seeds from their favorite apple trees. Many written histories state that planting apple orchards was among the first tasks the early settlers undertook.

Here in the Northeast, those first orchards were planted with imported seeds and were used to produce cider. Owing to the peculiarities of apple biology, these first seed grown apple trees hybridized with each other and with crabs that had become naturalized. The result was an explosion of new varieties.

Initially, apple growing in the Northeast – and throughout much of the US, as land was settled – was limited to seedling trees of uncultivated varieties. Apple trees do not reproduce true to seed, which means that the seed from the Cortland you're eating will not produce a tree with Cortland apples. Growers intent



This wild apple tree has been released from competition.

on cultivating any particular variety had to learn and develop sophisticated methods of grafting and propagation.

Eventually, three varieties emerged as the early favorites: Baldwin, Northern Spy, and Rhode Island Greening. Of course, there were others, including Rome, Twenty Ounce, Nonesuch, Wealthy, Winesap, and Winter Banana.

By 1900, commercial orchards of cultivated trees had become the source of New York's apples. Slowly, but inexorably, as unproductive farms were abandoned and reverted to forests, the remaining small homestead cider orchards gradually slipped into the woods.

Abandoned but not forgotten

Considering their importance to both wildlife and people, it is no surprise that abandoned and decrepit apple trees have become the focus of some intensive restoration and management programs.

Because forest grown apple trees provide so much for wildlife and because they are often lacking in vigor, managers try to "release" them from the competition of surrounding trees. This entails cutting all surrounding trees and shrubs back to the drip line of the apple tree and removing large overtopping trees from at least three sides, especially toward the south side of the tree.

Foresters recommend releasing apple trees when the opportunity presents itself as part of a timber sale. But it can also be part of a landowner's ongoing habitat improvement efforts.

As if saving the apple trees and increasing their production of fruits were not benefit enough, releasing apple trees also yields indirect benefits. Removing competing trees stimulates growth of new and different species – herbs, shrubs, and tree seedlings – in the understory, which provide added food and cover to a variety of critters.

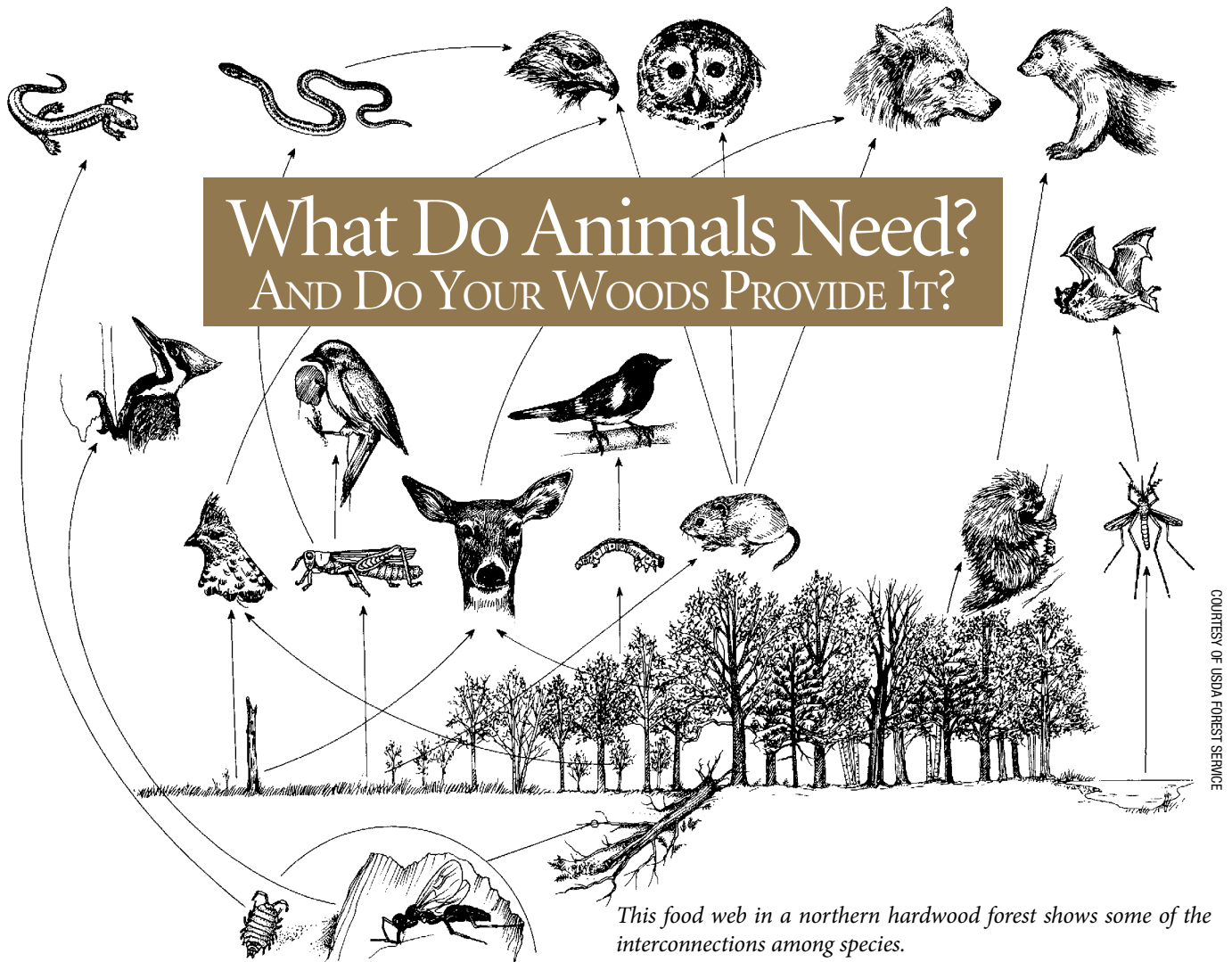
Apple trees are not the only target of such release projects. You can do it for any soft mast (food) producing trees and shrubs – cherries, serviceberry, dogwoods – but it's best to not be tempted to cut hard mast producers like oaks and beech to release soft mast trees.

Maybe it's excitement and anticipation – not tension – that I feel among the apple trees living on the edge between cultured and wild. After all, there's always the promise of fruit. Right after Thoreau described those decrepit trees he went on to point out the apples on the ground beneath them. "Surely apples are the noblest of fruits," he wrote.

Something tells me he did not mean noble in the patrician, aristocratic sense. I'd rather believe that he saw apples as noble because of their dignity, generosity, and magnanimity. He rightly pointed out that we too can partake of the apple tree's offerings.

In imploring us to get out and walk among the wild apples, he wrote, "The outdoor air and exercise which the walker gets give a different tone to his palate, and he craves a fruit which the sedentary would call harsh and crabbed. What is sour in the house a bracing walk makes sweet."

MICHAEL SNYDER IS THE COMMISSIONER OF VERMONT'S DEPARTMENT OF FORESTS, PARKS, AND RECREATION.



BY STEPHEN LONG

What makes one piece of ground a haven for seemingly every species that Noah saved while another is comparatively void of animals? And how does a forest-land owner know whether her woods is an ark or a wasteland?

At the heart of what has to be a complex answer is one simple statement: every animal species needs food, water, and cover in a physical arrangement that meets its specific needs. Whether or not a plot of land can serve as home to any particular species depends on its capacity to provide the requisite combination of food, water, and cover. Some animals are generalists – white-tailed deer are a prime example – that can thrive under a multitude of situations, from the industrial forest, to agricultural land, to suburbia. But there are less-adaptable species whose habitat requirements are so specific that the loss of that particular habitat can put the

species' local population in a tailspin. The woodcock, for instance, feeds in dense young stands, nests in slightly more mature woods (15 to 30 years old) and performs its courtship ritual out in the open. If these three elements don't exist in close proximity to one another – and the combination is becoming scarcer in the Northeast where forests are aging and former agricultural land is turning into subdivisions – woodcock will not be there.

It's not by accident that both examples I've cited – deer and woodcock – are game animals. For many years, wildlife management meant game management. State fish and game departments saw their job as managing game animals for the people (hunters) who, through license fees and excise taxes on sporting goods, paid their salaries. That mission has shifted in the past few decades, a change signaled by the renaming of many departments from "Fish and Game" to "Fish and Wildlife." In New York's

Department of Environmental Conservation, it's the division of Fish, Wildlife, and Marine Resources. This shift has come about through recognition that wildlife belongs to all the people, not just hunters and anglers, and that watching wildlife is a pastime enjoyed by thousands.

Because of wildlife managers' historic focus on game animals, it is the game animals' habitat needs that have been studied most thoroughly. Volumes and volumes have been written about managing habitats for turkeys, ruffed grouse, woodcock, white-tails, snowshoe hare, quail, cottontails, migratory waterfowl, and game fish such as trout and bass. Hunting and conservation groups like Wild Turkey Federation, Ruffed Grouse Society, Ducks Unlimited, and Trout Unlimited have spent considerable time and money planting oak, patch-cutting aspen stands, building wood duck boxes, and restoring streambanks, all in the name of providing for the needs of their favorite species. Fortunately, though, by concentrating on the needs of game animals, managers have also been providing good habitat for many other species as well. For instance, the ruffed grouse requires thick sapling stands of hardwoods with dead logs on the ground for its breeding habitat. This same habitat serves the needs of a number of small mammals, amphibians, and songbirds, including veeries, red-starts, and rose-breasted grosbeaks.

Today, instead of featured species, wildlife managers and forestland owners are thinking in terms of biological diversity, or biodiversity. They are paying attention to food webs and biotic communities. These refer to the collections of plants, animals, and other organisms that occupy an area, co-existing in a way that is mutually sustaining to the species, if not necessarily to the individuals.

As in a human community, not all of the residents are present all the time. In a thicket, for instance, migratory birds may use the habitat for much of their northern stay. Ruffed grouse hens, on the other hand, use it for breeding, then move to more open woods for nesting. Others, like the fisher, pass through while hunting for a meal, so the thicket is a very small part of the five square miles it might roam in a month. At the other extreme, an animal with a small home range (the red-backed vole, for instance) can find all the seeds, nuts, and insects it needs in a quarter-acre thicket. The presence of all of these animals, along with the plants and insects, has an effect on all the other parts of the community.

New York's fields and forests are home to 442 vertebrates: 61 mammals, 316 birds, and 65 reptiles and amphibians. Most of these animals have small home ranges, with the vast majority of them living on 50 acres or less. (Note that for migratory birds that cover thousands of miles, the range we're referring to is their range while in residence here.) Because of these small home ranges, it's quite possible for most New York landowners to play a significant role in the presence or absence of a large number of wildlife species.

No matter how hospitable your land is, however, it will not be home to all of these species. To put this into perspective, let's look at the Huntington Wildlife Forest, a 15,000-acre research station operated since 1932 by the State University of New York College of Environmental Science and Forestry. Huntington is

located in Newcomb, in the central Adirondacks. Stacy McNulty, associate director of the Adirondack Ecological Center, housed at Huntington, said that researchers have been examining the forest's wildlife habitats for nearly 80 years. This gives them as thorough an accounting of species as can be expected anywhere, and they have documented the presence of 27 reptiles and amphibians, 46 mammals, and 171 bird species. Impressive species diversity like that can only happen in a forest that is itself diverse. About seven percent of Huntington's 23 square miles of forest are approximately 300 years old, while most of the remaining forest is interspersed with stands of trees in various stages of experimental management, from small clearcuts to thinnings to uneven-aged forest.

This mix of managed and unmanaged forest ensures a tremendous variety of tree sizes and species composition, and that is supplemented by intact complexes of small ephemeral pools and larger more permanent wetlands. All this helps support a rich array of biodiversity.

But most likely, you don't own 23 square miles of forestland and don't host half of New York's species. Still, there's a role for you to play. If you want to encourage the presence of a particular species, there is information available through state fish and wildlife agencies to help you get started. Keep in mind that the task will be different if, rather than a songbird, it's a large mammal you're interested in because you probably do not own enough land to serve all the needs of the large mammals – deer, moose, black bear – whose ranges are measured in square miles rather than acres. In this case, it's a collection of many adjacent landowners who hold the key to habitat.

If we're serious about our interest in the large landscape creatures, we need to be serious about the large landscapes. It's important for people to think about the larger picture and where they fit into it. For bobcats and bears, for instance, it's essential to have large stretches of continuous forest cover. When new houses are built on hitherto unpopulated ridges and hilltops, they are serious interruptions in what had been continuous forest cover.

Mariko Yamasaki, a wildlife biologist who works with the USDA Forest Service, in Durham, New Hampshire, is the co-author of two books that have served as the bibles for wildlife managers in the Northeast, helping them provide for the habitat needs of our mammals, birds, reptiles, and amphibians. She said, "Traveled roads are barriers. That's why the national forest gates logging roads when the work is done – so there's no traffic. But a woods road is not fragmenting if people are not driving on it. Animals will walk across it, no problem. The problem comes when there's a change in usage and people are driving on it every day."

Evaluating habitat

If the key to good wildlife habitat were to be summed up most succinctly, it would be in one word: variety. Beyond being the spice of life, variety is the single most important factor in determining whether wildlife will find your patch of woods hospitable. And that variety has to be considered on a number of different scales, ranging from a patch of less than an acre up to the entire landscape.

The first step in evaluating your land is to get the big picture, both figuratively and literally. Yamasaki said, “The larger landscape is the first thing to consider. Is it forested? Is it mixed farms and forest? Is it suburban?” The wider look at the landscape allows you to determine whether your land is typical of what surrounds it, or whether it may provide some unique features.

“Look for things that have inherent diversity,” Yamasaki said. “What is there besides woods: are there aquatic or wetland situations, are there any strikingly different elevations? That’s the stuff you either have or you don’t have; you’re not going to make any more of it. The more interesting the mixture of those things, the more interesting the piece of land is going to be for critters.”

How large a landscape do you need to be thinking about? As a rule of thumb, Yamasaki recommends that you know what an area ten times your own acreage looks like. If you are the typical New York forest landowner and own approximately 20 acres, then you should take a look at topographical maps and aerial photos that cover at least 200 acres. If you own more land, expand your overview proportionally.

It used to be that you had to go to the Natural Resource Conservation Service office to get an aerial photo of your property. NRCS offers photos that they updated every 10 years or so. Now, with the online availability of satellite imagery, orthopho-

tography, and maps combined with aerial photos, it is easy and fun to get a feel for some of the ways in which a particular property fits into the larger landscape. These bird’s eye views provide an immediate sense of whether your land is a continuation of a large trend or whether it holds some anomalies.

If a forester has developed a management plan for your property, the map that accompanies it will be invaluable. Photocopy it and add details to it as you discover more about your land. As you look at these maps or photos, it’s variety that you are seeking: variety in elevation, in land cover, in forest type. If, for instance, your reverting pastureland is the only open land in the area, it can have tremendous significance for any number of grassland birds, including the bobolink and eastern meadowlark. If, on the other hand, your land is part of an unbroken stretch of sidehill hardwoods or bottomland spruce-fir, then your challenge will be to introduce some variety through your management choices.

More information can come from soil maps and bedrock maps, which can help you recognize an anomaly on your land. It may be that your land serves as a deer wintering area or that it holds endangered plant or animal species. These, too, are mapped and available from the state fish and wildlife departments.

Mariko Yamasaki said that the different style of landowners’ use of their land over the years has precluded uniformity of habitat. “In the Northeast, the intensity of management has not been uniform. Because of different outlooks and different types of landowners, the likelihood of managing stands all alike is really low.”

She notes that other parts of the country don’t have the built-in mix that is so important in the Northeast’s landscape. “The terrain is extraordinarily heterogeneous, sites are extraordinarily heterogeneous, the landscape is changing dramatically every five to 10 acres, and so it’s harder to be absolutely uniform. However, having said that, the tendency of a new kind of landowner to want it all to look like untouched woods does have an effect over time, and that’s what we’re seeing.”

The societal preference for a mature forest may stem partly from a reverence for the “forever wild” lands of the Adirondacks and Catskills, but the effects are seen throughout the state. It is particularly apparent in the areas where forestland is owned increasingly by people with urban or suburban attitudes toward logging and forest management. There, the forest can be markedly lacking in an understory, which provides food and cover for so many species.

“People are talking about unbroken forest canopy being the epitome of what folks want to see,” says Yamasaki, “but frankly, from a wildlife habitat perspective, this is Boresville. It’s horrible! There are reasons to do that, but there are a whole lot of reasons not to make it the only tool in your bag.”

The party in Boresville – the break in an otherwise unbroken canopy – comes either from natural disturbances such as ice storms or windstorms that blow down sections of forest, or forest



BERNARDSON

This barred owl hunts from its perch on a dead pine branch.

Water, Food, and Cover

Water, food, and cover are the essentials of life for any species. Water comes in many forms, whether standing in ponds and lakes, running in streams, brooks, and rivers, or pouring forth from the ground in a spring. Its more ephemeral forms – rain-soaked shrubs or dewy grass – can meet the water requirements of many small species.

The forest is full of food. From beneath the ground to the forest canopy, there is a tremendous variety of food. Animals eat parts of plants that range in size from grasses to trees: they eat the leaves, stems, buds, flowers, and seeds of trees, shrubs, forbs, and grasses. They eat fungi, mosses, lichens. And they eat each other.

The relationship between predator and prey is at the heart of habitat, which makes it nearly impossible to talk separately of animals' needs for food and cover. It's true that animals require cover from the elements – they need shelter from heat, wind, cold, and precipitation. But more important – literally, of life and death importance – is the need for cover from predation.

The predator-prey relationship determines the habitat choices that nearly all animals make. Predators are seeking prey. Prey animals are seeking food and always aware of cover that will make them less vulnerable to predators. At specific times, they are looking for different kinds of cover: travel and escape cover is different from roosting or sleeping cover. Depending on who is the prey and who is the predator, cover can take many forms. Tunnels provide voles with cover from most of the mammals and all of the birds that prey on them. Thick stands of hardwood saplings provide grouse with shelter from their chief avian predator, the goshawk. Thick stands of softwoods and brush keep rabbits and hare safe from fox, coyote, bobcat, and lynx. A lone spruce in an otherwise deciduous forest is a magnet for nesting songbirds. For their nest sites, hen turkeys look for low shrubby cover next to a tree or stump.

When you think of predators, the region's larger ones – coyotes and bobcats – come to mind. But think smaller, too: fox, fisher, mink, and other weasels. Think beyond mammals: owls and hawks. And if you're willing to recognize invertebrates as prey, then it becomes wide open: turkeys eat grasshoppers, woodcocks eat worms. Insects are a staple for many songbirds, if not throughout the summer, at least for their broods. The strict herbivores in the crowd are few: a dozen or

so mammals and fewer birds. Not a single reptile or amphibian in northern New England relies solely on plants.

Why is this so important?

"Prey has to be available," Mariko Yamasaki said. "Predators have to have something to eat, and there has to be some predictability in the likelihood that they'll find something to eat if they wander through [a particular area]."

Some of her research at the Bartlett Experimental Forest in the White Mountains of New Hampshire has been on the small mammal prey base that serves the needs of the small- to medium-sized predators. She said that six species of small mammals supply 95 percent of the biomass that's available to be eaten: short-tail shrew, red-backed vole, masked shrew, woodland jumping mouse, deer mouse, and white-footed mouse.

What about the bobcat, whose numbers are decreasing across the area, and the lynx, which some organizations are trying to have listed as an endangered species? What about large carnivores like the mountain lion and the wolf that many people would like to see back in these woods? Said Yamasaki, "These are big area wanderers, hundreds of thousands of acres for some of these things. Again, prey has to be available."

And while society's concerns for safety and possible economic loss will have a lot to say about whether wolves and mountain lions are welcome in the Northeast, their presence and that of bobcat and lynx is tied to the existence of a viable prey base. The lynx relies particularly on snowshoe hare, but hare populations are down, largely due to loss of habitat. "People in New England are not doing a whole lot to make the prey bases attractive enough to hold the larger carnivores. There's less regenerating forests and consequently there's not as many bunnies. The New England cottontail is close to being listed [as an endangered species]. They love abandoned farmland, they love real brushy dense hardwood regeneration. The more you make the cuts smaller, the less regeneration, and the less opportunity for snowshoes and others to get by in and flourish. And it's not just the large carnivores; there's a whole slug of species – owls, for instance – that are tied into what rabbit and hare are doing."

management that imitates nature by removing patches of trees.

Variety. Diversity. Heterogeneity. Once you've gotten acquainted with the bird's-eye view and you can see whether your land provides any variety on the landscape scale, it's time to take a walk so you can see what it all looks like on the ground. And the good news is that one walk won't be enough for you to get the complete picture.

A Walk in the Woods

Many people who take walks in their woods have developed a routine. Maybe there are logging roads, trails, or other kinds of woods roads that serve as the regular route. Or there are particular stops along the way that just have to be made – the hilltop opening with a great view, or a favorite huge old tree. Contrast that with the way a forester conducts a timber cruise, which is to lay out a grid over a map of the land, identify the sample plot

points, and then head out with a compass to examine the woods from that series of pre-determined points. It's a thorough and scientifically sound method for getting detailed information about the woods.

I'm not suggesting that you set up a grid of plot points for the exploration of your woods, but you should adopt the *spirit* of the forester's timber cruise, if not its rigor. Cover the ground systematically. Above all, get off the trail. Explore areas you habitually bypass. If you do, it's guaranteed that you will see your land with new perspective.

What are you looking for?

On your first pass through, get the general impressions. Observe on the ground what you will have already seen on your topographical map and your aerial photos. See how the non-forest areas that showed up in the photos make the transition to the adjacent forest. Try to develop an eye for the stands, that is, groups

of trees that are about the same size and the same dominant species. Notice the size of the trees and their density. See if you can note when the forest changes in appearance. It can change in type or it can change in the size and relative density of the trees. Thus, you could find yourself going from a mature sawtimber stand of northern hardwoods into a pole-sized stand of aspen and paper birch and then into a mature stand of white pine. Take along a field guide if you need help identifying tree species.

If you don't have a management plan prepared by a forester, sketch out a map as you make the rounds. Photocopy and enlarge the topographical map of your land, draw the boundaries and, using the openings, streams, or other features that show on the topo map, sketch in your stands.

Besides doing the mapping, take an inventory of the species that are present. In winter, migratory birds will be gone and reptiles and amphibians will be hibernating, but you'll be able to see tracks of mammals and birds like the grouse and turkey. For the breeding bird survey, June is the best month. Contact your local Audubon chapter and see if a volunteer can come along and help you with bird identification. Carry a notebook and make note of confirmed species.

Don't be scared off by the word "inventory." It won't take days and days and days. If your land is all more or less the same – say it's all sidehill northern hardwoods – the wildlife will not differ from one place to another. It's the anomalies on your land that might show some interesting things. If you have identified them beforehand on your map – maybe you have a vernal pool or a swamp in the midst of an otherwise continuous stand of mature hardwoods – then you can concentrate your effort there.

Horizontal and vertical diversity

One of the more subtle features that you'll be looking for on your walks is horizontal and vertical diversity. One way of understanding these concepts is to think first of a football field, because it has neither. It's flat, is made up of two dimensions, not three, and growing on it is an unbroken monoculture of Kentucky bluegrass. I suppose you could call the yardline markers an interruption in the otherwise sameness of the horizontal plane, and you could call the goalposts vertical diversity, but let's

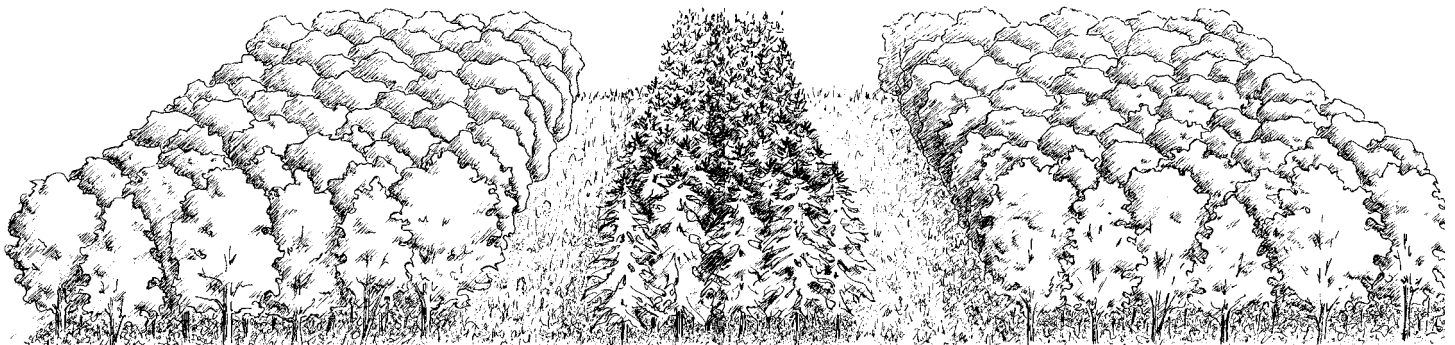
not. One other good reason to think of a football field is that it is approximately an acre in size (Without the end zones, a football field covers 1.1 acres).

While it isn't utterly void of wildlife – robins are finding worms, and moles are tunneling beneath it unless the groundskeeper has found a way to control them – a football field has grave limitations. But with that flat grassy area as a starting point, there are a number of ways to improve on it. First, you can't consider it on its own, outside of its context. If it is bordered by woods, chances are there are bats roosting adjacent to it who will fly out at dusk and pick off insects. Swallows, too. Deer may even come out of the woods and graze if the groundskeeper lets the grass get long between games. Place it in a city, surround it with stands and lights for night games and suddenly you have a lot of birds. Naturalist Ted Levin has documented 16 species of birds while watching a game at Yankee Stadium. (Yes, the Yankees play baseball, not football, but trust me, that doesn't make a difference.)

So even a flat, grassy surface has some merit for wildlife. For the moment, let's forget about the surrounding context and let's make improvements in the diversity of the field itself. The first thing we'll do is add a stand of hardwoods between the goal lines and the 30 yard lines. Between the 30 and the 40, make it a pasture that hasn't been grazed for 10 years. And between the two 40-yard lines, add a stand of softwoods. By changing from hardwood to pasture to softwoods to pasture and back to hardwoods as you go from one end of the field to the other, you have created horizontal diversity. However, there is no vertical diversity, unless the stands we placed there have it within them.

Since we're playing God, let's go ahead and do it. In the hardwood stands, let's have about 60 percent canopy cover. The trees are 12 to 16 inches in diameter and the tallest are 60 feet tall. In the openings among them, there are hardwood saplings growing among thick patches of shrubs. Shadbush and dogwoods get a chance at the edges. In other places, there are trees that regenerated 30 years ago; they're not quite half as tall as the sawtimber, and only four or five inches in diameter. In the softwoods, let's interrupt the dominance of the mature spruce with some patches of regenerating spruce and fir. They're three or four feet high and so thick they're hard to walk through. Paper birch and pin cherry

Here's the football field after we've put in the stands of trees, providing horizontal diversity, which is crucial for wide-ranging animals. Traveling from (or over) one end of the field to the other, an animal would encounter hardwoods, then pasture, softwoods, pasture, then hardwoods again.





CHARLES H. WILLEY ©



CHARLES H. WILLEY ©

are interspersed in the softwoods. And there are brambles and other sun-loving shrubs. Suddenly, at all the levels – from the forest floor to the canopy – there is food and cover.

Then, along the transitional edges between the mature softwoods and the pasture, let's put some pole-size trees, and since there is a good adjacent seed source, we'll scatter some softwood seedlings in the pasture among the knee-high grass, juniper, mullein, and thistle.

Let's jack up one corner of the field so it's 30 feet higher than its diagonally opposite corner. And let's have a small stream find its way from the top corner to the lowest corner. Winding its way

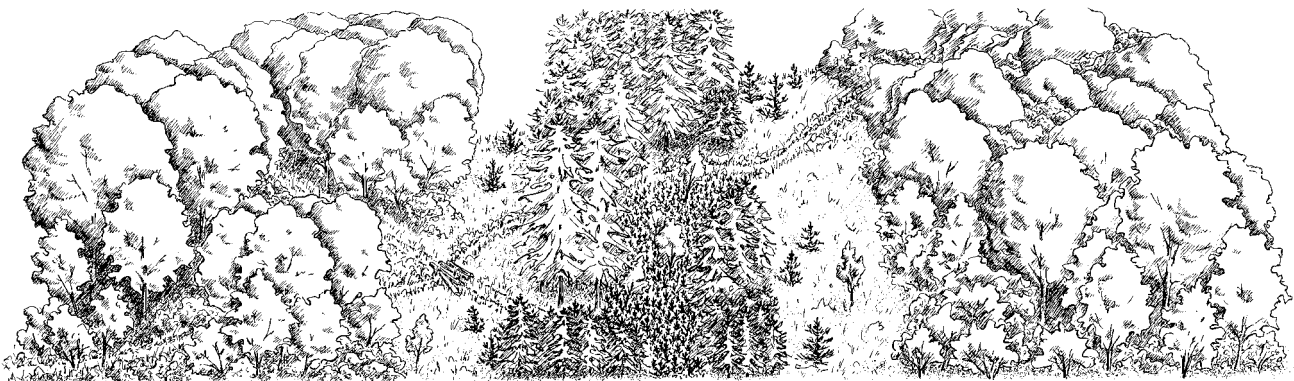
Both moose and wood duck are drawn to beaver ponds.

to the stream from one of the other corners, let's have a woods road that naturally reseeded itself in a combination of wildflowers, grasses, and other herbaceous plants.

Of course, that's an utterly unrealistic preponderance of diversity for a single acre of ground. Also, lines between stands are never this clearly defined, unless one of the stands is a plantation. It's much more likely that the kinds of changes I've described would take place on a scale of at least 30 or 40 acres.

But the forest we've assembled is now full of diversity, both horizontal and vertical. For wide-ranging mammals (predators,

Much greater complexity comes from adding vertical diversity within the stands. The more complex the structure of the forest, the greater diversity of animals whose needs will be filled there.



ILLUSTRATIONS BY BETSY BRIGHAM

along with deer and moose) and birds (raptors and carrion eaters, for example), it's the horizontal diversity that's so important. They need a variety of cover, and thus food sources, to travel through or above. Just as it would be hard for a red fox to eat, drink, and sleep on a football field (even if we extended it to the fox's home range of 400 acres), it would be equally difficult for the fox in a 400-acre stand of mature hardwoods with little or no understory.

For forest birds, it's vertical diversity that is crucial. The wood thrush, for example, sings from the canopy, nests in the mid-story and feeds on the ground. Almost all – if not all – songbirds use more than one layer for feeding, roosting, breeding, nesting, and raising broods.

Complex three-dimensionality is at the heart of habitat. And the more complex the structure of the forest, the greater diversity of animals whose needs will be filled there.

A checklist

Finally, as you walk through your woods, use this checklist and make note of special features, ranging from landscape scale to individual trees, that are a boon to many species of wildlife. Add these features to your map.

Deer wintering areas. One sign that deer are using an area in winter is overbrowsed hardwood saplings (thick branching makes them look broomy) within primarily softwood stands. Deer are such efficient generalists that they can find food and cover almost anywhere nine months of the year. Winter habitat is the only limiting factor; without it, there can be large winter kills in prolonged periods of deep snow and below zero temperatures.

Wetlands. Swamps, marshes, bogs. Wetlands are home to a tremendous variety of plants and animals; these special biotic communities are found nowhere else. Animals are drawn by water, thick cover, and food including invertebrates and plants unique to wetlands.

Vernal pools. These are specialized wetlands – depressions in the forest floor that hold water only in spring. Void of living vegetation but perhaps containing some fallen woody debris, they are very important habitat for a number of species of salamanders, frogs, and invertebrates such as fairy shrimp.

Rivers or streams. Not only the watercourse is important, but also the riparian zone along rivers and streams, which serves as a travel corridor for many species.

Lakes, ponds. Shorelines have some of the same qualities as riparian zones. They also provide nesting sites for waterfowl. If the lake is large enough, it might have loons.

Beaver ponds. True magnets for wildlife ranging from moose to muskrat. Waterfowl, songbirds, reptiles and amphibians, herons, otter, mink – all are drawn to the cover, food, and water the beavers create.

Woodland seeps or springs. Particularly important for salamanders, they are also sought out by turkeys, bears, and migrating birds in the spring. Seep vegetation is the first to green up, and the surrounding ground is the first to thaw.

Dead and down wood. Decomposing trunks, limbs, and stumps are used by many species of reptiles, amphibians, birds, and mammals. They provide cover, moisture, nest and den sites,

and food in the form of insects, mosses, and lichens. This is a very important and easily overlooked habitat feature.

Stone walls or cellar holes. Besides being remnants of our past, these can provide safe openings for ground-dwelling animals like snakes and burrowing mammals, and hiding places for chipmunks and mice.

Groves of beech or oak. The seeds of all trees provide food, but beechnuts and acorns are a critical source of protein for animals preparing for winter. Before entering hibernation, bears load up on beechnuts if they are available. Their claw marks will still show many years later in the beech's smooth bark if they have climbed it in search of nuts. They also gorge on acorns, as do deer, who need to put on fat to get them through winter. Beechnuts and acorns, known as hard mast, are also eaten by turkeys.

Soft mast. Many trees and shrubs provide fruits and berries, and hundreds of species rely on them. Particularly important are cherries (from the black cherry to the pin cherry), blackberries, raspberries, and wild apples, either as single trees or old orchards. Wild apples are a particularly important late-season food.

Overstory inclusions. A few softwoods within a predominately hardwood stand provide cover and nesting sites for birds. Hardwoods within softwood stands provide food. Either one provides structural diversity.

Large cavity trees. Woodpeckers are the excavators, but the cavities they make are then used as nest sites for many birds and den sites for mammals. Songbirds, squirrels, bats, weasels, owls, and raccoons are among the many species that use cavity trees. As the crown dies back, cavity trees are used as perches and roosts. When looking for cavity trees, think also of those in the future. Prime candidates are injured trees and those with a limb broken off. Think also of leaving large trees in your woodlot, those that are too poorly formed to be a sawlog and too big to be handled as firewood.

Raptor nests. Hawks and owls nest high in the canopy, making their own nests or re-using other species' nests of twigs and sticks. Many of the nests are used repeatedly year after year, especially if there is a minimum of human activity near the nests during breeding season.

Cliffs and ledges. Important niches for bobcats, which have had much of their habitat usurped by coyotes.

Rare plant or animal sites or communities. This is the one feature that will probably require outside help to identify, but your legwork can get the process started. If an area looks substantially different from its surroundings, take note of the species of plants. In New York, these include sites such as Atlantic white cedar swamp and limestone woodlands.

Observing, understanding, and mapping the features of your land can be an end in itself, or it can be the first step in developing a management plan. Enhancing your forestland's potential for wildlife can best be accomplished if you enlist the services of a forester or a habitat specialist.

STEPHEN LONG IS A FOUNDING EDITOR OF NORTHERN WOODLANDS MAGAZINE.

Property Tax Reduction for Woodland Owners A Look at Section 480-a

BY MIKE GREASON

New York has an abundant and resilient forest that does much to benefit all New Yorkers, not just those people fortunate enough to own a piece of forestland. Clean air and clean water, habitat for the many species of wildlife, and jobs in wood-related businesses are just some of the boons our forests provide. Large forest tracts are particularly important.

Those benefits to society are not taken into consideration in the state's property tax system, and New York's property taxes on forestland are among the highest in the nation. These taxes can be such a burden that for some owners, the only recourse is to cut off and subdivide forested tracts into smaller parcels. All New Yorkers lose out when the forest is parcelized further, because it often leads to diminished capacity of the forest ecosystem.

State officials have recognized this problem for a long time, and the first forest tax law was enacted in 1912. It and all revisions since then have sought to stabilize the forest industry in the state while retaining larger forested tracts. Unfortunately, the trend

toward smaller parcels continues. The 1970 Forest Service Survey calculated the average woodlot ownership at 40 acres. Figures from the 2006 Forest Services Survey showed the average size had dropped to 21 acres. If this trend continues, much of the rural landscape will soon be more suburban than rural.

There is a program that helps combat this trend. The current version of the forest tax law is Real Property Tax Law, Section 480-a. Through its provisions, owners of at least 50 acres of contiguous, eligible forestland can enroll their woodlands in the program and enjoy an 80 percent reduction in assessment on the qualifying acres. This benefit applies to both the annual property tax and the school tax bills. "Contiguous" property can be made up of one or more tax parcels in one or more towns and one or more counties. The woodlots can be divided by non-forestland, such as cropland, pastures, and water bodies, as long as they are under the same ownership and not divided by an interstate highway or similar obstruction that prohibits access as a contiguous tract. Qualifying acreage must be reasonably well-stocked with trees, which can be measured in three different ways:



BEN HUDSON

- a minimum of 60 square feet of basal area per acre (basal area measures the density of the forest, often referred to as the stocking level)
- 600 stems per acre of commercial tree species one foot tall or taller
- forest plantations with at least 600 stems per acre that have been established for a minimum of three years.

If there has been a harvest within three years of the application filing, it must have been conducted under an acceptable, planned silvicultural prescription. That prevents someone from conducting a heavy harvest and then enrolling the parcel.

In essence, the program provides a major tax incentive to owners who are willing to commit their land to the program for a rolling 10-year period. In return for this reduced assessment, the State expects good forest management, and there are provisions to ensure that. The program requires a management plan prepared by a forester and approved by the Department of Environmental Conservation (DEC). Enrollees file an annual commitment form with DEC and the local assessor to obtain the reduction in assessment. The work schedule in the Certificate of Approval details the management commitment.

When the management plan calls for a harvest, or any cutting,



ANDREW CROSIER

the forester develops a silvicultural prescription and marks the trees to be cut. The Department of Environmental Conservation (DEC) evaluates the appropriateness of the cutting and approves the prescription. When there is a harvest, the stumpage value is certified, and the owner pays a 6 percent stumpage tax to the county treasurer. Lawmakers envisioned the program as a tax deferral, postponing the tax to coincide with income from a harvest, a time when the forest owner can best afford the tax. In reality, the property tax savings over the years should far exceed the periodic stumpage tax.

Every five years, the management plan and Certificate of Approval must be updated so that the work plan always extends for at least the 10-year commitment period. The updated management plan must have updated inventory data for any harvested stands, and all stands must have inventory data no more than ten years old.

Management activities are those an active forest manager would undertake, whether enrolled in 480-a or not. Cutting is prescribed as stands become fully stocked and ready for silvicultural treatment; if a stand is immature and cannot be harvested commercially, pre-commercial timber stand improvement may be required. In those cases, the landowner may qualify for cost share assistance if funding is available.

For woodlot owners who are interested in long-term ownership and have goals that include timber production, Section 480-a can greatly reduce the property tax bill and help keep the land as productive forestland. More than one million acres are currently enrolled.

The program is not for everyone. If you're planning to subdivide your property some day, the penalties for doing so will be onerous. It is important for landowners to plan ahead and not commit acreage that might be converted in the future. Violating the plan or converting the land to a different use results in a penalty of 2.5 times the tax savings for the commitment period up to ten years, plus compound interest. If only a portion of the property (say for a home site or a pond) is converted, the penalty is 5 times the tax savings for the acreage converted. If committed properties are sold, the commitment carries on to the new owner.

Talk with a consulting forester or a DEC forester to see if your forestland might be a good fit.

MIKE GREASON, NOW RETIRED FROM HIS POST AS CHIEF OF THE BUREAU OF PRIVATE LAND SERVICES, IS A CONSULTING FORESTER IN CATSKILL, NEW YORK.

HOW TO APPLY

If you own 50 acres of contiguous forestland and want to enroll in the 480-a program, you can obtain an application from the regional forestry office of DEC. (See the resource guide on page 78 to find your regional office.) Applications are also available online at the DEC website. Along with the completed application, you'll need to provide two copies of a forest management plan prepared by a forester, and two maps delineating forest types. Once it's certified by DEC, the property is committed for a "rolling" 10-year period.

A Celebration of Dead Trees

BY GALE LAWRENCE

I manage for dead trees.

Don't get me wrong. I don't actually go out and kill them, but when I see an aging giant showing signs of decline, or notice a top blown off, or look up to my ridge and locate the stark silhouette of the long-dead pine that marks my northwest corner, I perceive value.

The loggers and foresters among you might be getting nervous at this point, assuming that I'm some sort of fuzzy-headed tree-hugger who wouldn't know a board foot from a bird song. But I assure you that my 100 acres of woodland are under the supervision of a sane and reliable forester. Sawtimber production is the long-range objective of the management plan she has written for me, and I promise I will contribute a reasonable number of board feet to the wood supply. But because my own stated objective – right there on the first page of my management plan – is wildlife habitat, I could not do better than to prioritize my dead trees.

There's no danger of my becoming a necrophiliac, however. On the contrary, I am endlessly fascinated, amazed, and surprised by life, especially by watching the way life works in the wild. And, ironically, it is my dead trees that offer me the most life to look at.

First there is the life of the tree itself. If the dead tree achieved any size, it probably led a long and interesting life marked by the seasonal and annual rhythms characteristic of its species, including enough seed production to assure the perpetuation of its genes.

But trees, like human beings, reach a point in their lives when their vigor diminishes, their ability to resist diseases and insect attacks decreases, and they begin to decline. The difference between the way trees and human beings die is that trees take

In the last stage of death, fallen trees are broken down by fungi and other organisms until they return to earth and nourish the next generation.

much longer. A big one might spend a century dying and in the process serve wildlife in innumerable ways. I like to think of this extended dying as the tree's "death cycle," and to me it's every bit as interesting as the life cycle.

A tree's death cycle can begin with old age or it can begin earlier as the result of an injury or insect attack. As the tree begins to die, leaves or needles fall off the dead branches, creating exposed perches for birds. Predatory birds such as eagles, hawks, and falcons use these perches as lookouts. Flycatchers also use them. They feed by "hawking" insects – that is, by flying out from an exposed perch like a small hawk, catching a passing insect, and returning to the perch to eat it.

In the next stage of the tree's death cycle, the bark loosens, creating nesting opportunities for the intriguing little bark gleaners called brown creepers, who wedge their nests between the tree trunk and a shingle of loose bark. Bats also use loose bark to roost under during the day.

Dead branch stubs and rotted heartwood make it easier for woodpeckers to excavate a



KATHRYN LIND JOHNSON

When the central column of the trunk begins to decay, the tree is ready for woodpeckers. They drill through the hard exterior wood and then easily excavate a nesting cavity in the soft interior. These cavities, which woodpeckers excavate anew every year, serve as winter roosts and future nesting cavities for the many species of birds that don't have the equipment to excavate cavities for themselves.

If the tree still stands tall after it has lost its bark and most of its branches, it is called a "snag." These snags can persist for years, providing perches and nesting and roosting cavities for generations of birds. If a snag breaks off or decomposes to a height of less than 20 feet, it is called a "stub." Stubs are often riddled with insects, which provide food for insect-eating birds, and when they become punky enough, they offer nesting opportunities to black-capped chickadees. Chickadees can't excavate hard wood, but they can chip away at and carry off bits of punk to create themselves perfect little nesting cavities.

Even after the stub falls or crumbles to the forest floor, the death cycle is not complete. Carpenter ants and other insects invade the decomposing wood, providing food for pileated woodpeckers and other forest dwellers. Amphibians, reptiles, and small mammals seek both food and refuge inside and under the rotting wood.

At this advanced stage of the death cycle, new plants often

This pileated woodpecker is starting an excavation in a sugar maple.



NEED THERRIEN

By the time fungi fruit, there is extensive interior decay in the host tree.



GERRY LEWNO

begin to grow from what's left of the old tree, transforming it into what's called a "nurse log." Finally, the nurse log is reduced to humus, contributing the last of its nutrients to the forest soil, where they can be recycled into future trees.

The stage of the tree's death cycle that interests me most is what I call the woodpecker stage. That stage can begin long before the tree dies. All it takes is an injury. A portion of the trunk or an upright branch might be injured by wind, ice, fire, insects, or logging activities, admitting fungi that attack and begin decomposing the wood.

A healthy tree responds to the invading fungi by self-protecting. It compartmentalizes the decay so that whatever decomposition is going to occur can't move beyond a fixed boundary. New, healthy wood forms outside this boundary, and the tree continues to grow upward and outward with the rot contained in a central column that grows no bigger than the diameter of the tree at the time it was injured. This interior rot progresses only downward from the injury, creating a tree that looks and acts very much alive but has a lower, central portion that is decaying.

Woodpeckers are experts at detecting these trees. That's because these injured survivors are just as good at providing nesting cavities as dead trees are. The outside sapwood is still strong and healthy, providing good protection and insulation, while the inside heartwood is decaying, making a cavity easy to excavate.

Different-sized woodpeckers prefer different-sized cavities, so they look for different-sized trees. In New York, nine species of woodpeckers need cavity trees, but I concentrate on the needs of four of them, which I consider indicators of the different size-class cavity trees.

The downy woodpecker, for instance, looks for trees that are about 8 inches in diameter at breast height. For those of you who, like me, don't own Biltmore sticks or specially designed measuring tapes that can convert circumference to diameter, there is a relatively easy way to come up with a personal reference system that will help you ballpark the diameters of prospective woodpecker trees – and it's only a little bit embarrassing.

I said earlier that I am not a tree hugger. However, to estimate a quick diameter at breast height (DBH), I'm willing to do it. By



ROGER IRWIN



GERRY LEMMO

Above: Ruffed grouse use downed logs for drumming, their mating display. Right: This flying squirrel uses a hole made by a woodpecker.

hugging and measuring the circumferences of numerous trees and then dividing by pi (3.1416), I have learned that my own personal hugs range from 6 to 18 inches DBH. A skinny little 6-incher, I can hug all the way around and touch both shoulders. An 18-incher stretches my hug to its limits: the tips of my longest fingers can just barely touch on the far side.

I have come up with three intermediate-sized hugs that help me measure intermediate-sized trees: 8-inch DBH for downy woodpeckers; 12-inch DBH for hairy woodpeckers; and 15-inch DBH for the northern flickers. The pileated woodpecker's need for big trees, ones that are in the 22-inch DBH range, is humbling. Stretch as hard as I can, I can't reach around them – which pleases me. They make me feel small. Not diminished, just small, which, strangely enough, enlarges me, or at least rearranges my sense of scale.

If all this hugging and measuring is too much for you, you can simplify the program by focusing on only the biggest of your injured, dying, or dead trees. The smaller woodpeckers can readily excavate their nesting cavities in bigger trees, but pileated woodpeckers can't use smaller ones. So if you manage for big dead trees, you'll have the present taken care of, and all you'll need to do is retain enough smaller dying trees to provide replacements.

Actually, my personal woodpecker-based, dead-tree management program isn't too far removed from what the U.S. Forest Service does. According to Clayton Grove, former wildlife biologist for the Green Mountain and Finger Lakes National Forests,

most “soft snags” – dead trees with most of their wood in an advanced stage of decay – are left for wildlife. In addition, four trees classified as “hard snags,” “den trees,” or “replacement trees” – trees just like those I wander around looking for – are left per acre. That means that I can feel perfectly justified in my pursuits until I find upwards of 400 dead, dying, and decaying trees.

New York's Department of Environmental Conservation has guidelines that suggests

we should try to leave at least four large-diameter cavity trees per acre, and four snags per acre. In both cases, at least one of them should be 18 inches dbh or larger. And if you don't find that many snag or cavity trees, be sure to leave large live trees that might be good candidates for developing into snags or cavity trees. These guidelines make me feel downright virtuous as I patrol my woods for what I have to come to call woodpecker trees.

If I had said at the outset that I manage for woodpeckers, I wouldn't have had much to explain. After all, woodpeckers – and most other cavity nesting birds, for that matter – are insect eaters, so they are good guys. They contribute to the health of the forest and therefore to marketable sawtimber. But woodpeckers are so mobile and hard for me to count that I would have difficulty monitoring the progress or success of my personal management program. Because trees stand still and can be measured, observed, and evaluated over time, I feel more comfortable counting them. The truth is that I have perfect confidence in the woodpeckers' ability to manage themselves, if I can just assure them a healthy number of dead trees.

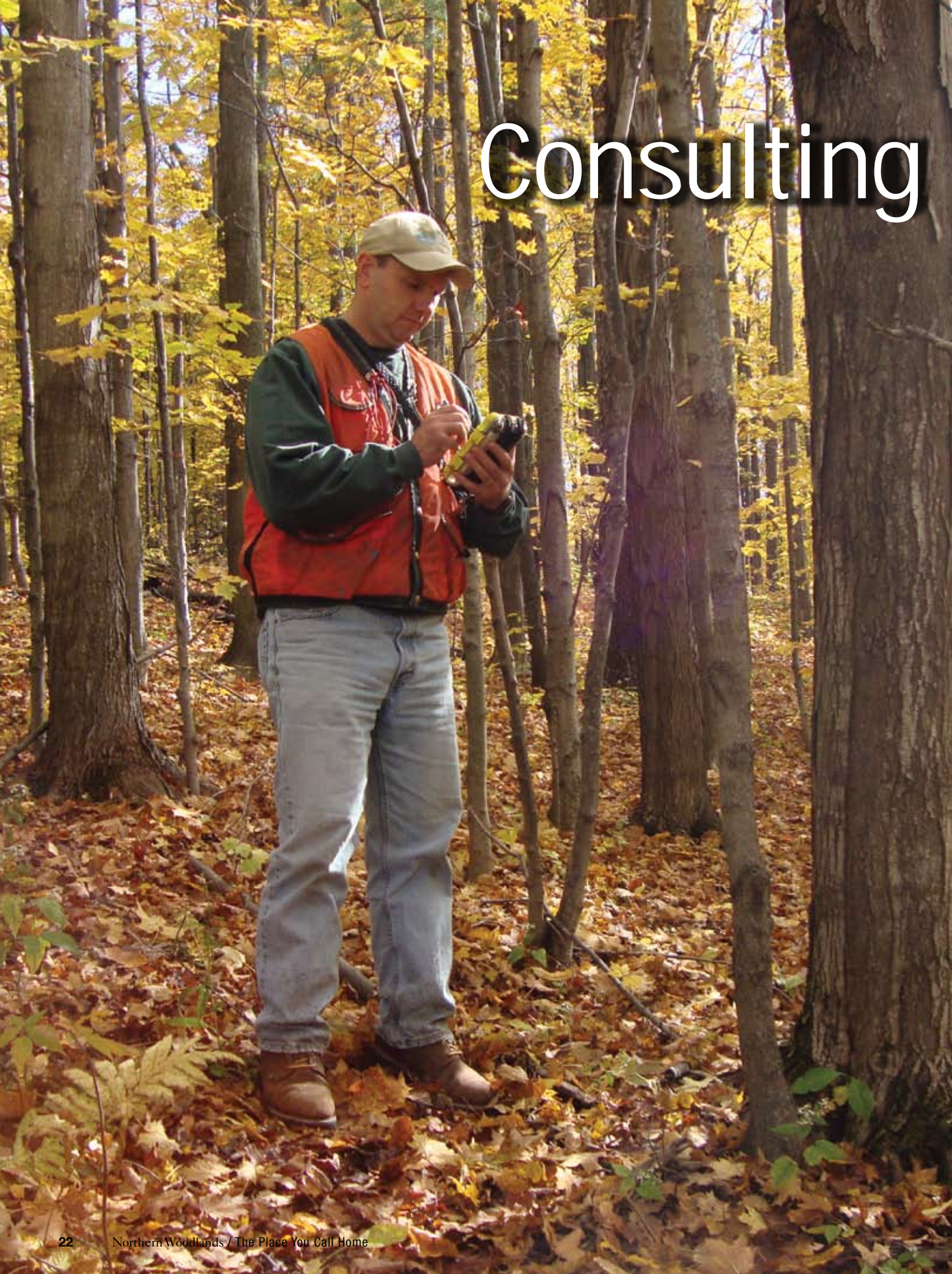
GALE LAWRENCE IS A FREELANCE NATURAL HISTORY WRITER AND THE AUTHOR OF *The Beginning Naturalist*.



GERRY LEMMO

This flat bark beetle eats insects and fungi beneath loose

Consulting



Foresters

What They Do and Why You Need One

BY EBEN McLANE

You can make money from a timber sale and improve the condition of your woodlot. It happens every day, though it won't happen without considerable commitment on your part. What you'll need is some basic knowledge about your woods, an experienced forester, and a skillful logger. That's the good news. The bad news is that lacking any one of those three pieces, things can definitely go wrong in the woods.

The problem could start with a landowner who knows just enough about logging to get into serious trouble. Unschooled landowners get dollar signs in their eyes when a logger tells them that he will thin their woods for them and pay them good money for what he takes off their land.

Caveat emptor doesn't exactly apply here – the buyer is well aware. It is the seller who too often doesn't know the true value of what is being sold or, more importantly, what should be sold. If the logger is making the choice of which trees he buys, there is no incentive for him to cut those that have little value. But removing these poorly formed trees is an essential part of forest management; if you remove only the valuable trees, you're left with an impoverished forest, one that will provide you no appreciable income for many decades. Many forests across the Northeast have been cut in this way for generations – it's known as high-grading – and the best way to avoid it happening on your land is to enlist the services of a good consulting forester.

Rod Jones, a forester based in the southern Catskills, has observed forest owners carefully for over 30 years and does regular consulting work for many responsible owner-stewards. Still, he's well aware of the need to educate owners, even those who have been on their land for a long time and have the best intentions. "Some have had their land in the family for generations and have no clue," he said. "They hire some local logger to come in and cut, and he pays them what he feels like paying them . . . and they think they're doing the right thing." Jones, who owns Northeast Timber Services in Walton, contrasted forest owners with farmers: "Forest owners are still learning about what they want to do with [their land]; most farmers have already figured out what they want to do. They've been managing for years."

"In time, hopefully, forest owners come to understand that they could use some skilled advice," said Craig Vollmer, a western New York Certified Forester with Forecon, a consulting firm that manages forests all over the Northeast. "You don't go to court

Craig Vollmer

Finding a Forester

Your local office of the Department of Environmental Conservation or Cornell Cooperative Extension will have a list of consulting foresters for hire in your area. Contact information for these offices can be found in the Resource Guide on page 78.

When you have some names, make some calls. Get a sense of the forester's working style and areas of expertise. They don't all know the same things: some are particularly good at habitat improvement; some specialize in managing sugarbushes. If one sounds like a good match, make an appointment to get together. Most (not all) foresters will go for a woods walk free of charge.

Ask any potential forester for references. Get the names of three people the consultant has worked for in the last year. Talk to those landowners and ask if you can visit their woods.

Go for the walk. Look around. You can get some sense of the forester's work by the quality of the trees left behind. Are the trees healthy and straight or do they look like corkscrews? And while you may not be capable of evaluating the silviculture, you can get a sense of how careful the work was. Would you want your woods to look like this?

without your attorney or go into surgery without your doctor, and you don't go into forestry without your forester." Variations on this professional analogy come up frequently in conversation with foresters.

A consulting forester's chief role and chief responsibility is land management in accordance with the goals and wishes of his forest-owning client. It doesn't matter whether the forest is 20 acres or 2000 acres, enrolled in a state or federal stewardship program or not – the responsibility is the same. But establishing exactly what an owner's goals and wishes are can be the biggest challenge of the forester's job.

Management plan

The keystone of the relationship between forest owner and forest consultant is a detailed management plan. The plan begins with listening, according to Billy Morris of Bradford, just west of Watkins Glen. Morris worked as a service forester for New York's Department of Environmental Conservation for 32 years before retiring and taking on clients as an independent forester eight years ago.

"It's very much like a marriage: you've got to understand what your partner wants, or it's just not going to work," he said. It's common to hear foresters use words like "partner" or "friend" when referring to clients. Like many consulting foresters who have been in the business long enough, Morris has formed a deep personal attachment to certain properties he's worked on over the years. His attachment extends to the owners as well, while they, in turn, have come to rely heavily on his role as advisor and sometime confidante.

"You see some people worried about giving up control of their forest to a forester, but that's not what we do," Rod Jones said. "[Ideally] all forest owners should be comfortable with their forester – they need to trust him."

"Trust" is easily the most commonly used word to identify the bond that develops in a healthy owner-forester relationship. At the start of the relationship, a forester needs to hear from prospective clients why they own the property to begin with – not always an easy question to ask, or answer. The forester's second question is easier for some, harder for others: what do they want to do with their land in the long run?

To get at the answer, a walk in the woods is helpful. A forester can walk the boundaries with the owners while describing what sort of woods they have and some of the options open to them for keeping it healthy and productive.

This initial walk can be an eye-opening experience, even for people who think they know their property pretty well. Owners are often surprised, for example, to find that their trees may be more (or less) valuable than they had thought, or that their land sustains an unusual population of a certain amphibian or nesting bird. The forester's professional strength is making owners aware of what they have in terms of a natural resource, from wildlife habitat to marketable timber, and how to plan for the future of their land.

Once the initial field work is done, a forester will start work on a more detailed management plan. The plan starts with a sta-

tistical inventory of forest resources, covering the entire property. Information for the inventory comes from the forester's field work on the ground, and is enhanced by maps of soils and bedrock geology, which influence a property's capacity to grow trees. In creating a map of the property, the forester will include special features for overlay, such as wildlife habitat, invasive plants, significant geological features, wetlands, and vernal pools. The result of the inventory phase of a management plan should be a clear and accurate picture of the layout and current condition of the forest.

Another key component of the management plan is working out long-range ownership goals and how to achieve them. Craig Vollmer has spent 20 years educating clients not just on the natural resources of their land, but how to use these resources in estate and financial planning. Do the owners plan to pass the land on to their children? Do they hope to get useful revenue out of the land to defray the cost of property taxes or maybe pay college bills?

"As we go through our evaluation of the land and what it's capable of, we help them further define their goals – that's what drives the management plan, really," Vollmer said.

Most foresters use software programs of various descriptions to help them in their work of understanding the land they're contracted to manage. In addition to mapping tools, they employ increasingly sophisticated programs to convert raw statistical field data into information their clients can understand. Vollmer uses proprietary software developed at his company to help owners understand their forest property as a potentially valuable asset in the service of family financial planning. The software can show timber inventory volume for major tree species and project it forward year by year over the life of the management plan, which can be helpful in planning any timber harvests the owners would like. When Vollmer plugs in costs of ownership in taxes, costs of management, and projected returns from timber sales, his clients "can get an extended view of how their property would perform in a portfolio as an investment," he said.

Timber sale

Sooner or later, a timber harvest will be scheduled as part of the plan. And here is where the need for communication and trust figures so prominently, because cutting trees dramatically changes the look of a forest.

Logging practices have improved much over time, with loggers taking better care to protect what the forester and owner have decided to leave in the woods. Still, there's no way around some of the effects of the heavy equipment that logging crews use to harvest the trees.

But a good forest consultant can do much to limit the damage, both physically to the woods and psychologically to a property owner. Owners need to know beforehand exactly what they're getting into when they authorize a timber sale.

"I want forestry clients to understand what to expect in detail," said Craig Vollmer. "A lot relies on having a good contract in place and a good process that dictates the terms, so that nothing is open to interpretation. That gives the whole thing an assurance that helps [owners] feel more confidence, especially if they're worried in advance about the outcome. They need to know we're not just

looking at the timber but also at the ecology of the site.”

When putting up a timber sale for bid, many foresters opt for an invitation-only process, which allows them (in consultation with owners) a good deal of control over the quality of the bidders. Also, foresters and loggers typically know a lot about each other, and a forester can advise his client fairly specifically as to how good a job a contractor is likely to do, sometimes even down to the quality of the individual crew working on the land. Before the logging is even underway, a forester will make sure that trees to be cut are marked clearly and that roads will make the least impact on surrounding land, especially sensitive land features such as wetlands. Once work has begun, he or she monitors its progress and maintains regular contact with the crew. Above all, most foresters will retain the right within the terms of the sale contract to stop the work if it is not up to agreed-upon standards. Some forestry consulting firms will require that a performance bond be built into a timber contract so that if there’s a problem that the buyer or logging contractor isn’t willing to fix (over-rutting of the forest floor by logging equipment, for example) the forester and his client have the bond money to fall back on.

Vollmer sees the forester-client relationship in terms of fiduciary and professional loyalty, much like in the legal and medical professions. “We have a responsibility to them as their advocate,” he said.

Incentive programs

As advisors, foresters are typically called on to explain the often-Byzantine rules and regulations of various state and federal programs designed as incentives to landowners to manage property with sustainability and approved silviculture practices in mind.

In New York, Section 480-a of the real property law passed in 2006 provides for an 80 percent reduction in property and school taxes for eligible forest land of at least 50 contiguous acres. (For more on 480-a, see page 17.) Landowners must enroll their property for a minimum 10-year period and provide an approved management plan to be updated every five years.

There are also the possibilities of federal programs that help landowners pay for work in their woods. The USDA-Natural Resources Conservation Service regularly provides cost-share grants administered by the state to qualified landowners following management practices that improve the health and productivity of their forests. Although, as Rod Jones notes, some forest owners prefer not to have the government looking over their shoulders, the tax breaks offered by these programs are alluring to many.

Forest property is cherished by all who own it, whether they own it for recreation, for esthetic contemplation, for the use of its timber, for wildlife habitat, or a combination of these. However, for people who are new to forest ownership, it can also seem like a daunting responsibility – even a burden. Yet it needn’t be so.

Hiring a consulting forester to help guide you in your decision-making can take some of the anxiety away. “We talk a lot about the owners’ plans and their dreams and protecting their rights,” Craig Vollmer said. “It’s gratifying to see the comfort level grow.”

EBEN McLANE LIVES IN SCIPIO, NEW YORK, AND WORKS AS A FREELANCE WRITER AND EDITOR.

PHOTOS: EBEN MC LANE



Above: Rod Jones; below: Billy Morris





Certification Comes to New York's

BY TOVAR CERULLI

Erwin and Polly Fullerton ended up with green-certified forestland almost by accident.

Erwin had grown up on a small dairy and poultry farm in the 1930s. After serving in the Army at the end of World War II, he studied animal husbandry at SUNY Cobleskill and then took a job running a milk plant in Hudson Falls. With a dairy venture firmly in mind, he and his wife, Polly, kept their eyes open for likely farmland.

Seven years later, when Erwin switched to working in the Finch-Pruyn power plant in Glens Falls – generating heat to dry freshly made paper – they were still looking for a farm. After a few more years, they realized their future wasn't in dairy. But they still wanted land, maybe some woods and a place to build a cabin.

In 1967, Erwin found a parcel that felt right: 100 acres within a mile of the Hudson River. He put down a deposit on the spot, beating another buyer to it by just 20 minutes. When Polly visited the property for the first time, she saw thick brush, a mosquito-filled swamp, and no suitable place for a cabin. "Oh, my Lord!" she thought. "What'd he buy this for?"

That first parcel, as well as 100 adjoining acres the Fullertons soon added to it, had been logged hard over the years. Nearly every harvestable tree had been cut. Erwin wondered what a forester would recommend. When he was a boy, a forester had advised his family to keep their cows away from a stand of white pine his grandfather had planted, lest their hooves damage the exposed upper sections of root. The forester also suggested that the pine's lower limbs be trimmed off. He specified that they should be removed neatly with a carpenter's saw, not hacked off with an axe. Erwin's curiosity had been aroused. Now, with land of his own, he had a good excuse to give that curiosity free rein.

The first thing he and Polly did was bring in a forester from the



COURTESY JOHN SULLIVAN
COURTESY ATFS

Family Forests

New York Department of Environmental Conservation (DEC). Eager to learn, they went with him whenever he visited the property. Before long, he steered them toward Tree Farm.

Formally known as the American Tree Farm System (ATFS), Tree Farm is recognizable nationwide by its distinctive green-and-white, diamond-shaped signs reading “Wood, Water, Recreation, Wildlife.”

Through their membership in Tree Farm and in the Southern Adirondack Chapter of the New York Forest Owners Association (NYFOA), which they helped form, Erwin and Polly became part of a network of people who were eager to learn from each other and took pride in investing in long-term forest values. Those values included growing healthy, high-quality trees for generations to come, while protecting forest soils and waterways from



*Above: The view from John Sullivan’s Kipp Mountain Tree Farm.
Right: American Tree Farm System sign.*

erosion and other damage. They also included managing for conservation of wildlife habitat and native plant species and for recreational uses such as hiking, cross-country skiing, bird-watching, and hunting.

The Fullertons quickly became active advocates for forest management and planning. (Erwin chaired the Southern Adirondack Chapter of NYFOA for a couple of years and Polly served as its treasurer for over a decade.) And the cabin they'd hoped for now sits proudly amidst beautiful, productive forest. Polly says she loves the land now.

Another active NYFOA member, John Sullivan, got involved in much the same way. When he was first learning how to manage his family's 300 acres near Chestertown in the 1970s, a DEC forester suggested he join Tree Farm. The program helped Sullivan see that for owners of small forests there's strength in numbers. And he valued Tree Farm's successful efforts to foster an environmental consciousness among small, private landowners.

Then, in the early 1990s, something new caught his attention. An international movement had been sparked by concerns over global forest problems such as illegal logging and the rampant destruction of rainforests – concerns that culminated in the forestry discussions at the 1992 Earth Summit in Rio de Janeiro. These were issues that the Tree Farm program wasn't designed to confront.

In response to these global issues, the international nonprofit Forest Stewardship Council (FSC) was formed in 1993 by a consortium of groups with interests in society, the environment, and the economy. The new organization had an ambitious goal: to improve forest management worldwide. Sullivan followed FSC's development as it grew into the first international system of "third-party forest certification" – wherein an independent, accredited organization evaluates on-the-ground conformance with a given set of standards and puts a stamp of approval on landowners' management practices. He was intrigued by what he saw.

"It got the whole industry thinking," Sullivan recalled. In 1994, the American Forest and Paper Association followed suit with its own system, the Sustainable Forestry Initiative (SFI). Originally a self-verification system, SFI morphed into a full-blown third-party system by the late 1990s.

Certification seemed like an excellent development toward the goal of better forestry practices, but Sullivan didn't see any way for a forest owner like himself to pursue certification. It would cost thousands of dollars – far too much for most small landowners to afford on their own.

Then, several years later, Sullivan received a call from the director of the non-profit Residents' Committee to Protect the Adirondacks (RCPA). The organization planned to pool a number of properties and apply for FSC group certification. As part of a group, each landowner's costs could be reduced. And RCPA would help cover those costs, making it even more affordable.

Sullivan jumped at the opportunity. He knew that FSC's standards would either validate or challenge and improve what he'd been doing on the land for 25 years. And Sullivan figured there might someday be a market advantage to having his woods certified. In 2002, when RCPA was accredited as an FSC group manager, Sullivan's parcel was one of the first to be enrolled.

RCPA has since consolidated its operations with those of the Association for the Protection of the Adirondacks, and the combined organization, now known simply as Protect the Adirondacks, has maintained its FSC accreditation. Its stewardship program includes 35 landowners owning 16,500 acres.

A matter of scale

Other groups have been formed to take advantage of the FSC group-certificate option, but it's still uncommon for "family forests" like Sullivan's – private, non-industrial parcels of anywhere from a few acres to a few thousand acres – to have FSC certification. Even though 60 percent of the nation's wooded acres are owned as family forests, until recently, less than one percent of this acreage was third-party certified.

In contrast, just a decade and a half after FSC and SFI were created, about 70 percent of the larger corporate timber holdings in the U.S. are certified under one or both systems. (Many publicly owned forests, including more than 760,000 acres of state lands in New York, are certified as well.) Corporate timber owners' enrollment in certification programs is not due entirely to their environmental ethics. Over time, it has become a near necessity for selling wood on the global papermaking market.

There was, for example, a substantial increase in the pressure toward certification when just one large paper purchaser, Time, Inc., publisher of more than 120 magazines, gave notice that it wanted 80 percent of its paper to be certified by the end of 2006. Time – a member of the corporate Paper Working Group collaboration – uses an estimated 500,000 tons of paper annually. Suppliers wanting to sell to Time and other like-minded purchas-

Erwin and Polly Fullerton



NORTHERN WOODLANDS



John Sullivan milling FSC-certified white pine on his portable band-saw mill. The boards were kiln dried in a solar-powered kiln and sold to a reproduction furniture maker in the Hudson Valley.

ers had to go through the lengthy and rigorous process of becoming certified, often obtaining dual certification through both FSC and SFI. Today in the Northern Forest states, nearly 4 million acres are certified to the FSC standard while over 7 million acres are certified by SFI.

So far, similar market pressures and advantages have not come fully into play for family forests. Still, some landowners want to have their certification in place, either to validate their management practices now or to be ready when it does make a difference in the marketplace.

Two routes to certification

For years, the only third-party certification option for smaller forest owners was the route John Sullivan took: participating in a group with the Forest Stewardship Council.

Some FSC groups, like the one Sullivan joined, are managed by nonprofit organizations. Others are managed by private forestry

Forest Certification Structures

The world of forest certification has many players. The following chart helps sort out what can seem like an impenetrable maze of acronyms and affiliations.

Programme for the Endorsement of Forest Certification (PEFC)

- American Tree Farm System (ATFS)
- Individual memberships – by far the most common
- Independently managed group certificates – run by a group manager (e.g. NewPage Corporation, Wisconsin's Managed Forest Law Program)
- Sustainable Forestry Initiative (SFI)
- Canadian Standards Association's Sustainable Forest Management Program
- More than 20 other national certification standards around the world

Forest Stewardship Council (FSC)

FSC-Accredited Certifiers

- SmartWood
- Scientific Certification Systems
- Bureau Veritas Certification
- SGS Systems and Services
- More than a dozen others around the world



Labeling

Raw materials from certified forests – and the products made from them – are labeled in a variety of ways. The highest level of certification is represented by a “chain-of-custody” label. This label confirms the tracking of wood and wood products, from forest to end-user, including every link in the chain of processing and distribution along the way.

Because chain-of-custody certification requires such thorough tracking and documentation, the forest itself is not the only part of the chain that must be certified. For an end-product to bear a chain-of-custody label, every company or organization along the supply chain from forest to end user must be chain-of-custody certified as well.

There are also various types of “fiber-sourcing” (SFI) and “controlled wood” (FSC) labels, which make more general claims. They might assure consumers, for example, that the labeled materials and products were not harvested illegally, did not come from environmentally sensitive areas, or came from within a specific area (such as North America).

firms. Bevan Forestry in Livingston Manor, New York, for example, has a pool of just over 600 acres held by six owners.

Larger forestry firms, such as Fountains Forestry, also manage FSC group certifications, but relatively few of the parcels they manage are in the family forest size range. David Daut, president of Fountains Forestry, notes that his firm could certify a parcel of any size, but so far only the larger investment properties have taken that option.

Once an appropriate management plan is in place, the costs of FSC group certification vary widely. A private forestry firm might charge an initial entry fee of several hundred dollars to enroll a 100-acre parcel, as well as more modest annual fees and periodic audit charges. Other firms treat the cost of certification as part of their overhead and don’t pass any specific fees on to landowners.

The first forestry organization that Sullivan and the Fullertons joined – Tree Farm – also offers third-party certification for smaller forest owners. This is a recent development, dating from 2008. (See accompanying story on page 31.) All Tree Farms in good standing now have third-party certification. To join Tree Farm, you need 10 or more acres and a written management plan that meets the American Forest Foundation’s standards of sustainability. Beyond providing and adhering to that plan, there is usually no cost to enroll.

An advantage in the marketplace?

For family forest owners – those considering the options and those who already have certification – the question remains: Whatever its other benefits, when will certification bring them a real market advantage?

Erwin and Polly Fullerton, for example, are enthusiastic about Tree Farm and are active in education efforts. Over the years, they’ve hosted tours of their land for several hundred people interested in forestry and wildlife. But their participation in ATFS hasn’t directly brought them higher log prices.

As Erwin Fullerton put it, “There may be a financial benefit in the future, but we haven’t seen it yet.” He may see it soon, as more links are forged between family forest owners and end-user markets.

In some isolated cases, certified wood already has commanded prices 15 to 30 percent higher than non-certified wood. But these dramatic price differences may never become commonplace. Instead, some observers anticipate that it will simply become harder to sell non-certified wood, as certification becomes the norm, even for small parcels. If the pulp and lumber markets start demanding higher percentages of certified wood, that could drive more and more family forest owners toward certification.

Niche opportunities could also draw a few landowners, as buyers seek local, certified wood. In 2007, Old Adirondack, Inc., was looking for FSC-certified, Adirondack-grown white cedar. In the past, they had built “authentic” Adirondack chairs with non-certified wood from Vermont. The company found John Sullivan – and a friend of his who was willing to mill the wood – and a deal was struck. Specialized local sales are more formally organized by business networks such as Catskill WoodNet.

Keeping the basics in mind

With the growing market potential for certified wood products and the increased ease with which small parcels can become certified, family forest owners have good reason to be excited. But foresters and landowners alike caution against losing sight of the basic point: improved forest management.

John Sullivan and Erwin and Polly Fullerton are happy to see forest owners become interested in certification and possibly

gain market advantages. But, as they see it, what really matters is involving more landowners in good stewardship.

“We need to keep reaching out to the folks who aren’t specifically interested in certification,” said Sullivan. “The main idea is to get a professional plan in place and help people learn the rudiments of forest management.”

TOVAR CERULLI HAS WORKED AS A LOGGER, CARPENTER, AND FREELANCE WRITER. HE LIVES IN VERMONT.

On the Origin of Certifications

Though their paths have intersected, FSC and Tree Farm came to certification by very different routes.

When the American Tree Farm System (ATFS) was initiated by the Weyerhaeuser Timber Company in 1941, it was designed to educate non-industrial forest owners about good forest management and thereby help to ensure a steady wood supply for the forest products industry in the U.S. The international Forest Stewardship Council (FSC), in contrast, was formed five decades later to combat global deforestation.

How, then, did ATFS and FSC end up side by side, both offering third-party certification for family-owned U.S. forestland?

The Forest Stewardship Council’s story is brief. Formed in 1993, FSC received support from conservation, social justice, and business organizations around the world and quickly grew into the first international system for third-party forest certification. Headquartered in Bonn, Germany, FSC oversees forest certification standards being applied in over 80 countries. FSC’s guidelines cover ecological and economic sustainability as well as cultural survival, workers’ rights, and other factors. FSC-US was established in 1995 as the national chapter of FSC.

In the past, FSC certification has been sought primarily by larger-scale timber owners, but the organization has identified increasing certification of smaller, family-owned forests as a key goal. According to Fran Price, director of certification programs for the Forest Trade Program of The Nature Conservancy and a member of the FSC-US board, new standards for certification of family forests recognize the differences in scale between large corporate timberlands and family forests.

“Family forests will be held to the same standards. We aren’t lowering the bar,” Price said. “But, at present, small-scale operations can have difficulty documenting certain aspects of their performance. To make certification more accessible, we’re finding ways to streamline the documentation requirements so that the evaluation criteria make more sense for family forests.”

The American Tree Farm System – now a program of the nonprofit American Forest Foundation’s Center for Family Forests – has a more complex history. ATFS has always focused on small, private forest owners. And it has required that members adhere to management standards that take wood, watershed, soil, and habitat impacts into consideration. But for most of the 90,000 current member properties – encompassing 24 million privately owned acres in 46 states – there has been no third-party oversight. As critics have noted, Tree Farm’s volunteer inspecting foresters have long faced a basic conflict of interest: they have been certifying their own work.

In recent years, the American Tree Farm System has worked hard to improve its programs and overcome that credibility gap. ATFS has re-organized its internal auditing system, moving away from the traditional five-year re-inspection schedule



and instituting an annual randomized sample inspection of properties around the country, covering every state with a Tree Farm Committee. Further, it has arranged for independent certifying bodies to conduct regional third-party audits each year.

ATFS made this last move – the addition of independent certifiers – with clear awareness of certification’s increasing market clout. The move was aimed at turning Tree Farm into a fully recognized third-party certification system. In August 2008, Tree Farm’s efforts were rewarded by endorsement from the Programme for the Endorsement of Forest Certification (PEFC), an independent nonprofit based in Geneva, Switzerland, that serves as an umbrella organization, assessing and endorsing national forest certification standards around the world.

ATFS is the second U.S. certification scheme to be endorsed by PEFC. The first, in 2005, was the Sustainable Forestry Initiative, a program designed to certify large corporate-owned forests. Now that ATFS is a globally recognized third-party system, wood from Tree Farms can be included in the chain-of-custody certification labeling used by PEFC and SFI.

All these recent changes may pose a challenge to Tree Farm’s long tradition of not passing any costs on to landowners. Historically, ATFS was most actively promoted by government service foresters with explicit instructions to do so. These foresters – along with many private consulting foresters – also served as ATFS volunteer inspectors. So far, that hasn’t changed; enrollment in the program and inspections continue to be free. The one difference is that because the management plans need to be more comprehensive, some consulting foresters have begun to charge fees for developing them.

By earning certification through either system – the Forest Stewardship Council or the American Tree Farm System – family forest owners become part of a rapid change in the international wood-and-fiber trade. Between 2000 and 2007, the global area of certified forests expanded from approximately 110 million acres to over 750 million acres. PEFC-endorsed certification systems such as Tree Farm account for about two-thirds of this area, FSC certifications for about one-third. (FSC and PEFC-endorsed systems do not recognize one another’s certifications. Thus, dual certification is required for a seller to have full access to all certified wood markets.)

While the international growth of certification is impressive, the scale of the world’s forests puts things in perspective. Globally, over 9.7 billion acres of the earth are forested. Less than 10 percent of those forested acres are certified. The vast majority of that certified area is in the temperate and boreal forests of the northern hemisphere. Only one percent of the world’s tropical forests have certification.



Fields Among the Forests

Keeping Open Land Open



BY CHUCK WOOSTER

Can you name the most heavily forested region in the United States? The answer might surprise you: the Northeast. The broad swath of land that extends from the Tug Hill Plateau in New York eastward across the Catskills, Adirondacks, Taconics, Green Mountains, White Mountains, and the mountains of Maine all the way to the Atlantic is the largest expanse of forest in the country. The region is more than 80 percent forested.

That means that if your piece of land happens to include an old field or meadow, you have something of a rare treasure on your hands. Open fields can add greatly to a property's value, thanks to the views they afford of nearby hillsides or distant peaks. Open fields are also great places to take a walk, watch the sunset, or fly a kite. On top of all this, open fields provide critical habitat for many of our most beloved species of wildlife. So there are a lot of good reasons for keeping them open.

Doing so, however, can be something of a vexation. Leave the field alone for too long, and you'll wake up one morning with a young forest on your hands. But try to tackle your field with the lawn mower, and you'll be out there for the rest of your life.

So what to do?

You have three general options for keeping fields open, depending on how you decide to look at your old field.

First, you can view your field as an agricultural resource. It's thanks to animals, after all, that we have open fields in the first

Opposite page, top: when trees get too large for a rotary mower (brush hog), the next step up is a forestry mower (bottom). This one is mulching a six-inch-diameter pine. This page, left to right: grazing sheep is an effective method of keeping your land in fields. Bobolinks, which make a series of mechanical twitters, frequent fields with tall grasses.

place in this part of the country. If your field is reasonably flat and fertile, a local farmer may be interested in cutting the hay once or twice per year. This works out well from the farmer's perspective – free hay for the cutting – and from your perspective as well, since you're keeping your field open without so much as lifting a finger. Don't expect to be paid for the hay: the financial benefit in this for you usually comes from having the farmer keep your field open for free. Ask for a buck or two a bale, and you'll soon discover the farmer mowing your neighbor's field instead.

Alternatively, you can run a few animals on the field yourself. Sheep, the original livestock inhabitant of much of the region's fields, thrive here, as do horses, goats, and beef cattle. (Dairy cows do too, of course, but that's likely to be beyond the scope of what you're after.) In a way, running animals on your own field helps keep someone else's field open, too, as the animals eat your grass all summer and someone else's grass (in the form of hay) all winter. You'll want to speak with your county extension agent for more details on what it entails before deciding to get into the grazing business.

If your avocations don't run toward the agricultural, a second way to view your old field is, well, as an old field. All you need to do is cut the grass once per year, and the field will remain a field forever. Hire your neighbor with a tractor to come and cut it, which typically costs about \$50 per acre. Some people balk at the idea of paying someone to mow their field – shouldn't the land be able to pay its own way? Sure, but if you've already skipped over the part about owning a flock of sheep, this have-the-neighbor-do-it solution could be for you. There's no simpler way to go. Think of it as the annual maintenance fee on your "million-dollar" view.

But a more fun way to go might be to buy a tractor of your own, outfitted with a rotary mower (often referred to as a bush hog or brush hog). Previously owned, two-wheel-drive agricultural tractors that are perfect for field mowing can be had for a song (okay, a few thousand dollars) these days, and, in addition to delighting all the boys in the neighborhood, can be outfitted with a snow plow for winter driveways. Simply cutting the grass without removing it for hay has the additional advantage of returning fertility to the soil and improving the land instead of carting the



KINDRA CLINEFF/KINDRACLINEFF.COM



STEVEN D. FACIO



From top: this field is mowed every year; saplings in this field will soon be too large for brush-hogging; this field has grown up too much to be brush-hogged and is on its way to becoming a forest.

fertility away to feed someone else's animals.

Whether you mow with your tractor or someone else's, you'd do well to wait as late in the season as possible. Though some landowners like to keep the grass short all summer for the "neatly trimmed" look, doing so comes at a great price for local birds and animals. Before mid-July, your field is likely to be home to red-winged blackbird chicks, young bobolinks in their nests, a host of sparrows, and maybe even a fawn or two, not to mention native insects (one of which, the firefly, is so beloved that people often forget it's an insect). Waiting until sometime between August and

November will still accomplish the task of keeping the field open while sparing the local wildlife.

The third way to view your open field is as a wildlife nursery. If you only knock the grass down only every third year or so, you will still be maintaining the view while also allowing coarser grasses and tree seedlings to take hold in the field. This type of habitat, called "early successional," is preferred by all of the above species, plus woodcock, snipe, a host of warblers, and hawks on the hunt. Deer will love the winter browse, and don't be surprised to see fox and coyote hunting rodents year-round.

This type of habitat is so rare and ephemeral (remember, 80 percent of the land in our area is forested) that federal cost-share money is often available for landowners who agree to adopt this every-third-year mowing strategy. That's right, the government will pay you to keep your field open for wildlife habitat. The current program is called the Wildlife Habitat Improvement Program, or WHIP, and you can find out more information about it from your county extension agent. In general, landowners need to sign multi-year contracts to participate in the program, which ensures that the habitat will remain available to wildlife for years to come.

Though the field-as-wildlife-nursery approach has two great advantages (the abundant wildlife and the federal money), there is one disadvantage to keep in mind: your field won't be suitable for haying anymore because the grass and seedlings will be too coarse for animal feed. Reclaiming such a field for agriculture in the future will require some combination of animal grazing and tractor work, combined with re-seeding. If you never intend to return your field to the agricultural economy, that's not a problem. But if you're waffling on running that flock of sheep, it's worth mowing every year until you make up your mind.

A final variation on the wildlife-nursery approach would be to let the field grow in until it starts to have tree saplings that are about as thick in diameter as your wrist. Then mow it. If the tractor can bend it over, the brush hog can sever the stem. You might be able to go six or eight years between mowings if you go this route, which is even better for wildlife and even lighter on your wallet. Once the saplings grow fatter than your wrist or so, however, a tractor with mower will be unable to bend them over. At that point, you'll either be committed to a young forest or facing a very hefty bill to have specialized land-clearing equipment come in to reclaim the field.

Regardless of which of the three approaches you choose for maintaining your field – agricultural resource, old field, or wildlife nursery – you're doing a great service by keeping it open. The mix of forest and field is precisely what gives the pastoral Northeast its unique character and distinguishes it from areas with steeper terrain, where far more dramatic mountain ranges end up being hidden from view behind thick forest canopies.

That the pastoral aesthetic is an essential part of our landscape is clear after even a quick browse through the "regional" section of your local bookstore: there are sure to be a half-dozen or more luscious picture books that feature rolling pastures, pocket fields tucked in among protective forests, or river-bottom holdings windrowed with hay, with each photograph crying out that this is how home is supposed to look. Come to think of it, they're right!

CHUCK WOOSTER IS THE ASSOCIATE EDITOR OF *NORTHERN WOODLANDS* MAGAZINE. HE KEEPS SHEEP, GROWS VEGETABLES, AND MANAGES WOODLANDS ON 100 ACRES IN CENTRAL VERMONT.



By MICHAEL SNYDER

Can Your Woods be Too Tidy?

A LANDOWNER ONCE PHONED TO ASK ME TO VISIT HIS property to see all the good work he'd done extending his landscaping efforts from his yard into the surrounding woods. He was pleased with his work and eager for the county forester to see how well he had "cleaned up the woods" and "improved the health" of those woods by removing and chipping or burning all that "ugly dead and rotting stuff." He thought maybe we could use it as a demonstration site for his neighbors. So I went.

And sure enough that landowner had, indeed, made some dramatic changes to a few acres of woods bordering his well-manicured yard. But I was considerably less enthusiastic than he was, and I was at a loss for a gentle way to explain to him that his "tidying" had done nothing to improve the health of his woods – that, in fact, he may have done some real damage to its health. As he showed me



CARRIE SANDIN

around from stump to branch scar, noting with pride how easy it was to walk and see through these woods now, I didn't know how to say, "Well sure, but now there's so much less to see." All I could muster was a head nod here and an "I see" there. Then he gave me my big opening.

He told me that before doing all this work he used to see woodpeckers and warblers in the woods, but not anymore. This man truly valued the woods, and he enjoyed working in them – with the best of intentions – but somehow had failed to recognize the full value of all that so-called mess. He had missed the connection between dead trees and woodpecker food, between a dense shrub layer and nest sites for black-throated blues. The conversation that followed wasn't necessarily easy, but now it at least had a new context; he could see his woods in a new light. And by the end of our walk, he had a different work plan for the bit of woods he'd yet to work on the other side of his house.

If your only interest is in the neat and tidy, and you just can't abide a natural mess, there's really no argument. You certainly are free to "clean up" those woods. But if you're interested in the health of the land, too, and if your aesthetic sensibility has room for a bit of death, decay, and disarray, then you'll be glad to know there is a way to have it both ways.

It's a matter of blending forestry with traditional landscaping.

This sort of management hybrid is sometimes called woodscaping. It incorporates an understanding of forest ecology – a sense of how the forest functions fully – into landscaping activities. It stresses values like species diversity, the importance of retaining some dead and dying trees, and the need to keep vegetation in several vertical layers instead of just one canopy level. It is particularly effective when applied in those transition zones between a traditionally landscaped yard and the woods beyond. Yes, of course it's nice to

see into the woods from the yard, and there's nothing wrong with cutting some understory vegetation or pruning some dead branches or even removing a particularly messy tangle of downed woody debris – all of which may be obstructing your view or your walk from your yard into your woods. You just try to leave *some* of these things, recognizing that they are all part of a healthy forest.

This hybrid approach can involve all kinds of management activities; the possibilities are nearly endless. It includes thinning to remove diseased or unsightly trees and enhance the growth of remaining specimen trees. Or perhaps pruning some branches to improve sight lines and tree stem quality. Removed vegetation might then be lopped and scattered neatly on the forest floor. This is important for moisture retention, nutrient cycling, and habitat enhancement for many insects, amphibians, and mammals and is far healthier than burning and chipping. Woodscaping might also include planting trees and shrubs to add diversity or visual appeal. It might mean not weed-whacking a patch of ferns or not brush-hogging an area of whips and brambles.

This modified landscaping approach can involve any or all such activities, but it does so with an attitude. It is an attitude of understanding – or at least a desire to understand – that your woods, even at the yard's edge, are more than something you look at. They are living communities of creatures, each playing important – if sometimes unknown – roles with far-reaching implications for land health in your yard and beyond. These places don't have to be neat and tidy to be healthy.

MICHAEL SNYDER IS THE COMMISSIONER OF VERMONT'S DEPARTMENT OF FORESTS, PARKS, AND RECREATION.

BY HENRY S. KERNAN

THE GIFTS OF A FOREST

THE PRECEDENTS FOR MY 1200-ACRE FOREST FARM IN UPSTATE NEW YORK GO BACK TO THE DEPRESSED AND WAR-THREATENED 1930S.

Winter schooling in Manhattan seemed dreary and constrained to my brother and to me when we had weekend and summer freedom on 50 acres of woods and fields not far from New York's part of the lower Hudson's west shore. There we had our treehouses and our secret hideouts for smoking cornsilk, and there we put together our cabin of logs. We talked about living in the woods for weeks instead of days at a time, about having a fur farm in the Adirondacks, and about careers far from Manhattan.

We swam and fished for chubs in the Hackensack River. Our home-built scow took us far upstream into what was, for us, a vast mysterious swampland full of waterfowl and other wild creatures. Our dogs followed along the banks, splashing and nosing out turtles and frogs. We made archery equipment and spent many hours hunting, but never hitting, woodchucks and rabbits. Nor did our fishing tackle do much harm to the chubs in the river.

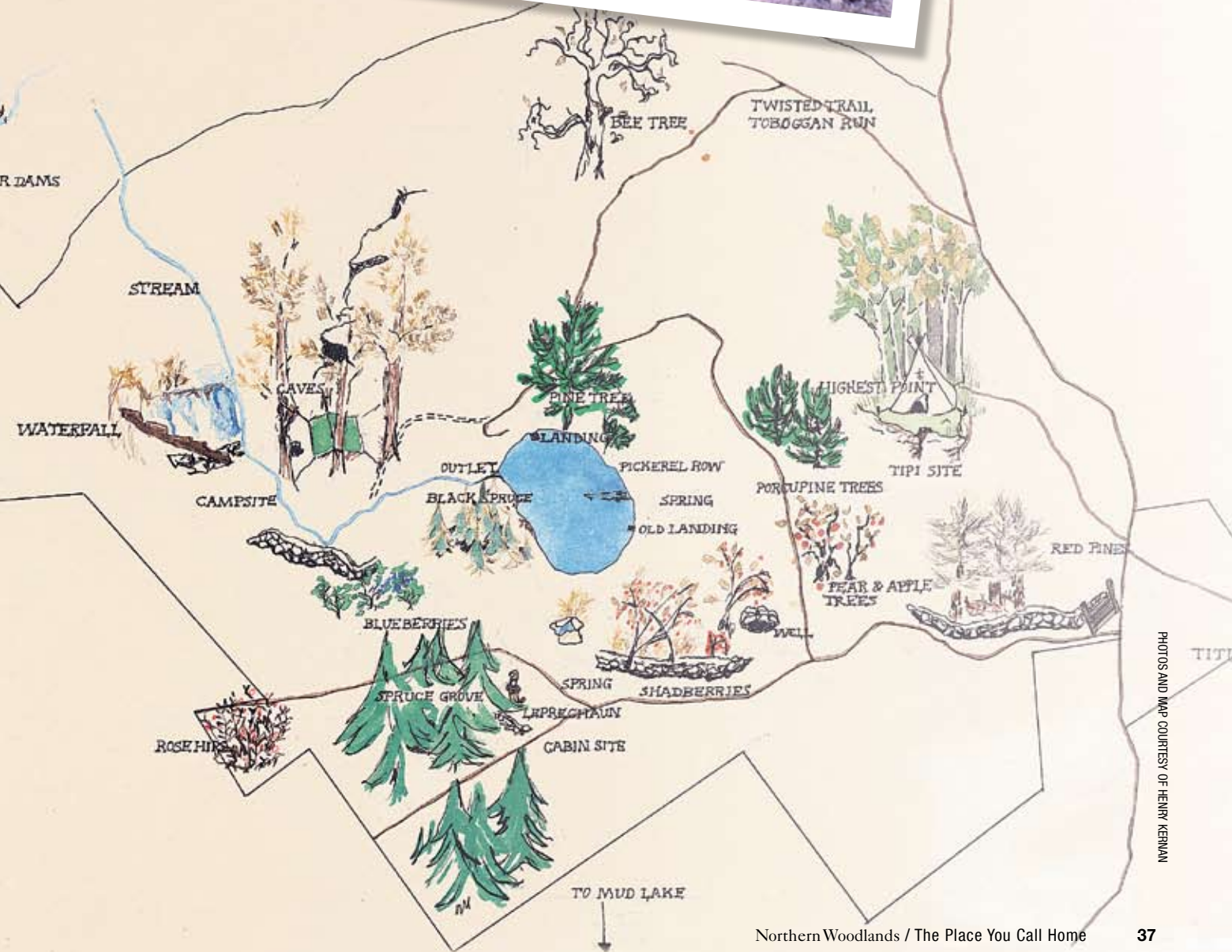
The post-war years came with drastic changes. The swamp was turned into a reservoir and the fields and woods became housing and pavement. The Hackensack's channel became nearly dry. Before the suburban fringe had quite engulfed Rockland County, I had found a replacement for the 50 acres 200 miles to the north.

My search had taken me to the town of Harpersfield in Delaware County where a hilltop overlooks an upper branch of the Susquehanna. The year was 1946, between the fall of leaves and the fall of snow. The hilltop was part of a country estate whose owner had a dairy of prize-winning Guernsey cows but no use for the outlying woodlands. A further discovery was an exquisite glacial lake (a vly in the local parlance) of 10 to 12 acres, whose outlet once turned a gristmill after bouncing down 600 feet through stands of ancient maple and hemlock to join the Charlotte River in the valley below. Twelve hundred acres of lake, stream and forest would all be mine for \$6,000, and I would only give up pin oak for sugar maple, chub for trout, quail for grouse, and one old farm for all or parts of eight.

By the 1920s, after a century or more of horse-drawn, lamp-lighted farming, all eight farms had failed to give their owners a living. Now, their mangled woodlots were growing back from the latest and heaviest round of logging; on the former cropland and pasture,



The planting crew:
Bruce, Patsy, and Kit.



PHOTOS AND MAP COURTESY OF HENRY KERNAN

the previous cover of northern hardwoods was advancing.

What once was productive farmland is still growing crops for our use, but the products are now the fruits of the forest, not of the field. In this part of New York, hard maple, beech, and hemlock form the main canopy of the mature forest. Above them are the crowns of the sun-loving, faster-growing white ash and the more valuable black cherry. The understory duplicates the species above, but also has several other species of smaller size and more tolerance of shade. On these old farms grow 34 woody species of trees, 24 deciduous and 10 evergreen.

On parts of my property, the aims of my silviculture are well-ordered stands of high-quality timber trees, at least 100 on each acre. The spacing allows the crowns to spread and the boles to grow up straight and tall. The future crop trees are chosen early on and their competitors are gradually removed, some to burn at home and some to decay where they fall.

Elsewhere, I reserve certain parts of my forest from the timber cycle. They are the roadsides, streamsides and hilltops, lands that are steep, lands that are poorly drained, and primeval timber wherever it's found.

Throughout my property, the trees grow with a rich complement of lesser plants and other forms of life in many combinations of growth and decay, including den trees and woody material on the forest floor. Together with shrubs, grasses, and forbs, they

provide food and shelter for wildlife while the soil is porous and teeming with microflora. Consequently wildlife is abundant and diverse. Newcomers are turkey, coyote, and beaver, with a rumored presence of black bear. Ten furbearers are taken for their pelts. There are as many as 80 species of birds.

White-tailed deer attract most of the attention and the controversy. Like stone walls and apple trees deep in the forest, deer are a legacy of land cleared, farmed, and abandoned to the seedlings, saplings, and brush upon which they thrive. For years, hunters have hunted on my land and have taken each year about a quarter of the deer population, all nicely fattened on my seedlings. But at 25 deer per square mile, there are too many for the good of the forest, and their browsing is having a profound influence on its species composition. The worst aspect is the spread of ferns, which deer do not eat and among whose rhizomes tree seedlings do not survive.

Kit and Dev Kernan



Bruce and Kit Kernan

In early spring, when deer have come out to graze on sunny slopes and Canada geese are honking overhead, wild leeks show their green, glossy leaves against the still dull colors of the forest floor. Their corms are ripe for flavoring evening fish chowder by the lake. Aptly we listen to a Celtic harp render the Welsh folk-song, "The Ash Grove," aptly because in this forest the white ash is the most splendid forest tree of all. "*Fraxinus in silvis pulcherrima*," wrote Virgil in ancient Italy. A myth of ancient Greece claims ash trees to be our remote ancestors. Yggdrasill, the Norse Tree of Life, was an ash.

Another wild food ritual comes with the ripening of blueberries in the sultry haze of midsummer. They are picked and baked into pies and puddings near the lake where their bushes grow among the fragrance of hardhack and duckmackie, one of the many viburnums.

As the night approaches, thrushes call and owls hoot from across the lake and the wooded hillside beyond. Fish splash, frogs croak, and when full darkness comes, beaver go noisily about their business of forage and repair.

I've made a list of 36 wild foods that come from this land, and half of them are fish, berries, and meat. Deer hunters fill my freezer with venison. Other meats are more experimental and marginal than routine; baked woodchuck, for example, and sautéed beavertail. Fallen apples are food for deer, but those still on the tree we gather for sauce and cider, but no use beyond. The local deer poacher (my coon-hunting companion) has shown me, with perhaps a faint sigh of regret, where once stood the now long-gone applejack still of his youth.

A wild bee tree is a rarer find than a wild apple tree. I once came across a hollow old beech buzzing with apian activity. I showed it to my youngest sons then age 12 and 14. They dressed in their baggy bee clothing, put on their bee headgear, and went to work with axes and a crosscut saw, which they knew well how to use. They chopped, sawed, and split; and then took away the wild forest honey made from the nectar of the late-flowering thoroughwort whose white blossoms lighten the forest understory in late summer. In their bee gear with the darkening forest of late evening, they resembled small bears.

They and their elder brother began to work with me in the forest when they were about age 10. Together with one, then two, then all three, we planted red spruce seedlings, wild stock lifted from our woods; we cut firewood; we did stand improvement cutting; and we did much else to bring about the healthy, productive forest where once were eroded fields and mangled woodlots. The imprint and memory of their work are by now part of the forest and part of them; it is where they worked, camped, explored, and played. One uses wood in cabinetry and building; one certifies the sustainable management of tropical forests; and one manages nature reserves for The Nature Conservancy. Both their sisters are professional landscape and botanical artists. Gifts of the forests



Henry Kernan and granddaughter Jody

have shaped their careers with deep and lasting memories of the woodlands where they played, worked, and learned.

My professional work as a forester has taken me to many countries on the five forested continents, and I believe that our forests in the Northeastern U.S. are the best attuned to human needs. I close with a line from Virgil:

*Pallas qui condidit arces, ipsa collat
Nobis placeant ante omnia silvae*

Let Pallas live in the cities she built;
Before all else let our joy be in the forest.

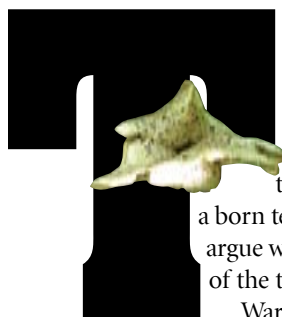
HENRY S. KERNAN'S HOMETOWN ONCE WAS MANHATTAN; HIS HOME AND LEGAL DOMICILE IS NOW UPSTATE NEW YORK. WITH A FORESTRY DEGREE FROM YALE, HE HAS MANAGED HIS FOREST AND WORKED IN FORESTRY PROJECTS IN 45 COUNTRIES.

Wild Foods

- | | | |
|---------------|----------------------|-------------|
| Trout | Strawberry | Honey |
| Bass | Shadberry | Maple syrup |
| Pickereel | Raspberry | Ginger |
| Bluegill | Black-caps | Mint |
| Frog legs | Thimbleberry | Leek |
| Beaver | Blueberry | Rhubarb |
| Venison | Rose hips | Ginseng |
| Woodchuck | Apple | Puffballs |
| Raccoon | Pear | |
| Rabbit | Pin cherry | |
| Canada Goose | Butternut | |
| Ruffed Grouse | Acorn, white and red | |
| Turkey | Hazelnut | |
| Blackberry | Hawthorn | |

Working the Small Woodlot

By JOHN SULLIVAN



here's an old saw that divides the world into two kinds of people: those who teach and those who do. The implication is that teachers can't do what they talk about. The idiot who thought that up never met Steve Warne, a born teacher if ever there was one – he might argue with that, but it's true – and a born doer of the things he teaches.

Warne is a forester who retired in 2002 after 32 years with New York State's Department of Environmental Conservation (DEC). He was one of a nearly vanished corps of service foresters – public employees who will visit a woodlot at the owner's request, offer management advice, and, once upon a time, even mark trees for harvesting. When Steve and two other foresters in the Warrensburg DEC office retired within the space of a couple of years, they were replaced by just one person, who operates under a limited mandate. New York is not unique. Vermont's county foresters have had similar consolidations in their ranks and they are spending less time in the woods with landowners and more time handling paperwork.

Warne first visited my woodlot 30 years ago, and I soon learned to pay attention to his recommendations. Our walks through my woods taught me what to look for in a tree or a stand of trees, how to evaluate loggers and consulting foresters, where to spend valuable time and where not, and many more of the rudiments of forest management. As I have said, Steve is a born teacher.

So it was natural that I thought of Steve when I was asked not long ago whether there is much to be gained by planned management of a small woodlot – let's say, 10 acres more or less. Can you get anywhere with this, or is it a game only for those who own hundreds or thousands of acres?

His answer was a simple "Yes, you can." Then he offered to take me on a walk through his own woods to show why. Steve Warne's forest consists of 12.5 acres on a hillside 10 minutes from downtown Warrensburg. Since he bought the land in 1989, it has become a certified Tree Farm and a source of great pride and pleasure for Steve. Both pride and pleasure are due in no small



LAUREL R. GALOR

measure to the fact that this small woodlot has more than paid for itself and is more valuable, both as timber and recreational land, than it was in 1989. In the past two decades there have been two commercial harvests and each year Steve removes between four and eight standard cords of firewood. That, in my mind, qualifies Steve Warne as a doer who has something to teach.

So we took a walk. It lasted two hours, about as long as it would take a forester to walk a similar lot with a landowner. Throughout, Warne maintained a running commentary on his own trees and the land they grow on, much as he has on similar walks through my forest. And the advice he offered to himself and other small lot owners was not much different from what he has told me; it's just modified to suit the circumstances.

Here, gleaned from notes of our conversation, is a sampling of his thoughts on how an owner can apply good management principles to a small woodlot and why he or she should. With apologies to Steve, I have reduced those notes to what I call Steve Warne's Tips for Successful Small Forest Management.



Set goals

Know your reasons for owning the land, or wanting to own land. “Goals” and “objectives” are important words in the forester’s lexicon, as they should be for the manager of any asset. Warne’s own objectives, drawn straight from his management plan, are:

- 1) Provide an annual source of firewood and an occasional sale of logs and specialty forest products.
- 2) Manage a Christmas tree plantation
- 3) Experiment in growing ginseng and goldenseal.
- 4) Maintain the property as a getaway.

“Another owner might have different objectives or different priorities,” he said. “What’s important is being able to state them simply.”

Goals, of course, may be influenced by reality. “My woodlot was heavily forested when I bought it. It hadn’t been logged for about 30 years and I could see that a harvest was possible – even necessary,” he said. But many people buy land that has been heavily logged just recently. “Those owners won’t be able to harvest sawlogs any time

Steve Warne (closest to camera) leads a walk to a vernal pool.

soon, but if they have a long-term outlook, they can focus their management on regenerating particular species or favoring those that are best suited to the soils and site. And, they won’t have to do much clearing if they want to build a cabin,” he added with a smile.

One of the first things we came upon as we entered Warne’s property was an area of about three-quarters of an acre that he had cleared by hand. At one edge is a cabin, dubbed “La Shantee,” which he reconstructed in 1990 of materials salvaged from a forest fire observer’s cabin. The rebuilt cabin, since joined by a garage, has been a success. It fits the land, is tight and comfortable. La Shantee is a good getaway. One goal met.

Know what you have

There are some prerequisites to management, such as a good title and legal access. Warne’s land is nearly a mile from the nearest public road and is surrounded by other people’s forest land. The

location would make any access difficult, and commercial tree harvests perhaps impossible, but for the fact that Steve has a deeded right-of-way over a good road. He also has well-marked boundaries. “When I bought the lot, the corners were clearly marked, and many of the old boundary line blazes were visible – enough information so I was able to complete marking the lines without much trouble.” Today, orange paint marks the blazes that show the way around the long, thin rectangle of the La Shantee Tree Farm. Steve checks them every year and repaints them every five to 10 years.

Fungi, like this Dryad’s saddle, are a sign of decay. This tree can go to the firewood pile.



Identifying and evaluating standing timber may be more problematic, although there is plenty of help available. On a small lot, however, sophisticated measurements such as basal area or tools like stocking tables don't come into play unless there is likely to be a commercial harvest. For the owners of most small forests, firewood is a major crop. Warne concentrates on poorly formed trees as well as downed trees and limbs.

“That’s a good way to start because as you work on firewood you will get to know your woods – which species dominate in certain areas, where the canopy is open or closed, which trees are growing well and have straight stems. Pretty soon, with a little patience, you will find that you know your forest pretty well,” he said. Not all of Warne’s dead or dying trees become firewood; he has left many standing snags and rotting logs to serve as food, shelter and nesting places for wildlife. “The object is not to create a tidy park,” he added emphatically.

According to Warne, management of a small woodlot can be a do-it-yourself matter if the boundary lines are marked and the owner has some rudimentary skills in map and compass use and tree identification. Speaking of his own land, he said, “There’s very little professional forestry taking place here since the last harvest (in 1993).” The one exception is a small area in the southeast corner where a pocket of beech trees, large and small, have become part of an experimental treatment conducted with Cornell Cooperative Extension to try to check the spread of beech. Beech is not a desirable species here; young trees crowd out valuable maple seedlings especially, and almost all adult beech will eventually succumb to beech bark disease, a fungal blight.

Make a plan

All this is not to say that a professional consulting forester doesn't have a place in managing a small woodlot. “It’s always worthwhile to have a forester walk your land with you. You will learn whether it can support a harvest or what you can expect from a harvest, and you will be taking the first step in producing a management plan,” said Warne.

For some, the term “management plan” conjures up images of fat folders full of technical analyses and elaborate activity schedules. Plans like that may be needed for some properties, especially those with more varied terrain and vegetation, much more land, and greater financial ambitions. Warne’s own plan runs to nine pages; he admits it is much more elaborate than necessary. It includes a discussion of the history of the area, its topography and wildlife, an examination of the quantity and quality of the principle tree species found there and detailed records of work conducted – a good idea for any plan, and too often neglected.

A landowner doesn't need this quantity and quality of information to start; it can be built over time, says Warne. Initially, a functional plan can be written on two sides of a three-by-five card: “Your goals, a map noting the location of various timber types, and a list of planned actions will do just fine,” he said. “It’s good to have a thorough description of each stand of trees, especially the size of dominant trees, their condition, the presence of any widespread disease or damage, and the canopy coverage. But a simple plan will be easier to use – and you will be more likely

to stick to it.” He adds, with a smile: “It might be nice to put your plan on larger paper so you can read it better.”

Get help

Steve Warne has an obvious advantage over most forest owners: he is a professional forester. “But I don’t know it all and I don’t hesitate to call a forester friend for advice.” The average landowner may not have a forester friend, but there is plenty of expert advice available. Much of it is free and eagerly offered. Warne ticked off several sources. (See the sidebar below) Although their schedules are busy, DEC service foresters still visit woodlots, talk with owners and prepare stewardship plans. Cornell Cooperative Extension offers a wide variety of publications as well as frequent workshops on topics ranging from agro-forestry – the cultivation of crops such as ginseng and mushrooms – to financial management and tree identification.

The New York Forest Owners Association (NYFOA) publishes a semi-monthly magazine, *The New York Forest Owner*, containing informative articles and activity calendars. Local NYFOA chapters publish newsletters and conduct regular woods walks on members’ properties; these usually feature professional commentary on subjects of interest and provide opportunities to meet and learn from other landowners.

NYFOA, Cornell Cooperative Extension, and the New York Tree Farm System co-sponsor the Master Forest Owner program. MFOs are forest owners who undergo training that qualifies them to provide guidance to other landowners. They will walk the land, answer questions, and put an owner in touch with sources of professional help.

Warne offers a few more bits of his own advice: “While you’re talking to MFOs, landowners, extension agents and others, always be alert for the names of good professional foresters and loggers. Ask other landowners whom they have worked with and what their experience has been.” DEC offices, he notes, maintain lists of foresters and loggers who meet certain qualifications. “Get good advice before you make plans to harvest trees or contract with a logger.”

Be flexible

Priorities change. Opportunities pop up. Warne’s Christmas trees have been less than successful. In the early 1990s, after clearing three-quarters of an acre by hand, he planted seedlings from a nearby commercial grower. He tells the rest of the story. “Christmas trees can be hard to grow, and this isn’t the best site. I’ve gotten very few Christmas trees out of here. Right now I’ll

make somebody a good price for truckloads of balsam brush.”

Meanwhile, the fruit trees planted in place of Christmas trees have thrived. A firewood wholesaler bought some attractive white birch logs to be wrapped in plastic and sold at retail to decorate the buyers’ fireplaces. And now Warne has planted a number of American chestnut seedlings in the hope of finding a few that are resistant to the blight that largely eradicated the species early in the 20th century.

Be persistent

Not long after buying La Shantee Tree Farm, Warne discovered a patch of native ginseng. The herb, which is native to the area and widely used in Asian medicine, was largely extirpated when farmers created pasture and hayfields from old forests. It has been making a comeback since the late 1800s, when farmers in the Adirondacks began abandoning their land. After attending an Extension-sponsored workshop in 2000, Steve became interested in cultivating herbs, and he planted ginseng roots and seed and goldenseal rhizomes.

“I have no intention of selling ginseng roots or seed,” he said. “I’m just interested in the cultivation.” Good thing, because Steve’s experience with ginseng has been as rocky as an Adirondack pasture. Standing amid a scattering of healthy plants with brilliant red berries, he tells about the setbacks: a large hemlock blew down, exposing the shade-loving plants to excess sunlight; moles and voles attacked roots and foliage, deer browsed what was left and, finally, poachers stole most of his crop a few years ago. Still, he goes on. “It’s a fascinating plant, and I have no intention of giving up.”

Enjoy yourself

Forest ownership isn’t a competitive sport. “This isn’t a race,” Steve said near the end of our walk. “It’s an opportunity to learn at your own pace, to spend time in the woods and to do it productively. It’s easy to start slowly, get a little advice, build on that and on your experience.

“Forest land – even a small lot – can be a good investment. And it’s more fun to take a walk in your woods than to check stock prices every day.”

JOHN SULLIVAN OWNS A WOODLOT IN CHESTERTOWN, IN THE SOUTHERN ADIRONDACKS. HE IS A FORMER OFFICER OF THE NEW YORK FOREST OWNERS ASSOCIATION, CHAIR OF ITS SOUTHERN ADIRONDACKS CHAPTER, AND BOARD MEMBER OF THE NEW YORK TREE FARM SYSTEM. HE WAS 2006 NEW YORK STATE TREE FARMER OF THE YEAR.

Sources of Information and Assistance

CORNELL COOPERATIVE EXTENSION

www.cce.cornell.edu

Extension offices are located in every New York county. Their addresses and telephone numbers can be found at the main website or in the local phone book.

NEW YORK FOREST OWNERS ASSOC.

www.nyfoa.org

New York Forest Owners Association, Inc.
PO Box 541
Lima, NY 14485
800-836-3566

MASTER FOREST OWNERS

www.dnr.cornell.edu/ext/mfo

108 Fernow Hall
Cornell University
Ithaca, NY 14853
607-255-2115

NEW YORK TREE FARM SYSTEM

www.nytreefarm.org

NY Tree Farm Office, Liana Gooding
PO Box 541
Lima, NY 14485
800-836-3566



BUILDING BETTER FOREST ROADS

BY MADELINE BODIN

There is a good road in Margaretville, New York. Actually, it's a network of roads providing access to the Taylor family's land. "Two things we have a lot of on this property are trees and water," says Ken Taylor. The roads provide access to a stone quarry, a sugarbush, and the slash from a recent logging job that the family uses for firewood. Some 60 water bars on those roads prevent all that water from washing the roads away into the nearest stream or pond. This is especially important in Margaretville, which is part of the watershed for New York City's water supply. During a recent logging job on the property, one stretch of road around a pond was straightened and rerouted to land above the pond. This will keep the road safe from the pond's spring floods, and it should keep both the pond, and the muskrats that sometimes play there, from the mud that used to wash in from the road.

Summer finds most of the road network in cool, deep shade. There are a few places where the roads are open to the sky and sun, much like in the surrounding landscape. The Taylors enjoy the wildlife on their land. They've tracked deer along their roads, and once they glanced up during a woodland picnic to find a porcupine had joined the gathering. One goal the Taylors had for planning roads and skid trails during the recent logging was to keep their property as friendly to wildlife as it had always been.

Until recently, a good road meant only that it was good for drivers, cars, and other vehicles. Road engineers have learned a lot about how to design this type of road in the last 50 years. It's only very recently though, that any attention has been paid to making a road good for both vehicular travel and the natural world. A good road, as far as the natural world goes, is one that keeps in place as many of the existing natural systems as possible and has the least impact on the plants and animals that live nearby. Not only does the Taylors' road allow access for vehicles, it also ensures continuity of the natural systems.

Highways and other big roads are usually built by states or cities, but there are several reasons for landowners to build new roads on their own property. Two of the most common are for access to a new house and to allow trucks to get from an existing road to a log landing and back. Skid trails can also be road-ish, so many of the rules of good roads apply to them also.

When snowmelt or heavy rains meet a poorly designed road, the water can wash away parts of the road, its ditches, and the adjacent banks. The resultant sedimentation pollutes streams and changes the nature of the streambed, filling in gravel beds – where fish such as trout lay their eggs – and the holes where fish keep cool. For this reason, one of the biggest impacts of a poorly designed or built road is on water quality, and some of the best

advice available tells you how to avoid those impacts. As it happens, so do most of the laws and regulations.

For example, the most important regulation for woodland-road builders in New York State is Title 5 of Article 15 of the Environmental Conservation Law, also known as “protection of waters” from the “Protection of Waters Regulatory Program” that implements the law. Many road construction projects fall under the stream-crossing provision of the law.

Sloane Crawford, Department of Environmental Conservation (DEC) forest stewardship coordinator, says that the best way to determine if your forest road project will require a permit is to consult an online publication called “Protection of Waters Program: A Guide for Applicants,” which can be found at www.dec.ny.gov/permits/6340.html. The publication describes the two instances in which a permit is required for a forest road building project related to forest management activities, and it walks you through filling out the permit itself. It includes contact information for Division of Environmental Permits offices in each of the state’s nine administrative regions. While currently exempt from a state construction activity permit, roads built for forest management purposes are still required to obtain a permit for crossing certain classified streams or for the placement of fill in navigable waters or their adjacent and contiguous wetlands.

More advice is available in NYS Forestry Best Management Practices for Water Quality. These best practices are designed to preserve water quality, address the building of skid trails, temporary roads, and permanent roads, and provide information, such as the size and placement of culverts, helpful to anyone planning a road.

A copy of this guide is available online at www.dec.ny.gov/lands/37845.html. Due to high printing costs and state budget constraints, Crawford suggests that anyone who wants a paper copy of the best management practices can go online and print it out. You can print out the entire PDF file or any of its four sections.

Good advice also comes from tradition, particularly regarding the temporary roads used in logging. For example, logs were traditionally hauled out in winter, when the ground is frozen and the fragile topsoil is protected from the trucks’ and skidders’ tires by a layer of snow or ice. And even though logging has become a year-round profession, there are some woodlots that simply have to be worked only in winter.

Tradition, however, also celebrates some now-questionable road-building practices. “Sunlight is nature’s gravel” is one old saying that suggests the wider the corridor, the drier the road. While bigger may be better for keeping some roads passable, the resident plants and animals would benefit more from a road cut the width of a lane rather than a boulevard.

It’s only in the last 15 to 20 years that the science of road ecology has sprung up to provide road engineers and other road builders with scientific information on the impact roads have on natural communities. Road ecologists can give some direction on how to build roads that have the least impact on the natural world while still remaining safe for humans.

There has been quite a bit of research, with national and regional conferences that bring together ecologists with govern-

ment transportation staffers to discuss that research. Still, in part because the field of road ecology is relatively new, and in part because the building of roads and the protection of the environment can be contradictory concepts, there are no rules that work in every habitat, for every creature, or on every road.

The research shows, however, that erosion and sedimentation are the biggest impacts that narrow, lightly traveled roads have on the forested areas they traverse. Besides minimizing those, the two most important pieces of advice the science of road ecology has for builders of small forest roads are, first, to maintain the tree canopy over the new roads as much as possible, and second, to close no-longer-needed roads to vehicle traffic and return them to their natural state as quickly as possible.

Actually, “Don’t build a road if you don’t have to” is the first piece of advice from Richard T.T. Forman, a professor of landscape ecology at Harvard University and a leader in bringing together diffuse studies into the coherent science of road ecology. “Minimize road length to save nature and save money,” he says.

On those necessary roads then, the narrower the road and the smaller the break in the tree canopy, the better. The more qualities your road shares with the surrounding forest, the less impact it will have on the surrounding natural community. The shade the canopy provides is a key quality.

When the forest canopy is broken, a new type of community called a forest edge is created. Edge habitats are by no means bad. They are as important as any other natural habitat and are home to many popular animal species, including many game species. It is just that in most places, even in rural New York, roads are slicing forests into ever edgier pieces. While species that prefer edge habitats thrive when a road breaks the forest canopy, some forest-interior species can suffer.

“Certain species of birds are very vulnerable at the edges of forests,” says Scott Jackson, a road ecologist and wildlife biologist with the University of Massachusetts Extension, Amherst. Some of these edge-sensitive species are susceptible to nest predators such as chipmunks, raccoons, and crows – all edge species.

Once upon a time, land managers tried to create as much edge habitat as possible, sometimes by purposely maintaining otherwise temporary roads built for logging. Forman believes a road should be maintained for driving from here to there. Creating edge habitat, he says, should be done thoughtfully, not as an inherent part of road building.

Habitat fragmentation is a problem that is related to the “edge effect.” A forest crisscrossed with gaps in the canopy created by roads can discourage some species of birds, such as the hermit thrush, from nesting in the area. “These birds seem to be able to size up the forest patch and decide if it’s big enough for them to nest there,” says Jackson. When there is a gap in the forest canopy, such as the gap made by a road, they may look elsewhere, and with more roads, there is simply less habitat for these species.

Roads also create barriers to animal movements. Highways give an obvious example of how a road can create a physical barrier to animal travel. We’ve all seen roadkill. But roads also create a mental barrier which has effects that aren’t seen. You don’t see the bear that didn’t try to cross the road, but it still didn’t get to the other side.

Big animals don't seem to have any trouble crossing small woods roads (although some may avoid areas where there are many roads), but research done on forest roads in the Northeast suggests that some small animals do have trouble.

Phillip deMaynadier, who now works for the Endangered Species Group of the Maine Department of Inland Fisheries and Wildlife, did his doctoral study on whether forest roads created a physical or psychological barrier to the movement of frogs and salamanders. He found that a larger, well-traveled logging road in his study did have an impact on the salamanders (but not the frogs) that lived near it, while the smaller road had no recordable effect.

First, there were fewer numbers of salamanders (deMaynadier studied redback, blue-spotted, and spotted salamanders and red-spotted newts) near the edges of the wider road, which deMaynadier feels may have been an edge effect. Second, adult salamanders were less likely to cross this road while migrating to their hibernation sites and much less likely to cross during their normal home-range wanderings.

The difference between the roads, says deMaynadier, was canopy cover. The center of the bigger road had only 17 percent canopy closure while the smaller road had a 42 percent canopy closure. In other words, it didn't take much more shade, or even total shade, to make the narrower road "invisible" to salamanders.

While deMaynadier didn't study the annual spring migration that brings so many amphibians onto even busy roads for a honeymoon massacre, he did study the fall migration toward hibernation sites and believes the two are similar. He found that the number of salamanders crossing the larger road during fall migration was 32 percent less than expected from the movements of other salamanders in the study.

To minimize the impact of any forest road, deMaynadier recommends leaving large-crowned hardwood trees next to it, first because they provide more canopy shade than conifers, but also because they provide an annual dose of leaf litter, which further helps the road blend in with the surrounding forest.

DeMaynadier notes that his study points out the importance of not building roads within 500 feet of a vernal pool – the average migration range of vernal-pool breeding salamanders like the

ones in his study.

Why go through the trouble of building a road that salamanders are willing to cross? First, says deMaynadier, salamanders make good sentinel species, exposing problems in a natural community before larger, more glamorous animals are effected.

Also, says Jackson, salamanders and other small animals are near the bottom of a food web that connects all the living things in the forest. Just because they are small, slimy, and largely unseen doesn't diminish their role. A road that is good for salamanders is good for the animals that eat salamanders, the animals that eat those animals, and so on.

Once you've built a lovely road it can be hard to say goodbye, but that is exactly what road ecologists such as Forman and Jackson recommend you do when a temporary road, such as one to a log landing, has served its purpose.

Might you do less harm to the surrounding area if you reuse the same road the next time around? Jackson says maybe. If you've done an excellent job on planning, drainage, and the rest and you are sure you will want to travel the same route the next time around, then the benefits of maintaining the road to use again may outweigh the drawbacks.

One significant drawback is increasing human access. "If not number one, I would put it near the top of the list," Forman says.

It's hard to deny the principle that a road means more people. If you must hike to your favorite pond, you are almost certain to be alone. Build a road to it and all sorts of people start showing up.

"We do want people to get out into nature," says Forman. "Society fundamentally depends on nature. It's a good thing to get people out there." The trick is not to let every temporary road turn into permanent access to an otherwise remote area.

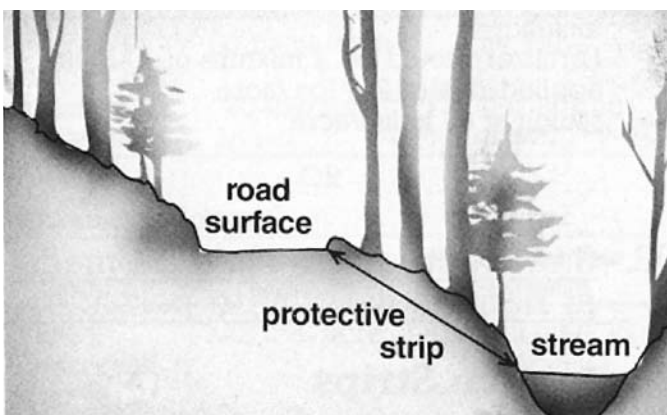
The solution, he says, is effectively closing temporary roads to vehicle traffic when their job is done. Forman acknowledges that, in this country at least, this is a politically sensitive issue. "In Canada they seem to know how to do it. I've seen wonderful examples," he says. "In the U.S. you say, 'close the road,' and there is a public outcry and people hire lawyers."

The other solution is to carefully plan where to build the roads in the first place. Roads built for recreational access should be at the perimeter of what Forman calls "the big, green blob," leaving the interior wild for the few hardy souls willing to travel beyond the road, he says. Similarly, other road networks can be planned with a goal of keeping large areas free of roads.

Forman is not against roads. In fact, he's all for them. He knows that many new roads will be built, and believes that is a good thing. He just wants those roads to do the most good for people and the least harm to the environment.

There is a special joy in walking, or even driving, down a forest road and seeing plants and animals that are usually only found deep in the forest. Building a forest road that keeps even the salamanders and the trout happy will probably do a pretty good job of keeping you happy too.

MADÉLINE BODIN IS A FREQUENT CONTRIBUTOR TO *Northern Woodlands Magazine*. SHE LIVES ON A STRETCH OF ROAD IN ANDOVER, VERMONT, WITH IMPRESSIVE CANOPY COVER.



A "best management practice" keeps an undisturbed area of vegetation between a road and any stream, pond, or wetland.



MARY THILL

Peter Smallidge pulls a buckthorn seedling.

WOODLAND INVASIVES: DOING BATTLE WITH NON-NATIVE PLANTS

BY MARY THILL

As Peter Smallidge walks through his woods, he stoops frequently. He plucks shin-high seedlings, shakes soil off the roots, and hangs them to wither in the branches of trees. The late-October Adirondack forest floor is a sepia mosaic of autumn litter. But amid the disorder, certain leaf shapes, vein patterns and colors catch his experienced eye.

Smallidge knows that there are only two balsams on his 50 acres. He knows a sunny spot where there are three types of cedar within ten yards of each other (northern white cedar, eastern

red cedar, and pasture juniper). He is a forester who can identify plants with the gestalt awareness of someone who's looked at them most of his life, which is why when he sees something unfamiliar in the woods, it stops him.

"As a rule of thumb, when I find something, I stop and take care of it," he says. What he has found beneath his sugar maples and red and white pines and oaks are common buckthorn and oriental bittersweet. Because he identified these invasive plants early, Smallidge has been able to keep them in check with herbicide and hand-pulling.

But he remains vigilant. Along the few miles of road between his tract and the hamlet of Crown Point, on Lake Champlain,

Smallidge has seen how thick buckthorn can get. He does not want the fast-growing European shrub to mature enough on his property to produce seeds and shade out the native trees sprouting on the forest floor, especially white pine, which he logs and mills himself. So he stoops and pulls. Every suspicious three to thirty-inch seedling is enough to detour him from his other woodlot chores.

“From a targeting perspective, fall is a good time of year because you can find the invasives,” he says. “The native plants have senesced. You don’t have to worry about collateral damage” when applying over-the-counter herbicides such as Roundup. Plants that have migrated from warmer climates tend to stay green longer than natives – the buckthorn retains a vibrant mid-summer hue, and the bittersweet is the color of an overripe lime – so they stand out at the end of the growing season.

Smallidge first applied chemicals after he bought the property six years ago. Then there were clumps of bittersweet and buckthorn; now there are just scattered plants, likely spread by birds that eat the berries. He’ll spray any he happens to see while he’s using Roundup to contain grasses in two small clearings he recently opened to diversify wildlife habitat and encourage white pine.

Like most interior forest in the uplands of northern New York, Smallidge’s land so far has been relatively insulated from invasive plants. Exotic terrestrial plants that have made inroads into this sparsely populated outcrop of Canadian shield are just beginning to cause economic and ecological problems. Pockets of garlic mustard are infiltrating the southwestern Adirondacks as well as campgrounds throughout the park. Stands of Japanese knotweed are becoming familiar along roadways and waterways. Oriental bittersweet is creeping up I-87, the corridor linking Montreal to New York City. Pale swallow-wort has taken root on Lake Champlain to the east and in the St. Lawrence Valley to the west.

“Swallow-wort colonizes just about every habitat but open water. We’re on early-warning stage here,” says Hilary Smith, who heads the Adirondack Park Invasive Plant Program (APIPP). Smith keeps tabs on invasives encroaching from New England, Canada, and the rest of New York State.

Often the first indication ecologists have that a new species is in the area is from private landowners. Smith answers 100 to 200 calls a year from people seeking to confirm the identity of plants on their property. That’s an important part of her job, as is collaborating with other organizations to provide plant I.D. classes and invasive-species management training. These programs help landowners determine when to hand-pull, when mechanical cutting or burning might be effective, when to use herbicide, and when they need permits to apply chemicals near wetlands. They also provide advice on what to plant in place of invasives and where to find native plant nurseries. With the help of networks like APIPP, you don’t have to be a botanist to detect and deal with aggressive non-indigenous plants.

APIPP covers the Adirondacks, but it has seven counterparts across New York State. Called PRISMs (Partnerships for Regional Invasive Species Management), these collaborative organizations are “a good first call,” Smith says. (See sidebar for contact information.)



JAPANESE BARBERRY

Berberis vulgaris (pictured)

COMMON BARBERRY

B. thunbergii



ORIENTAL BITTERSWEET

Celastrus orbiculatus



COMMON BUCKTHORN

Rhamnus cathartica (pictured)

GLOSSY BUCKTHORN

Frangula alnus



PALE SWALLOW-WORT

Cynanchum rossicum syn.
Vincetoxicum rossicum

BLACK SWALLOW-WORT

Cynanchum louiseae syn.
Vincetoxicum nigrum



GARLIC MUSTARD

Alliaria petiolata



BUSH HONEYSUCKLES

Lonicera maackii,
L. morrowii,
L. tatarica,
L. x bella



JAPANESE HONEYSUCKLE

Lonicera japonica



AUTUMN OLIVE

Elaeagnus umbellata



NORWAY MAPLE

Acer platanoides

DESCRIPTION AND HABITAT	THREATS	CONTROL AND REMOVAL
Deciduous shrub. Compact and twiggy, usually growing two to three feet, sometimes six feet tall. The small leaves are either untoothed (Japanese) or sharply toothed (common). Beneath each cluster of Japanese barberry leaves is a single spine; common barberry has two or three spines. One of the first plants to leaf out in spring. Clusters of ½-inch yellow flowers produce scarlet berries; foliage turns orange or red in autumn. Grows along roadsides and open fields and in open woods. The Japanese variety, being more shade tolerant, is more often found in forest.	Where barberry establishes a dense, shady ground cover, little else is able to sprout or grow. Deer and other browsers avoid it in favor of native plants. Raises soil pH and reduces depth of leaf litter on the forest floor.	The entire plant and roots can be pulled with hand tools or by other mechanical means. Alternatively, the stem can be cut and herbicide applied to the stump.
Deciduous woody vine. Climbs in a twining pattern to 60 feet high. Vine base can reach two to five inches in diameter. Alternate leaves are highly variable in shape and size; small, greenish-yellow flowers. Best identified in fall, when yellow fruits split, displaying the scarlet seed covering. Grows in forests, fields, wetlands, and beaches. (Note: American bittersweet, <i>C. scandens</i> , looks similar but produces flowers and fruits only at the end of the branch. Oriental bittersweet has flower and fruit clusters between leaf and stem. While <i>C. scandens</i> is native and non-invasive, this has been complicated by hybridization in the wild.)	Twining vines girdle the trees and shrubs they climb. Vine mass can pull trees down and make them more vulnerable to wind, snow, and ice damage. Once an infestation is well-established, a nearly impenetrable mat blankets the area, shading and choking out other vegetation. Unfortunately, it remains popular as an ornamental.	A combination of mechanical removal and herbicide (often triclopyr) is typical. Large infestations are difficult to control, as roots sucker and seeds persist in the soil for several years. In fields, weekly mowing is effective. Infrequent mowing merely stimulates root-sprouting.
Deciduous shrub or dense, small tree. Dark bark with lenticels. Leaves of glossy buckthorn have parallel veins. Common buckthorn has smooth, rounded, finely-toothed, sub-opposite leaves; black, glossy fruit; twigs often tipped with sharp thorns. Glossy buckthorn has glossy, oval, toothless, alternate leaves; red fruit turns nearly black. Larger specimens can resemble old apple trees and grow to 20 feet. Shade-tolerant. Occurs in a wide variety of habitats – including fields and forests – with common tending toward drier, alkaline sites and glossy preferring wet, acidic soil.	Dense stands shade out all other shrubs and tree seedlings, as well as wildflowers and other herbaceous plants, reducing habitat for small mammals and birds. Seedlings can wait decades for the canopy to be opened. Laxative properties of fruits can harm wildlife or rob them of energy. Elevates nitrogen content of forest soils, altering insect communities.	In small numbers, seedlings can be pulled by hand and hung in nearby trees to desiccate. In thicker stands, pulling can stimulate growth, as can mowing or burning. Foliar herbicide is sometimes required. Larger trees can be girdled, or cut (with herbicide then applied to the stump).
Perennial, herbaceous, twining vines 2–6½ feet long. Opposite, glossy, elongated-oval leaves (medium green in pale swallow-wort, dark green in black). Small star-shaped flowers late May–mid July. Fruit resemble milkweed pods and open in late summer releasing downy seeds. Also known as dog-strangling vine, both species can be found in mixed hardwood forest to heavily shaded woods as well as disturbed sunny areas and open fields in moist to dry soils.	Swallow-worts interfere with forest regeneration and choke out native plants. Wind-dispersed seeds are abundant and travel a great distance. Pure stands of pale swallow-wort suppress other species. Deer and cattle tend to avoid it. Because swallow-wort is a member of the milkweed family, monarch butterflies sometimes lay eggs on it, but larvae do not survive.	Hard to control once established. Hand-pulling is difficult since the stem base is brittle. To prevent seed dispersal, pods should be removed and burned before they open. Mow in early July, when pods are very small. Burning is not effective and can improve conditions for seeding. Triclopyr or glyphosate can be applied to foliage mid-September. Glyphosate treatment of cut stems is effective but labor intensive. Stay out of infested areas during seed dispersal to prevent dissemination.
Biennial. First-year plants show basal rosettes of kidney-shaped leaves with scalloped teeth. In spring, second-year plants generate stalks two to three feet tall with alternate, heart-shaped, sharply toothed leaves and clusters of white, cross-shaped flowers. When crushed, new leaves and stems emit a strong garlic odor. Taproot is slender and white with a distinct S-curve. Highly adaptable; grows in sun to heavy shade, favoring forest and forest-edge habitats.	Shade tolerance, dense growth, and prolific seed production (to 6,000 per plant) make it an aggressive competitor, especially against other spring-blooming species. Kills mycorrhizal fungi, thus threatening hardwood regeneration. Certain native butterfly larvae often die when hatched from eggs laid on garlic mustard.	Infestations are best pulled by hand (with care taken to remove the taproot) or repeatedly cut at ground level before seeds form. Second-year plants are best removed when in full bloom. Fire or herbicides are sometimes used for larger areas. Seeds persist in soil for up to five years.
Deciduous shrubs. Growth is multi-stemmed with opposing branches. Mature plants usually reach 6-10 feet tall. Leaves are opposite and one to three inches long. Sweet-smelling white, yellow, or pink flowers are tubular and paired. Berries are red or, rarely, yellow. Preferring sun to shade, they aggressively invade abandoned fields and forest edges but are also found in intact forests. (Note: less common is the Northeast's native and beneficial fly-honeysuckle, <i>L. canadensis</i> . It can be distinguished from exotics by the pith in the center of each stem. Cut a stem crosswise and the pith of <i>L. canadensis</i> will be white and solid. Non-native piths are brown and often become hollow.)	Spreading quickly in disturbed soils, honeysuckles can severely affect forest regeneration after logging. Mature bushes cast heavy shade and suppress growth of native species, resulting in a reduction of plant diversity. Because invasive honeysuckle is rarely eaten by deer, its presence increases browsing pressure on the relatively fewer, nearby native species.	Small plants can be pulled by hand. With mechanical removal techniques, any portion of the root left behind may resprout. Cutting and applying herbicide to the stump can be effective, especially in autumn.
Trailing or climbing, woody, semi-evergreen vine. Usually 6-10 feet long, but can reach 30 feet. Opposite one- to two-inch long leaves. Flowers are similar to bush honeysuckles, but berries are small and black, rather than red. Habitat is similar to bush varieties. (Note: native honeysuckle vines are distinguished by their red berries and connate, or fused, upper leaves. The upper leaves of <i>L. japonica</i> are separate.)	Competes ferociously for both light and soil resources, spreading by seeds, runners, and underground rhizomes. Can, like bittersweet, topple trees and shrubs.	Very difficult to control, due to its several propagation strategies. Pulling often leaves roots and rhizomes behind. Herbicide (sometimes in tandem with fire) is often applied in fall or winter.
Deciduous shrub or small tree. Grows to 20 or 30 feet. Autumn olive's alternate gray-green leaves are oval, smooth-edged, and – when mature – silvery underneath. Small, tubular, white or yellow flowers grow in clusters. Fruits are a pale, pinkish red. Olives can tolerate a wide variety of conditions, from wetlands to forests, and have a special advantage on infertile sites: they are capable of nitrogen-fixing.	Outcompeting native species, olives can form dense thickets that alter natural succession patterns and reduce plant, bird, and other wildlife diversity. Can interfere with the nitrogen cycle of native species dependent on poor soils. Prolific seeds are easily spread by birds. Can flower and set fruit at three to five years old.	Small plants can be hand-pulled. Herbicide is often required, applied to cut stumps or as a foliar spray. Cutting (without herbicide follow-up) and burning merely stimulate sprouting and more vigorous growth.
Deciduous tree. Grows to 60 feet. Popular as an ornamental and street-side tree, it resembles sugar maple. Norway maple's bark is more regularly grooved than that of sugar maple and its autumn color is more yellow. Norway maple is most easily distinguished by the milky sap emitted from broken stems or torn leaves. Shade-tolerant, fast-growing, and stress-resistant, it succeeds in a variety of conditions and locations.	Outcompetes sugar maple by spreading rapidly to disturbed forest sites. Seedlings sprout vigorously. Mature trees form a denser canopy than sugar maple, shading out wildflowers and other tree seedlings.	Control methods include pulling seedlings, cutting trees, and – when necessary – applying herbicide to prevent re-sprouting.

PHOTO CREDITS: NAJA KRAUS, NYSDEC FOREST HEALTH & PROTECTION; GERRY LEMMO; GERRY LEMMO; ELINOR OSBORN; NAJA KRAUS, NYSDEC FOREST HEALTH & PROTECTION; NAJA KRAUS, NYSDEC FOREST HEALTH & PROTECTION; CHUCK BARGERON, UNIVERSITY OF GEORGIA, BUGWOOD.ORG; DAVE SPIER; PAUL WRAY, IOWA STATE UNIVERSITY, BUGWOOD.ORG

“One of the most important things for landowners to know is there is a larger network to be involved with,” she says. “Often with invasives one can feel overwhelmed. But in working together we can really strengthen our approach, both with prevention and management.”

APIPP was founded in 1998 by a variety of organizations and agencies. It became a template for the other New York PRISMs, which are at various growth stages, from embryonic to funded and staffed. APIPP also has the advantage of having gotten going

early enough to have a real chance at early detection and prevention of some nuisance non-natives. Prevention is the ideal, for landowners as well as natural resource managers. Once a new species establishes itself, eradication is often not an option. Sometimes the most a landowner can do is try to minimize negative effects. U.S. government agencies, environmental groups and landowners annually spend billions trying to roll back the most disruptive plants and animals on land and in water.

New York State is ecologically diverse. According to the Department of Environmental Conservation, forests cover 60 percent of the land, ranging from overgrown pastures to Atlantic coastal pine barrens to northern hardwood and boreal habitat. The majority of the state is more profoundly affected than the Adirondacks by invasives. The temperate Lower Hudson Valley, for example, is inundated by swiftly migrating black swallow-wort, Japanese stilt grass, porcelain berry, devils’s walking stick, and ailanthus (tree of heaven). In 2009 a landowner discovered mile-a-minute weed at the edge of a forest in Westchester County; the trailing vine prefers open or disturbed sites but is a harbinger of unknowns yet to come.

In Western New York – which has lots of agricultural land and bears more ecological resemblance to the midwest than to New England – bush honeysuckle, common buckthorn, ailanthus, and black swallow-wort are creeping into the understory. Historically forested wetlands and floodplains are being taken over by common reed and Japanese knotweed. In combination with deer overpopulation, invasive species have had a significant impact on tree regeneration in managed and natural woodlands, says Western New York PRISM coordinator Paul Fuhrmann.

Peter Smallidge well knows the complex interactions of invasive plants on New York woodlands. He is not just a landowner; he is state extension forester for Cornell University. In this capacity he conducts educational programs on all aspects of woodlot management, mostly for owners, who are about as diverse as the territory. He cites a recent survey by the U.S. Forest Service, which found that the majority of New York private forest owners – 53 percent – have a “retreat mentality”; that is, they view their woodland mainly as a getaway from the hectic world. Those owners are less likely to come face to face with new shrubs and vines than the 24 percent whose primary objective is to work the land themselves. Among the retreat type of owner, Smallidge sees both a need and an opportunity: professional foresters have traditionally related to landowners through timber sales, but they could play a new role, showing people the invasive plants on their property and helping form a management strategy.

Landowners can also work proactively beyond their property line, Smith advises, by joining committees within their PRISM or forming sub-regional partnerships with municipalities and other landowners to prevent and contain invasive species in their own communities.

One small compensation for living in a landscape whose species are shifting is that it teaches us to notice. As we learn each newcomer we also look more closely at the everyday plants that evolved together over thousands of years. Our understanding of soils, light, and forest dynamics increases as we witness how new



1

THE LIST GOES ON

This article and accompanying chart only cover a handful of the major invasive plant threats to the forests of New England and New York. Others include:

1 Burning bush (*Euonymus alatus*) This deciduous shrub continues to be sold as a landscape plant despite its invasive habits. Grows anywhere from full sun to full shade. Easily seeds in through bird distribution.



2

2 Japanese knotweed (*Fallopia japonica*) This large perennial resembles bamboo, though the two are not related. Primarily a problem along rivers, where it destabilizes bank soils, knotweed is also a problem for many of the Northeast’s floodplain forests.



3

3 Ailanthus, aka tree of heaven (*Ailanthus altissima* (Mill.) Swingle) Swingle) A common city tree that sprouts in parking lots and through sidewalk grates, it does even better in forests. Prolific seeder, it can also resprout from cut stumps.



4

4 Japanese stilt grass (*Microstegium vimineum*) Highly adaptive, stilt grass can spread in all but the deepest shade. It has been found in New York and has been moving north through the Connecticut River valley for over 20 years.



5

5 Mile a minute weed (*Persicaria perfoliata*) As expected from the name, this vine grows rapidly. It prefers open or disturbed sites, but can also climb over existing native plants to reach the sunlight.

Invasive species are a problem for all habitats, not just woodlands. Many plants, including purple loosestrife and wild chervil, threaten wetlands, roadsides, and grasslands. Others, such as Eurasian water milfoil and water chestnut, pose serious aquatic dangers. More broadly, invasive species include not only plants but also many animals (particularly insects and fish) and diseases.

LESLIE J. MEHRHOFF; NAJIA KRAUS; RICHARD WEBB; TED BONNER; JILL M. SWEARNEN; 1, 3, 4, 5 COURTESY OF BURNWOOD.ORG

species organize themselves by these variables.

It's clear that Smallidge takes no pleasure in finding buckthorn whips in his woods but that he does take pleasure in noticing what grows where. Don Leopold, chairman of the forest biology department at the State University of New York College of Environmental Science and Forestry in Syracuse, impressed upon Smallidge as a student that he should know at least the genus of every tree around him. In this era of accelerated change, Smallidge has had to learn some new species, but he's gotten quick at it. If New York woodland owners imprint a mental image of only a half-dozen problematic plants – say buckthorns, Japanese barberry, swallow-worts, Oriental bittersweet, honeysuckles and Japanese knotweed – he says they might gain a key advantage through early detection. “Once you learn them, they start jumping out.”

MARY THILL IS A JOURNALIST AND FORMER EDITOR OF *Adirondack Life* MAGAZINE. SHE LIVES IN SARANAC LAKE, NEW YORK.

USING HERBICIDES

Due to ecological concerns, some people are understandably reluctant to use herbicides. In the case of invasives, however, many experts feel that their judicious application is better than letting the plants thrive.

Ted Elliman of the New England Wild Flower Society uses herbicides in his work. “We certainly don’t discourage people from using them on their own land,” he said. “We just advise them to use the best chemicals and techniques for the application, and in the right concentrations.”

The herbicide most widely used in invasives control is glyphosate. Originally sold under the trade name Roundup, glyphosate is no longer under patent and is available in various formulations. It works by inhibiting an enzyme reaction crucial to plant survival. Although it is a full-spectrum herbicide, killing most plants, it is considered significantly less toxic than many other herbicides, including chemicals from the organochlorine family such as DDT.

Appropriate concentrations of herbicide vary depending on the application. More diluted solutions are used for spraying leaves, while higher concentrations are used for direct application to cut stumps. Cut-stump application is particularly effective in the fall, when nutrients are being moved downward into the plant’s root system for winter storage. Directly applying the herbicide to the stump also minimizes the risk of inadvertently spraying other plants and animals. (Alternatively, cut stumps of woody species can be covered with a patch of heavy-duty black plastic tied around the stump to suppress resprouting.)

Cut-stump applications can be impractical, especially with vines that have extensive root systems. In the case of Oriental bittersweet, for example, a spray treatment of triclopyr is often recommended. This herbicide kills broadleaf weeds and woody plants without affecting grasses or sedges.

For further guidelines on herbicide use, landowners can consult conservation organizations experienced in invasive species control. If wetlands are nearby, your state environmental agency must be consulted. Local regulations may also apply.



JOHN DOUGLAS / FLYING SQUIRREL

If you have questions about invasive plants, the coordinators of the state Partnerships for Regional Invasive Species Management (PRISM) for your area are a good place to start:

Adirondack Park

APIPP (Adirondack Park Invasive Plant Program)
Hilary Smith
(518) 576-2082
hsmith@tnc.org
adkinvasives.com

Capital-Mohawk region

Peg Sauer
(518) 765-2237
www.newyorkinvasivespecies.org/PRISM/Capital_Region_PRISM.aspx

Catskills

CRISP (Catskill Regional Invasive Species Partnership)
Meredith Taylor
(845) 586-2611
mtaylor@catskillcenter.org
www.catskillcenter.org/index.php/crisp

Finger Lakes

Gregg Sargis
(585) 546-8030 x34
gsargis@tnc.org
nyis.info/PRISM/Finger_Lakes_FL_PRISM.aspx

Long Island

Steve Young
(518) 402-8951
smyoung@gw.dec.state.ny.us
nyis.info/liisma

Lower Hudson

Ed McGowan
(845) 786-2701
Edwin.McGowan@oprhp.state.ny.us
nyis.info/PRISM/Lower_Hudson_PRISM.aspx

St. Lawrence Valley and Eastern Lake Ontario

Sue Gwise
(315) 788-8450
sleloinvasives.org

Western New York:

Paul Fuhrmann
(716) 684-8060
pfuhrmann@ene.com
nyis.info/prism/Western_PRISM.aspx

OTHER RESOURCES

Sea Grant / Cornell Cooperative Extension New York Invasive Species Clearinghouse
nyis.info

USDA National Invasive Species Information Center
www.invasivespeciesinfo.gov/plants

iMap geotracking invasive exotic species imapinvasives.org

Landowners seeking funding for invasive species management should contact their Natural Resources Conservation Service county office to see if there are funds available for Environmental Quality Incentive Program (EQIP) assistance.



Healthy Rivers

The health of America's rivers has come a long way since Cleveland's Cuyahoga River caught fire, and many other rivers – whether combustible or not – could not be deemed suitable places to fish or swim.

Think back 40 years when the cities and factories that lined the nation's waterways spewed waste directly into them. The gravity of the problem was so apparent and so appalling that, along with air that was increasingly unfit to breathe, it gave birth to a national concern about the environment.

Today, water quality problems are much more subtle. Instead of coming from individual pipes, pollution is carried in runoff from adjacent land.

Sedimentation, under the perhaps more dignified name of “non-point source pollution,” has become the major threat to our rivers and streams. It can be said that a river is defined entirely by the land that it flows through.

As a devoted trout fisherman, I don't need much of a shove to step into the water, and I can't say with a straight face that I was doing research about water quality when I had my revelation about sedimentation. I was fishing.

It was a few years ago, during the course of a dry summer, when I began to notice a pattern of shifting conditions on my local river that affected my ability to entice a trout to rise to a fly. Between rains, the water would be low, clear, and – especially during the afternoon – bathtub warm. In the heat of August, the only time I could catch a wild trout was at first light when the water was at its coolest.

Eventually it would rain, and it didn't take much of a downpour to raise the water level of this lowland river and turn its color to chocolate brown. For two days, the water would be stained, the

trout couldn't see to feed, and it was pointless to cast even the flashiest streamers.

On the third day, I'd catch trout. The water was still cool from its infusion of rainwater, and the clarity was off just enough to hide my line and leader and make a mayfly imitation look exactly like dinner. That summer, I learned to wait for the third day, and I caught lots of hungry trout that way.

I accepted that cycle as a fact of river life until I realized that the same downpour on the same river five miles upstream did not discolor the water. It brought the river up enough to make wading difficult, but the water still ran clear. In that day on a headwater stream, I learned the basic truth of water quality, that the condition of the land determines the condition of the water.

The muddy color follows the release of billions of silt particles from the streambank into the water, enough of them to turn the river opaque.

When these fine particles settle into the river bottom's gravel, they function like caulk, sealing the gravel and rendering it incapable of incubating fish eggs. The silt also takes away the major food source for adult trout by making the streambed inhospitable for many mayflies, caddisflies, and stoneflies.

In his book *Natural Acts*, David Quammen wrote, “On their best days, these [aquatic insects] rule as lords of the stream-bottom jungle; one bad day, one mistake, one loss of footing and they are in the belly of a trout.

“Thousands of bad days for millions of cold-water insects, and the result is what we often call, with some narrowness of vision, a good trout stream. But a good trout stream must first be an excellent insect stream, a superior haven for algae and fungi and bacteria, a prime dumping ground for dead leaves, a surpassing reservoir of oxygen and calcium. It will then also, and thereby, be a good osprey stream, a favorite among otters, a salvation to

dippers and kingfishers and bank swallows and heron, mergansers and Canada geese and water shrews, mink and muskrat and beaver.

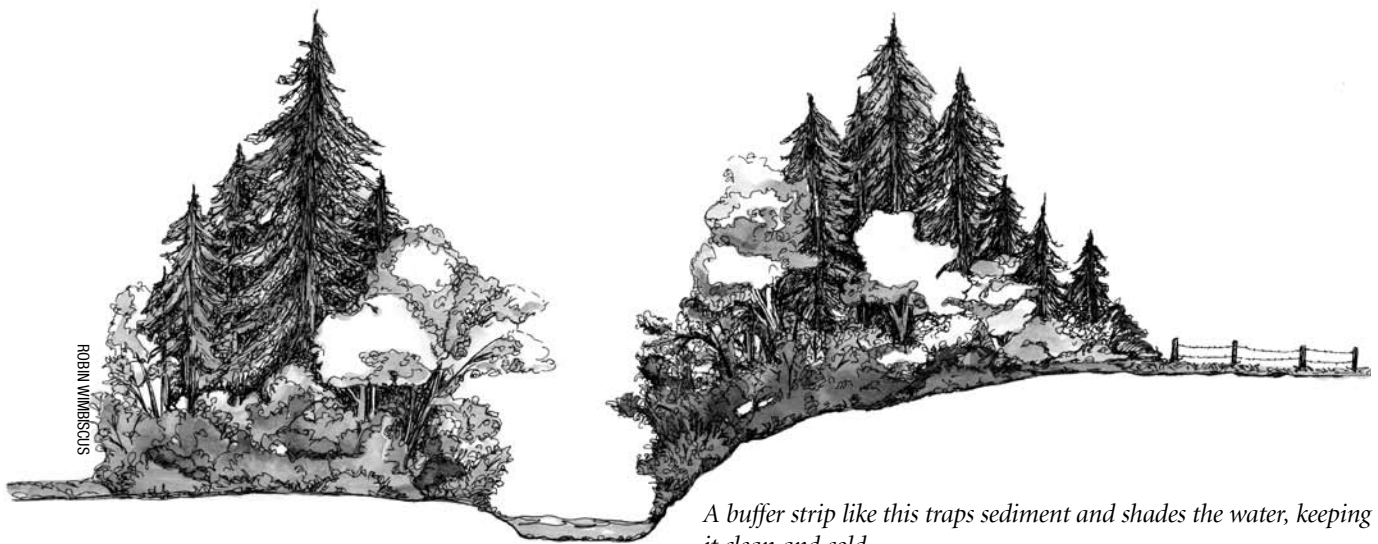
Not to mention the occasional grizzly bear...”

Having spent many mornings and evenings between the banks of a trout stream, I can corroborate Quammen's catalog of the riverine ecosystem. While fishing rivers in the Northeast, I have waded within casting distance of wood ducks, mallards, and black ducks; I have seen predators at work – the osprey, mink, otters, heron, and the ubiquitous kingfisher; and I have watched a black bear swim across a swift current, climb up on the bank, shake like a dog, and then walk casually away into the brush.

Water, clear and cold, is the source of life. Unfortunately, a lot of the water in New York rivers is neither clear nor cold. But it's not all bad news. Clearly, our rivers are in a state of recovery.

are Made in the Shade

These biologists are conducting a stream census by electroshocking. The fish are momentarily stunned, measured and counted, and then released unharmed.



A buffer strip like this traps sediment and shades the water, keeping it clean and cold.

There have been dramatic differences in land use. Farmers are doing a better job at protecting water quality. Road crews are not mining streams for gravel. Factories are not dumping solvents and other chemicals into the rivers.

Just as the main sources of water pollution have changed, so have the means of monitoring it. Forty years ago, water quality was measured in terms of its chemistry. Today, while chemistry is not ignored, scientists are looking at streams and rivers in physical and biological terms as well. There's more to river health than dissolved oxygen and *E. coli*.

I suppose, too, that there's more to river health than the presence of a reproducing population of wild trout, but biologists assure me that my use of trout as a gauge of river health isn't as parochial as it might seem. Trout are a good indicator species. They have a set of habitat requirements that make them the proverbial canary in the coal mine.

Counting trout

I once had the opportunity to spend a day in the river with fisheries biologists who were conducting a fish census; the river was in Vermont, but picture a river about the size of the Salmon River upstream from Pulaski. Their method was electroshocking; immersing a wand with a DC current causes an involuntary impulse called galvanotaxis that impels close-by fish to swim toward it. They are then netted, measured and released unharmed.

In one 600-foot stretch of the river with a nice combination of riffles and pools that should have been loaded with trout, there were only two spots that held trout. The first was the confluence with a tiny brook 12 inches wide that pumped a steady stream of cold water into the head of a bend pool. Lined up tight to the bank like children at a drinking fountain was a pod of wild brookies, ten of them in all – not surprising since the water temperature elsewhere in this stretch was 73 degrees, not quite lethal to trout but approaching the danger zone. More than a day or two at water temperatures above 77F and brookies will go belly up. Rainbow trout and brown trout can handle slightly warmer

temperatures, but the preferred temperature for all of them is within a few degrees of 60 degrees F.

In the next pool upstream, there was a similar number of brookies along with an eight-inch brown and some hatchery rainbows camped out in a three-foot-deep pool in the shade and shelter of a blowdown spruce. The trout had found the only relief they could, the shade of a blowdown and the cold water of a feeder brook.

If it weren't for the canopy over the brook and the mature spruce that had fallen into the river, there might not have been a single trout in this stretch of the river.

The take-home message from the biologists is this: "Leaving a buffer strip is the single most important thing landowners can do to improve or maintain trout habitat. If you have a canopy over your brook, leave it there. If it's gone, let it grow back. We're talking about even tiny brooks not big enough to hold trout. The shade keeps the water cool, not just in the brook but in the river that it flows into. The river depends on it. Once the water warms up, no amount of shade is going to cool it down. It takes cold water entering the stream to bring the temperature down."

Cold water is not the only benefit provided by riparian buffer strips. Brush and trees also help to stabilize the stream bank by binding the soil with their roots. Without streambank vegetation, each shift in water level dislodges silt from the banks, which gets deposited on the river bottom somewhere downstream, the exact destination determined by the speed and volume of water and the steepness of the grade it flows through.

Another critical part of a buffer strip – the leaf litter – filters and traps sediments being carried toward the bank in runoff. Sediments can contain phosphorus, nitrogen, silt, petrochemicals, heavy metals, and other toxins from sources such as residential and commercial development, agricultural land including both cropland and pasture, logging, and roads and ditches.

River managers today are at an odd disadvantage because the threat to river health is not as readily apparent as it was 40 years ago. Back then, the spewing pipe was a stark image that brought clarity to the issue, if not to the water. Everyone could embrace



NORTHERN WOODLANDS

the cleaning up of industrial and municipal waste. Today, the problem can seem as clear as mud, because almost any 10-acre parcel has at least some water standing or flowing through it. Today's challenge is one facing almost every single landowner. The buffering of our streams will take – if not a grass roots effort – a tree roots effort.

What does a buffer strip look like?

Stand on the streambank, turn your back to the stream and walk away from it. Take three long paces (a left and a right), which will carry you 15 feet from the bank. This is Riparian Zone 1, as defined by New York's "Best Management Practices for Water Quality," known as the BMPs. The ground between you and the stream should be covered with brush and trees. There shouldn't be any roads or trails, temporary or permanent, within that 15-foot strip. Equipment should be excluded from operating in this zone. When cutting trees, they should be felled in the direction away from the bank and winched out without entering the zone with a skidder.

Riparian Zone 2 starts where Zone 1 ends and extends farther away from the stream. The steeper the slope, the wider Zone 2 will be. At a minimum, it is 50 feet or 10 paces farther. Where the terrain draining to the stream is pitched steeper than 10 percent, the strip needs to be wider than 50 feet. The goal for Zone 2 is to maintain a continuous forest cover made up of different age classes. Equipment can operate in this part of the buffer, but the goal should be to minimize it, so that natural processes are disrupted as little as possible.

If a lawn or a hayfield encroaches into the space, it's time to cut the engine and let this section of lawn go wild. If necessary, flag the edge of the buffer strip to remind overzealous mowers about the no-cut zone. We have inherited from our European ancestors a love of the park; with its neatly trimmed grass and the occasional round-crowned shade tree, the park brings comfort to those who need to know that the wilderness has been tamed. It fails, however, to do anything for the stream or the wildlife that depend on it.

Livestock also help to tame the land, and they, too, serve to remove the vegetation that is so vital to rivers. If you have been

Clearing down to the river's edge compromises water quality and habitat.

pasturing livestock within the riparian zone, it's going to take a sacrifice and some fencing to keep them out. The Natural Resources Conservation Service is in the business of helping landowners in this situation. They generally have funds available and can help to design an area where livestock can get water without having free access to the regeneration within the buffer strip.

It doesn't take long. If you do nothing more than simply allow nature to take its course, early successional poplars, dogwoods, willows, or other quick starters will be as tall as the grass by the end of the summer. If the laissez-faire approach doesn't appeal to you, plant some quick growing shrubs or trees. Willows and dogwoods can be transplanted at anytime and they'll do a nice job of holding the bank while larger trees get established.

Beneath them, longer-lived river-loving species like yellow birch and hemlock will seed in.

If your buffer strip is already forested, then you are more than halfway there. The task then is to make sure that it provides continuous cover now and continual cover for generations. Manage your buffer strip as an uneven-aged stand, with a goal of maintaining three age classes of trees: saplings, pole-size and mature. If the stand is crowded and has sparse regeneration, thin lightly. If, when removing trees, the leaf litter is scraped down to mineral soil, seed it with an annual grass and mulch it with hay.

The future of our rivers

It was a major shift in thinking, a national awakening to environmental reality, that brought about the changes to our water quality in the last 40 years. Bringing about the full recovery of our rivers will require a similar shift in understanding, and an equally widespread commitment by those who own the land. Incrementally, tributary by tributary, brook by brook, the water can run clearer and the river system can be full of life.

STEPHEN LONG IS A FOUNDING EDITOR OF *Northern Woodlands* MAGAZINE



Smart Planning

Preparing for the Eventual Transfer of Your Land

BY EBEN MCLANE AND ANNETTE LORRAINE

If you, a conscientious landowner, could glance into a crystal ball to look at your land 100 years from now, what would you hope to see? Actively managed forestland? Woods that still feel wild? Chances are you wouldn't want to see that the forest had been liquidated. Many landowners who have invested love and labor into their land would like to see that legacy continued. As an owner, you have some control over making that happen.

Over the course of decades beginning in the 1960s, John and Carol Krebs bought parcels of forest and farmland in Livingston County, south of Rochester. John was a hunter and an active conservationist, and both were lovers of native wildlife. The couple watched as neighboring properties were routinely sub-divided into small building lots, an act that fragmented the landscape and scattered the patterns of animal life around them. As the decades passed, John and Carol knew they needed a plan to protect what they owned against an uncertain future.

The situation the Krebs family found themselves in is quite common. As a group, private woodland owners are aging – more than 60 percent of them in the U.S. are over age 55, and over half of those have already retired. Inevitably, the ownership of those forests will be changing soon. And because women's life expectancies exceed men's, there could be a wave of older women who initially become the next woodland owners before the land goes to the next generation.

That's what happened when John Krebs died in 2003, leaving

Carol in charge of their land. Fortunately, before John died, he and Carol planned for the property's future. John initially wanted simply to give the land to the State in the hope it would be wisely managed after they were gone. But Carol persuaded him that a better option would be to work out a partnership with a proven land conservation organization. After much discussion, they opted to approach the Finger Lakes Land Trust in Ithaca with the idea of donating a conservation easement on their entire property, protecting more than 400 acres of forest and fields from development, forever.

Donating a perpetual conservation agreement to a nonprofit land trust is the most typical method landowners have of preserving their property in perpetuity. In this scenario, a landowner signs a contract with an organization whose sole purpose is to restrict development permanently and monitor management of the land. At the same time, the landowner retains other rights, including ownership of the land and freedom to sell or leave it to heirs as desired.

The conservation agreement must be conveyed to a public entity or a nonprofit organization that the Internal Revenue Service deems qualified to hold and enforce those rights in perpetuity. These are usually land trusts or land conservancies. Landowners can claim the value of the easement donation on their income tax return as a charitable contribution when the agreements accomplish certain goals, such as the conservation of working farms, forestland, or wildlife habitat. To qualify for federal tax benefits, a landowner must obtain a detailed appraisal to verify and calculate the drop in value due to the conservation agreement. At tax time, that difference in value is considered to be a charitable donation. These tax benefits are often worked



THINKING AHEAD, STEPPING FORWARD

1. Communicate with Partners, Heirs, or Likely Buyers.

Start a conversation. Will they continue to value the land as woodland? Are they knowledgeable about forest management or willing to learn? Are they prepared to invest their time and resources into it as you have? If not, you may want to look into securing a permanent conservation easement before you relinquish control of your land.

2. Review Your Estate Plan. If you don't make your wishes known in a will or trust, the government will distribute your assets for you. The results may not be pretty. Find out how vulnerable your estate is to taxes. Make arrangements to transfer your woodland and other assets the way you want, and in ways that save money. Simply adding an heir to your deed as a co-owner cause more problems and expenses in the long run. Talk to an experienced professional tax and estate planner first. Once you have a plan in place, review it annually in light of changes in family circumstances and tax laws.

3. Coordinate your Business Planning.

Owning and managing woodlands is a business that subjects you to taxes and other liabilities. Talk with your accountant or attorney to determine whether it helps to create a formal business entity like a partnership, limited partnership, limited liability company, or corporation. Some of these entities dissolve with your death, while others continue without interruption.

4. Inspire Future Good Management.

If you die or become incapacitated, someone else will manage the land, but you can provide some influence over that future process. You could set aside designated funds in trust to encourage and support your successors to hire professionals and pay for good land management. Or research and consider private contractual arrangements now. Certification programs or cost-share programs advance good management practices for fixed periods of time. Conservation agreements with qualified land trusts are designed to be perpetual. Conservation agreements may also provide various tax benefits both now and in the future.

You can decide what balance will work best for you and your successors by considering how each option will affect your levels of:

- Control
- Liability
- Taxes
- Flexibility
- Continuity

out with the help of the land trust involved in the easement.

In New York, there is an additional incentive. The conservation easement tax credit for easement donors provides for reimbursement of 25 percent of school, municipal, and county taxes paid on the land, with a maximum credit of \$5,000 per taxpayer per year. The tax credit runs with the land, so successor landowners benefit in turn.

That mirrors the fact that conservation agreements place restrictions on the property that will affect every future owner of that property. For instance, the land can never be subdivided and developed nor used for mining or storing trash. However, most land trusts allow – and often promote – timber harvesting with good forestry practices. And many will allow the owners to carve out a small development zone that is excluded from the easement.

Built into the Krebs' easement, for example, is a provision for five one-acre house sites, designed with children or grandchildren in mind. Carol Krebs doesn't know whether her two children, who live out of state, will ever come to build houses for themselves on the land, but she and John wanted the next generation to have that option.

The Krebs' conservation easement protects their woodland from any future development or exploitive management, regardless of whether Carol or the next generation continue to own it. According to the provisions of the easement, the forest is carefully



Carol Krebs

managed for timber, and the fields are leased to local farmers. “It’s all for the health of the land. That was our feeling,” Carol said.

Every conservation easement between a private landowner and land trust must reflect a mutual agreement about land use and best practices. And each agreement is tailored to reflect the owner’s goals as much as possible. It is the responsibility of the land trust to monitor compliance with the terms of the easement.

Transferring to the next generation

Every time land changes ownership, the woodland is at risk. New owners may not share the previous owner’s knowledge or values or appreciate the importance of continuity in management. Even if they do share the same values, heirs who inherit the land may be compelled by estate taxes or other debts to liquidate the timber, subdivide the land, and sell.

As the current generation of landowners prepares to transfer their land holdings to the next, there are a number of legal and tax issues that come into play. Capital gains, estate, and gift taxes are major concerns for many who wish to leave or give their land to heirs. Because the value of land across the state has increased so much in the last 25 years, estate taxes might be assessed on many people who would have been immune before.

Often, local folks gasp at the prices newcomers pay for back-country real estate – only to find out those seemingly outrageous values now apply to their own land as well. At per acre values of \$2,000 an acre, it only takes a holding of 500 acres to reach a million-dollar value, so it’s no longer only the obviously wealthy who need to worry about estate planning. Landowners who reach this level from their real estate values rather than from liquid assets must ask themselves how their heirs are going to come up with the cash to pay the taxes, or how they can reduce or avoid such tax liability.

So what to do? One essential step is to obtain estate planning and business advice from a professional, preferably one who has an understanding of family and partnership dynamics and land-based businesses. A simple will or trust may be an easy remedy. Some owners who have a partner or a specific child interested in the land opt for a partnership agreement or limited liability company with a built in buy-sell agreement; the buy-sell agreement allows a surviving partner to automatically buy out another partner’s share in the event of death or disability. For privacy and some continuity, some landowners opt to place their land in a trust with specific instructions to the next trustee. To avoid estate taxes, some landowners choose to transfer their land to their heirs in incremental gifts before their death, or to put their assets in certain types of irrevocable trusts. There are many estate and business planning tools. A landowner must be willing to sort through and examine their benefits and drawbacks.

Some landowners jump to what seems like the simplest option. They think that by adding a child or non-spouse partner to a deed as a co-owner with right of survivorship, their transfer issues will be solved. Instead, that can be disastrous. Only surviving spouses benefit from the marital deduction. A surviving non-spouse co-owner assumes the original basis so will likely incur a far greater tax burden in the long run than if their title came through inheritance.

An inherited basis is usually “stepped up” to the fair market value at time of death from the much lower basis of the original owner. That’s a big boon – consider how much the value of your land has increased since the day you purchased it – but the benefit is for heirs only, not for co-owners. It’s important to keep an eye on the tax law, however; Congress could change the “stepped-up” basis to a “carry-over” basis, which would have different results. There are still more drawbacks to this simple deed solution. It may trigger a gift tax depending on the value of the property and federal limits. More importantly, if one of the living co-owners suffers a financial setback such as from a medical crisis, or incurs a judgment, it would hinder that person’s ability to seek bankruptcy relief, and impede the financing options of the more solvent owner. Worst case scenario, they could both end up losing the property altogether. Estate planning is not necessarily a do-it-yourself project.

For people pondering estates and estate taxes, it is crucial to obtain up-to-the-minute professional advice. If you did your estate planning years ago, review your plans periodically in light of new tax laws. Federal estate tax rates, exemption limits, treatments of basis, and estate value parameters are changing yearly. While it is impossible to predict where they will end up, we know that some estate tax rates have been as high as 55 percent with an exemption of over \$1 million in assets.

Keeping land intact

Now retired from his peripatetic career as a school superintendent around New York State, Ron Service and his wife, Pat, moved back to his family’s farmland in southern Lewis County. They took up permanent residence at their house “at the dead end of a long road,” where Ron now hunts and fishes and builds furniture for his kids and grandkids. Ron’s 450 acres of land – about 60 tillable acres, with the balance in forest and designated wetlands – have been in his family since the early 1800s.

“When Pat and I leave, there isn’t going to be a big payday – our investment is in land,” Ron said. In Ron’s case, as with many other private landowners around the state, investment in land is measured less in dollars than in hard-to-quantify values like the pleasure of knowing your children and grandchildren will likely keep fishing the same stream you learned to fish with your father and mother. The problem is how to hold on to that investment.

Like many married couples, the Services will be able to benefit from the unlimited marital deduction; they can give away or leave as much as they like to



Above: Ron and Pat Service. Right: Earle Peterson and his son Jim.

each other as spouses, without having to pay estate, gift, or capital gains taxes. But this is a one-time benefit used at the first spouse's death, so a surviving parent cannot remain complacent. Uncle Sam will extract his due from the subsequent transfer to the next generation unless adequate estate planning measures are in place.

About 10 years ago, the Services began an extended discussion with their five children about the family land's future. The children all agreed with their parents that keeping the land "whole" was their priority. And they all agreed that placing a conservation easement on the land, with a provision granting the next generation small, roadside building sites should they ever want or need them. All the details were worked out with help from the Tug Hill Tomorrow Land Trust in Watertown, ensuring permanent conservation of the land and preventing its future subdivision or conversion into house lots.

"We didn't try to settle all the issues down through the generations – just for the next generation," Ron said. "That was important to us. Doing anything further is next to impossible."

As helpful as wills, trusts, and business entities are, they make no guarantees of high-quality land management. A permanent conservation agreement is currently the only option that can assure land will stay undeveloped and its management will follow certain standards. As a bonus, conserving land from subdivision and development lowers its fair market value, thus lowering the potential for capital gain, estate, or gift taxes upon transfer.

Theoretically, a decrease in property value should also reduce property taxes. However, governmental policies for assessing conservation lands differ from town to town. There is no guarantee that extinguishing develop rights through a conservation agreement will lower property taxes. In the case of land enrolled in New York's Conservation Easement Tax Credit program, however, conservation land is most likely already being taxed at its lowest possible rate.

Another landowner with his land legacy very much on his mind is Earle Peterson of Burlington, New York. As a child on a Southern Tier family farm in the 1940s, he has nothing but good

memories of exploring woods and turning over rocks in the creeks, wondering and watching. After his family's farm went under, like so many others did, Peterson found meaningful work as a veterinarian in the "deep south" of New Jersey, but he kept his feet pointed north, and when he finally returned in the 1970s, he bought land: 1,170 acres of remote wooded hills and wetlands and hayfields, just like he remembered it.

"I grew up in the woods here, with a feel for the land, and I've always wanted my kids to develop the same values

– I guess a combination of conservation and philanthropy," Peterson said. His son Jim and daughter Susan are active trustees of a family trust that has over 1100 acres under a conservation easement, over half of it forest.

Because of his obvious devotion to his property and powerful commitment to natural preservation, Peterson is particularly well-suited to a conservation easement. Protecting cherished wildlife habitat may have been a driving force in his decision to ease his property, but so was forestry itself.

Like Carol Krebs and Ron Service, Earle Peterson enrolls his forested land in the state's 480-a management program. (For more information on 480-a, see page 17.) He follows a detailed management plan drawn up by a licensed forester and approved by the Otsego Land Trust in Cooperstown, which walked him through the conservation easement process – and for that he receives a substantial property tax reduction. Managed timber sales also help defray the costs of forest ownership.

In addition, Peterson has forged a field research and education partnership with SUNY Oneonta. Students and teachers use portions of the land as a sort of outdoor classroom and research laboratory.

The Petersons' conservation easement is admittedly more complicated than most. The controlling entity is structured as a nonprofit charitable organization. In due course, Jim Peterson will probably take over the managing role from his father, and his sister Susan, who is involved in land conservation in the San Francisco bay area, will more than likely stay active in her family's New York land conservation project for years to come. Both have learned much from their father and mother.

So what does this all amount to in the vision of one's land for the future? With careful planning, it is possible to preserve one's financial resources, one's land, and one's land ethic for future generations. Conservation easements are one tool, and donors like the Krebs, Services, and Petersons feel satisfaction knowing they have been able to preserve and maintain the quality of open space that drew them inexorably to the wilds of New York in the first place.

ANNETTE LORRAINE LIVES IN VERMONT AND WORKS AS A REAL ESTATE ATTORNEY AND LAND CONSERVATION CONSULTANT. EBEN McLANE LIVES IN SCIPIO, NEW YORK, AND WORKS AS A FREELANCE WRITER AND EDITOR.

LAND TRUSTS OPERATING IN NEW YORK

WESTERN REGION

Chautauqua Watershed Conservancy
Western New York Land Conservancy

NORTHERN REGION

Adirondack Land Trust /
Nature Conservancy
Lake Champlain Land Trust
Lake George Land Conservancy
Saratoga P.L.A.N.
Thousand Islands Land Trust
Tug Hill Tomorrow Land Trust

CENTRAL REGION

Central New York Land Trust
Finger Lakes Land Trust
Genesee Land Trust
Genesee Valley Conservancy
Otsego Land Trust
The Catskills Center for Conservation
and Development

SOUTHERN REGION

Appalachian Trail Conservancy
Columbia Land Conservancy
Delaware Heights Conservancy
Dutchess Land Conservancy
Hudson Highlands Land Trust
Mianus River Gorge Preserve
Mohonk Preserve
Orange County Land Trust
Scenic Hudson, Inc.



JEANE BENNETT O'DEA

Earning Its Keep

Finding Sources of Income from the Land

BY STEPHEN LONG

There was a time when people who lived in rural areas made their living from the land. Subsistence living was neither an alternative lifestyle nor a quaint anachronism. It was what people did.

That is less common today, which leaves the land in an unusual position. No longer producing income, its value can be largely intangible. In fact, when the property tax bill arrives, owning land can begin to seem more of a burden than a benefit.

Fortunately, there are a number of ways that your land can earn money for you without having to quit your day job to make it happen. The opportunities break down into two possible streams: selling products that are part of the land, or leasing the land to someone for one of a number of different uses.

Timber sales

The most common way for earning income from forestland is through timber sales. Unless your holdings are relatively large, timber sales and the income from them will be intermittent.

To sell timber well, you need to keep in mind that since income is sporadic, it pays to time your sales to good markets instead of simply when someone knocks on the door with an offer to buy some wood. You need to understand the value of what you have now and in the future. Most importantly, you need to resist the temptation to try to cash in the woodlot's value today, because by doing so you will most likely reduce the value of the remaining forest so

drastically that you will not have another opportunity for income for decades.

If you don't know the current value of different species and different grades, and if you wouldn't recognize the difference between a good logging job and a poor one, you should contract with a forester to help you manage your land. Managing forestland is a complicated business, and having an agent represent your interests should be viewed not as an expense but an investment.

As nice as income can be, it's important to note that a timber harvest, no matter how skillfully done and how appropriate the silvicultural prescription, dramatically changes the look of the forest. The starkness is temporary because forbs, shrubs, and trees will begin to green it up in the first growing season, but the change is real.

Other products from the land

People may pay money for other things that grow on your land – mushrooms and medicinal herbs, for instance. Other saleable materials are those that have arrived courtesy of glaciers or volcanoes, such as sand and stone. Since we're not looking for an active enterprise in which you are cultivating, harvesting, selling, and delivering, but rather sitting back and accepting payments, the possibilities are probably limited to mineral rather than vegetable.

Whatever the asset you are interested in selling, there are tradeoffs for entering the activity at a level serious enough to make it pay. If you can live with the appearance of a hole gouged out of the bank, there's always a market for local gravel. Highway departments make use of many tons of sand per year for winter



MBG DESIGN

safety, road upgrades, or new roads. Building contractors regularly buy gravel for new roads and driveways. You can enter into an agreement with a trucking company to be paid by the cubic yard, leaving the responsibility for loading trucks to them. It's not a get-rich-quick scheme – depending on local supply and demand, a payment of \$5 per yard is in the ballpark, so a dump truck load of gravel could net you \$50-\$70.

As for stone, different parts of New York have different types of native stone or bedrock. There are extensive slate deposits in the Champlain Valley. Dutchess County is known for its bluestone. There's flagstone, there's fieldstone. In most areas, there will be native stone or bedrock that has been put to use locally. In general, stone of this nature is today used mostly for landscaping, with the better grades being finished for indoor uses in floors or countertops.

In centuries past, foundations, walls, and facings (as in New York City's brownstones) were commonly made of stone, and that historical demand means that the most readily accessible and productive sites have been identified and perhaps long ago played out. Still, if your land is rich with stone that has value to someone within trucking distance, you can make arrangements to sell it.

Before you attempt to develop a sand pit or a quarry, you will need to go through a permitting process. Depending on the state or local restrictions, you may decide it's not worth the effort.

Leasing your land

Another way to earn money from what's in the ground is to lease the mineral rights. In various pockets across the state, mining companies have leased or purchased mineral rights from landowners. Ask your neighbors or town officials if there is a history of leased mineral rights in your area.

While it's probably unrealistic to imagine a small-scale limestone, salt, or iron mine on your back 40, if you live in the southern tier, a natural gas lease may prove to be a lucrative option. Natural gas has been produced in New York for nearly two centuries.

There are currently as many as 14,000 active oil and gas wells operating in New York. The easily tapped deposits have been exploited for a long time, but as demand for new energy sources has escalated, investments in technology to extract natural gas have proven fruitful. More advanced techniques for extracting it from deeper and formerly inaccessible pockets of shale have made the Marcellus shale a viable source. Exploration continues, and some owners of the land above the shale, which lies as much as 7,000 feet beneath the surface, see their opportunity to become as rich as Jed Clampett.

But there are complications. The techniques of horizontal drilling combined with hydraulic fracturing (hydrofracking), in which the shale is blasted with bursts of water and chemicals, has raised cautions because of the possibility of contaminating water supplies. The Department of Environmental Conservation is currently evaluating the environmental impact statement, and their actions will determine the extent to which there will be further exploration of the Marcellus shale. Check local sources for the most current information on the status of what amounts to a de facto moratorium on permits.



MBC DESIGN

Wind turbines

Wind as an energy source is more widespread than natural gas deposits. Still, the potential for developing wind power sites is not uniform across the landscape.

Engineering studies have pinpointed areas of reliably steady wind, and wind developers have fine-tuned maps that identify areas where there is sufficient wind and access to the power grid to make investment worthwhile. The developer then contacts landowners in the region to try to enter into agreements with them to lease the land. Potential installations tend to be at high elevations or near large bodies of water, but in New York, productive sites have also been developed in open land formerly or currently cleared for agriculture.

Installations typically cluster 20 or more large wind turbines into a wind farm or wind park, so a considerable acreage is generally required, but the project can be in a collection of ownerships. The footprint of an individual turbine is relatively small, so the adjacent land can continue to be used for other purposes; agriculture and wind can go together quite compatibly. In some instances, single-turbine wind farms are viable investments.

The developer owns and operates the turbines, but generally doesn't own the land. Instead, they enter into long-term leases – commonly 25 to 50 years, sometimes longer – for the use of the land. Developing a wind farm requires a tremendous investment on their part, so they need to secure long-term rights to the land. The contracts are complex legal documents, and if you are approached by a wind developer and are intrigued by the possibility, have a lawyer with experience in the field help you make sure your rights are covered. Legal advice is important in entering into an agreement that could outlast your own tenure.

In any event, the lease will begin with an option period, typically five years. This buys the developer time to put the package together. If the developer doesn't exercise the option to enter into the long lease and develop the project, either party can walk away with no future obligation at the end of the option period.

Cell towers

With cell towers come many of the same considerations for leasing as wind power, but writ on a much smaller scale. Similar to windmills, cell tower construction follows an engineering study that shows it's feasible in that location. What a cell tower developer is seeking is a hole in the coverage that can be filled by the strategic placement of a tower. Again, they will find you. Again, leases are for a long period of time. Again, don't enter into a lease without expert advice.

Rent payments can be substantial, but make sure the income more than covers the potential increase in property tax for developing it. Another caveat is to make sure you negotiate a percentage for additional users of the tower in the future.

If you are in a prime location, you can expect to be contacted. If not, there's nothing you can do to make it happen.

Hunting or camp leases

In New York, a hunt lease tends to be what is called a posted lease. The landowner leases the exclusive right to use a particular parcel of land. The lessee then posts the land to declare their exclusive right to its use. Often there's a camp on the parcel that is owned by the landowner. The parcels can be as small as 40 acres or exceed a thousand acres.

Large landowners have found that recreational leases help offset the property taxes and other costs of owning working land. Is there an opportunity for a small landowner to participate in this activity? Here are some considerations for a New York landowner:

- You will need to purchase liability insurance because the favorable landowner liability protection laws go out the window when you charge a fee for the use of your land.
- If you lease the land, you are doing so for year-round use. If it's a 100-acre lot that contains your residence, you will be having close and regular contact with the people you lease to. Maybe that's not what you're after. On the other hand, if your woodlot is a distance from your residence, you might benefit from the peace of mind of having your lessees using the land on a regular basis. Absentee landowners have often found themselves the victim of timber theft or seen their land turned into a de facto

dump. A steady presence on the land can reduce those risks.

- If it's a small parcel with a camp, you are essentially a landlord. Is that a role you are interested in playing?
- Particularly near upstate cities, there's a high demand for land for hunting, and it doesn't necessarily need to have a camp on it. Annual lease payments for a 50-acre lot can reach \$1,500, though the per-acre price for larger parcels is more likely to be less than \$20. Land with a camp or other significant values will increase the potential income.

Maple tapping leases

Our examination of income opportunities began with selling trees, and now let us close by leasing trees. In sugarmaking as in other pursuits, larger scale operations are often more profitable, and many sugaring operations are seeking nearby sources of trees to tap.

If your land has a substantial percentage of sugar maples, this could be a good opportunity for you. The going rate for a tapping lease is somewhere between 50 cents and a dollar per tap.

The perfect situation for a sugarmaker would be a hillside with adequate pitch that drops uniformly down to a good access road. The forest would be heavily skewed to maple – a well-stocked sugarbush, tapped conservatively, should have around 50 to 75 taps per acre.

In order to make it work, the sugarmaker will need to install tubing infrastructure, a network of trails to service the tubing, a gathering tank, and in all likelihood a vacuum system. That means real money, so they can't enter into a short-term agreement. Most sugarmakers would want to have access to your land for a minimum of 10 years.

Another consideration is that the tubing should be considered permanent. The taps will be removed from the individual trees, but don't expect that the laterals or the main lines are going to be rolled up at the end of each spring sugaring season. In addition, it must be noted that sugaring season and mud season are essentially simultaneous. You can expect that traffic in and out will result in ruts in the road each spring, and it should be made clear in the lease that the sugarmaker is responsible for road maintenance. This legally binding lease should also ensure that your trees are responsibly tapped and cared for.

These are not the only possibilities open to landowners. There are, for instance, cost-share programs administered by the Natural Resource Conservation Service. You might be able to lease your land to growers of biomass, or enter into an agricultural lease with a farmer. In the future, the carbon credit marketplace will sort itself out, and perhaps someday there will be payments or tax credits to landowners for providing ecosystem services, such as clean air and water, and providing wildlife habitat.

The best way to explore any of these income possibilities is by tapping into local networks by talking with your neighbors, your local town officials, or your county extension service. There may be opportunities specific to your neighborhood that don't exist even 50 miles away.

STEPHEN LONG IS CO-FOUNDER OF *Northern Woodlands* magazine.



ANDREW CROSIER / MBC DESIGN



Tree Girdling Can Improve Your Forest

BY DAVID BEERS

In order to convert forestland to open land for growing corn, beans, squash, and tobacco, agricultural tribes of Native Americans in southern New England and New York developed an effective method for getting rid of the trees. Using stone axes, they removed a band of bark around the tree's circumference. This killed the trees, and after a short period in which the wood seasoned on the stump, they were easily burned. The resulting wood ash provided fertilizer for the new cropland.

Today, people still use this technique to kill trees. Rather than turning a forest into cropland, it's used to improve forests. And while the chainsaw has replaced the stone ax, the method of tree killing is the same. Foresters call it girdling. The continuous

Make two cuts at least an inch deep.

KRISTA MILLER

cut or girdle in the tree's bark, cambium, and, sometimes, the sapwood stops or drastically slows the flow of food and water between the roots and the leaves. The tree is left standing but it no longer competes with its neighbors.

Many people – maybe even you – have been told that their forestland has relatively low timber value. This may be true now, but it doesn't have to be so in the future, and the future is up to you. You can do something now that will have a positive effect on your forest for decades, and that something is girdling.

Tree girdling is the safest and most easily accomplished method of timber stand improvement (TSI). It increases the growth and health of desirable trees by killing competing trees. With fewer competitors, the remaining trees have more growing space, sunlight, nutrients, and water – everything they need to become vigorous. Trees with more vigor have an increased resistance to insect pests and diseases, and they grow faster, larger, and perhaps for a longer time.

Girdling imitates (and accelerates) nature. A young forest of seedlings has 5,000 trees per acre. One hundred years later, only 100 trees per acre will have survived to be large trees. These 100 have won the race for space and light. The other 4,900 trees died and rotted away because of competition for limited growing space. You can speed up and improve upon this progression by selecting the trees that will survive.

Think of the trees as your investments. If you focus your funds on high-yield investments by removing funds from low-yield investments, you make more money. If you girdle, you focus the sun, water, and nutrients on the high-yield trees by removing the low-yield trees.

CONSIDER THE ALTERNATIVES

The alternative TSI method is felling and leaving the fallen trees on the ground. The advantage is that the forest receives all the benefits of girdling without the wait for the girdled trees to die. However, the time it takes for a girdled tree to die is short relative to the tree's life span, making this advantage insignificant. Felling's disadvantages are that it takes more time than girdling, is less safe than girdling,

and creates a mess on the ground. When felling, it is easy to get the tree stuck in the branches of adjacent trees or have it fall in an unexpected direction. Both situations are extremely dangerous. You shouldn't fell any trees unless you have been trained in safe felling techniques and are confident in your ability. If that warning doesn't dissuade you, and you still want to fell some trees, it is best to fell only small trees, because their physics are more predictable and their impact is less threatening to you and other trees.

Why not sell the trees instead of girdling them? If you are fortunate enough to live in an area that has a market for small, low-value timber, you may be better off selling these trees. However, you have some hidden costs to keep in mind. First, a logger or mill rarely wants to buy only small, low-value trees. In order to get a buyer interested, you'll probably have to sell some of your large, high-value trees, and this might not be the time for that. Second, logging invariably results in damage – scraped bark, crushed roots, and broken limbs – to some of the residual trees. This can reduce growth rate and timber quality, and wounds will allow bacteria and fungi to get a start. Removing only low-grade wood is rarely worth it.

If, however, your forest is ready for a timber sale, you could include girdling in the timber sale contract. Make it a requirement that the timber buyer properly girdles or fells the trees that are marked with an X (the trees being sold are usually marked with a slash or dot). Marking unsaleable trees will result in a loss in revenue from the timber sale because the buyer subtracts the cost of girdling from the price paid for the timber.

Whether girdling, felling, or having a timber sale, you should get professional help and be an active participant in forestry. Most landowners who know their way around a chainsaw can do the girdling themselves and it's very rewarding work. But you should hire an experienced and educated forester to mark the trees to be girdled, felled, or sold, and you may want him or her to do the girdling. Girdling the wrong trees could ruin the plans for your forest – you cannot bring girdled trees back to life.

HOW IT'S DONE

Experience has shown that two cuts by a chainsaw (or an ax), at least an inch deep and ¼-inch wide are most successful at killing a tree. The cuts should be at least two inches apart. If your cuts are too shallow or narrow, bridges can grow over the cut, allowing the tree to recover. If you cut too deep, the wind can knock the tree over. Keep in mind that it is dangerous to walk in a girdled forest during strong winds, which can topple trees and blow off dead limbs. Be sure to explain the danger of girdled trees to visitors to your forest.

The girdle blocks the flow of carbohydrates from the crown to the roots. When the supply of carbohydrates in the roots is exhausted, the roots die and the whole tree is killed. Depending on the tree species,

JUST RIGHT FOR GIRDLING

Your forest is a candidate for girdling if the majority of the trees have at least 18 feet of their trunks clear of live branches and their diameter at breast height (DBH) averages between five and 10 inches. Trees of this size have the structure to produce high-quality timber in the future. Girdling a forest of smaller trees can produce limby trees of low timber value. Forests having larger trees can support a timber harvest that will produce the same effect as girdling.

Every acre of forest is different because of soil, terrain, species mix, tree size, and past land uses. Consequently, some acres will benefit from girdling many trees and other acres will not benefit from any girdling. Give preference to the best growing sites with the best mix of trees. Also, give preference to areas with the best access and the highest density of trees. The tree crowns should be within four feet of each other. It is not beneficial to girdle a tree that does not compete with another.

Top priority should be given to a forest with rich soils, gentle terrain, desirable species, excellent health, and easy accessibility. This type of forest will bring the greatest response and reward. Some indicators of a healthy, vigorous forest are smooth bark on large trees, taller than average trees, soils that are well drained but not dry, full large crowns, dark green foliage, and stems free of blemishes or abnormal growths.



tree vigor, and the depth of the girdle, it may take as long as five years for a tree to die from girdling.

What you're trying to accomplish by girdling is to provide enough growing space on three or four sides of each desirable tree. You should girdle trees whose crowns are within four feet of the crown of a desirable tree. If the tree you wish to favor has four trees around its crown, you should girdle at least three of them to provide the space needed for optimum growth. If the tree only has two trees near it, girdle one or both to bring the same results. You'll often be faced with the prospect of girdling one high-quality tree to favor another. Take a deep breath and do it because if you only girdle low-quality trees, your girdling may have little effect on forest growth.

Trees beneath the main canopy do not affect the growth of the overstory, though even the small understory trees occupy growing space and use nutrients that could be used by younger, better trees.

Dead bark is falling off this girdled tree.



NORTHERN WOODLANDS

On the other hand, understory trees shade the stems of overstory trees. This shading prevents the growth of branch sprouts on the stems of desirable trees, which can drastically lower timber value. And they provide a more complex structure to the forest, which is advantageous for many forest birds.

WHICH TREES

Which are the desirable trees? Which ones do you want to favor? How do you select the trees that will survive and prosper? This is up to you, with guidance from a forester. Some trees may be favored because they produce shelter and food for wildlife – cedar, apple, and hemlock, for example. Others may be favored because they look good or are unusual, like a beautiful flowering dogwood or a relatively rare basswood. Most often, we favor trees for their potential to grow high-value timber quickly.

Choosing the best timber-growing trees is complicated because you have to consider many forest and timber market characteristics. What species grow best in this climate, on this topography, and in this soil? What types of trees are most resistant to natural disturbances such as windstorms and gypsy moth? When will future logging occur and what will be cut? What species are most valuable in the local timber market? What about future markets? Answers to all of these questions depend on your particular situation.

In addition, there are five basic characteristics to consider when deciding which trees to girdle and which trees to favor:

Species: Certain New York species, including black cherry, red oak, sugar maple, and white pine, have traditionally provided more income than others. But again, I emphasize that there is no universal answer to which species to favor.

Health: Trees with insect infestations or diseases are likely candidates for girdling. Depending on the severity of the problems, these trees are less vigorous, have rotting wood, and die young. Insect and disease indicators include defoliation, foliage discoloration, dead limbs, fungus in the bark, bark discoloration, bark deformities, and holes in the bark.

Crown: The crown is the photosynthetic factory for the tree. It uses the sun's energy

to produce food for the tree. Large healthy crowns, fully exposed to the sun, produce the most vigorous trees. These trees often have the most disease resistance and timber growing potential.

Form: The tree with the best health and the largest crown will not grow timber if it has poor form. The first 18 feet of a tree's stem contains the majority of the timber. This area needs to be straight, free of large limbs, and free of defects to produce a large volume of high-value timber.

Size: Larger trees have more value than smaller trees. An 8-inch-diameter tree needs less growth to become a sawlog than a 6-inch-diameter tree.

Often you will need to weigh one of these characteristics against another. Do you favor a healthy 6-inch sugar maple with a large crown or a less healthy 8-inch red oak with a smaller crown?

INCREASING VALUE

The financial goal of girdling is the rapid production of high-quality timber. Timber increases in value two ways: growth and quality. Girdling can speed the growth rate of timber by 30 to 40 percent. Trees are the principal of your forest investment and the interest is deposited in the growth rings. In a forest of high-quality trees, girdling can more than double the interest rate earned from timber growth.

Girdling can cut in half the time it takes for a tree to grow into the next highest quality grade, which is the mill's designation of value, based on how much clear, defect-free lumber can be obtained from a log. When trees reach a threshold size that allows them to be sold for a more valuable product, their value increases significantly.

You, the landowner, guide the future of your forest. You can wait and watch or you can take an active role in your forest's development. Actively guiding your forest's development is good stewardship and great fun. Two cuts with a chainsaw can have a positive effect on your forest for decades.

DAVID BEERS IS A CONSULTING FORESTER, WRITER, AND TREE GIRDLER IN BRIDGEWATER, CONNECTICUT. HE HAS HAD OTHER ARTICLES ON FORESTRY PUBLISHED IN *Northern Woodlands* AND *The Northern Logger*.

RED OAK, BLACK CHERRY, AND GREAT BLUE HERONS

BY BOB HENKE



JIM BLOCK

Jon Raymond had some problems.

About 100 of them, each one covered with blue feathers.

Those who know him might not have found this surprising. He is on the board of directors of the New York State Bluebird Society. He is also, however, a consulting forester by profession, and those blue feathers belonged to a nesting colony of great blue herons, right smack in the middle of a logging project he was hired to manage in Buskirk, New York, in Rensselaer County, east of Saratoga Springs.

On his initial walk-through of the job site, Raymond was impressed with the timber on the site. Good soils on this former pastureland that hadn't seen cattle for much of the last century had produced beautiful stands of large-diameter black cherry, soft maple, and red oak. And then he discovered the heronry. It was in an excellent spot, from a heron's perspective. Many of the nests were located at the height of land, in the tallest of the aspen trees, both quaking aspen (*Populus tremuloides*) and bigtooth aspen (*Populus grandidentata*), that were the major component of that part of the 38-acre woodlot. From the heronry, the birds overlooked a large, swampy backwater of the Hoosick River, which flowed less than a half-mile away. A nearby island and expanses of shallow-water shoreline provided a tremendous feeding area for the herons with a very short "commute." He watched parent birds returning to the nest to feed fledglings at 10-minute intervals. From the neighbors he would learn that there had been herons nesting in that location for nearly four decades. Raymond, whose business card reads "Woodland Caretaker," did not want to do anything to compromise that long history.

He was faced with a challenge.

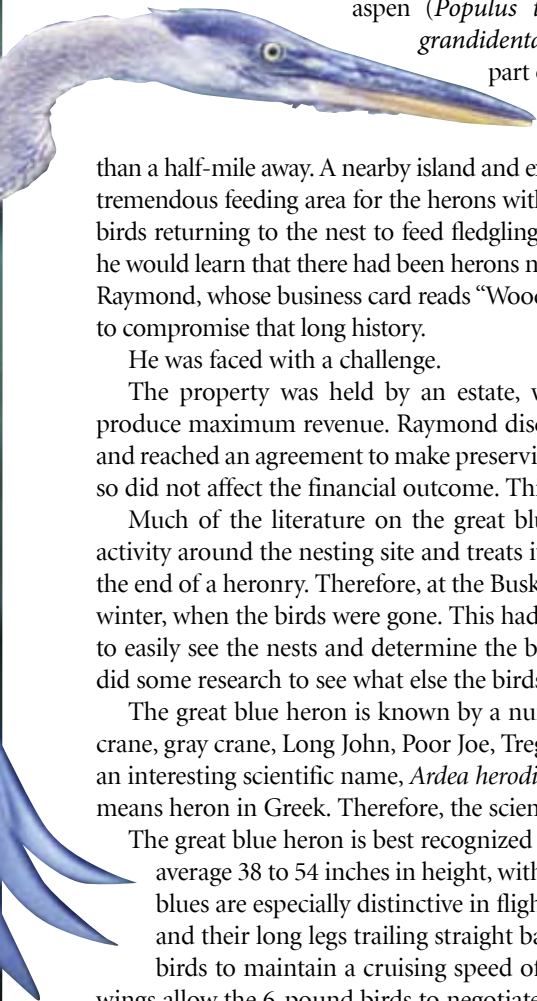
The property was held by an estate, whose heirs had requested that the harvest produce maximum revenue. Raymond discussed the heronry with the estate's executor and reached an agreement to make preserving the heronry a top priority, as long as doing so did not affect the financial outcome. This was all Raymond needed.

Much of the literature on the great blue heron mentions its sensitivity to human activity around the nesting site and treats it as a foregone conclusion that logging spells the end of a heronry. Therefore, at the Buskirk site, all harvest activities were done in the winter, when the birds were gone. This had the secondary benefit of enabling Raymond to easily see the nests and determine the boundaries of the nesting area. This done, he did some research to see what else the birds might need.

The great blue heron is known by a number of common names – Big Cranky, blue crane, gray crane, Long John, Poor Joe, Treganza's heron, and blue hero – and it also has an interesting scientific name, *Ardea herodias*. *Ardea* means heron in Latin, and *herodias* means heron in Greek. Therefore, the scientific name translates as "heron heron."

The great blue heron is best recognized by its large size and stately demeanor. Adults average 38 to 54 inches in height, with 24 inches of that being their long legs. Great blues are especially distinctive in flight, with their necks folded back in an S-curve and their long legs trailing straight back. A wingspan in excess of 6 feet allows the birds to maintain a cruising speed of 20 to 25 miles per hour, and deeply dished wings allow the 6-pound birds to negotiate the slow takeoffs and landings necessary on very small bodies of water without damaging their delicate legs. On the ground, they

Right: Raymond has completed measuring the circumference of a large nest tree (a red oak) and has tied a blue ribbon around the trunk to be sure it remains untouched by loggers.



GERRY LEMMO



VICTOR S. LAMOURHEUX



GERRY LEMMO



GERRY LEMMO



Clockwise from top left: Active great blue heronries can be found in the woods of the Northeast, including hardwood forests. / Raymond is flagging this large red oak as a signal to loggers to not disturb its crown. In the summer, herons were using it for nesting. / Looking straight up into the leafless canopy. While most of the nests in the rookery were in aspens, many of the trees in this photo are red oaks.

walk with long, silent strides as they search the shallows of fresh, brackish, and salt waters for fish, amphibians, crustaceans, and larger insects. They have also been known to stalk through freshly mowed hayfields feasting on mice and voles.

The great blue heron's nesting habits were the primary concern in Buskirk. Herons nest communally, preferring to place their large stick platforms in the tops of the highest trees in the area chosen for the heronry. Some trees will hold several nests, the highest belonging to the oldest pair and lower ones to their young that have reached breeding age themselves. Like the nests of eagles and ospreys, a heron nest is a work in progress, an edifice that is added to each year. Since a heron may live seven or eight years in the wild (the oldest in captivity reached 23) and juvenile females tend to nest in the area they were born, some heronries can get quite large. While the average is 20 to 30 nests, heronries have been recorded with as few as a dozen to as many as 160 individual nests. The Buskirk heronry held 50 nests in a 2-acre area.

Nest-building herons may pick up some sticks from the ground, but they often break them off the very tree they are nesting in. A few years of this kills the tree, and, ultimately, many heron nests topple when the wind breaks off the dead top of their tree. Losses from wind damage, heavy rain, predators, and lightning cause significant mortality, and roughly 69 percent of all young herons hatched do not make it to their first birthday.

When the nest falls or becomes unstable, the parent birds move to the next-highest tree of the preferred species in the immediate area. Therefore, to sustain itself over time, a heronry site must have good recruitment and growth of the preferred tree species. Newly created wetland areas sometimes attract herons for a couple years, but as the trees die out, the birds are forced to move. A long-term heronry requires quite a number of elements, all in the proper balance.

With his research done, Raymond began marking trees for the harvest, which took place in December 2003. His plan included a walking trail and central woods road, both located so as to avoid traffic directly through the heronry. A 50-foot buffer zone was left all around the perimeter of the existing heronry, and no aspens were cut even beyond that buffer. His hope was to avoid wind-snap, which has been a traditional problem in the area. Aspen was the key species to keep going, but it's an early successional species with a relatively short life span, which can make it difficult to maintain in steady supply over time. Raymond was able to make

half-acre patch cuts of the more valuable red oak and black cherry that were adjacent to large aspen. The aspen would have more room to grow bigger crowns and would provide a seed source to take over these half-acre seedbeds.

The herons were not the only wildlife species considered in this process. Several large trunk sections were left on the ground at various points as drumming logs for grouse, and seed oaks were left to provide acorns for wildlife food and regeneration.

The harvest was done in the winter, and all operations were finished well in advance of the herons' return in the spring. Raymond had been successful in maximizing the income for the owners. He removed nearly 100,000 board feet of oak and cherry, much of it veneer, and the heirs were very pleased with the revenue.

That part of the job was clearly a success, but what about the herons? Raymond knew he had done everything he could, but it was not without a good deal of anxiety that he returned to the Buskirk project to check on the birds. In order to not disturb the fledglings – if indeed there were any – he had to wait until July. He liked what he saw on the way in. The sunny openings were filled with green. A grouse drummed off on the eastern portion of the lot. A young whitetail buck, his antlers just showing the velvet promise of a fall rack, was jumped out of his bed along the walking trail. However, the forester could not relax until finally he heard what he was hoping for: that first hoarse croak of a heron leaving a nest.

The huge blue birds had returned.

Every nesting tree from the previous year was being used, and, even better, several new nests had been started. Not only was the heronry still viable, it was growing. As the summer months passed, and in spite of very high winds that toppled some nests and killed some nestlings, young herons continued to grow, and the heronry fledged as many as 30 youngsters to begin the migration south. The following July, Raymond saw that there was even further expansion of the rookery, with an additional eight new nests.

Raymond knew that all the heron literature depicts human intrusion, especially logging, as an anathema to a heronry. The Buskirk project can be seen as a test of that foregone conclusion. While it is early to call this an unqualified success, there is reason to hope as the third spring following the harvest arrives, that what was good for the landowner, good for the logger, and good for the buyers of the timber, will be good for the great blue herons.

By paying attention to the attributes needed by the birds, and carefully planning and executing a harvest designed in part to regenerate the aspens that they prefer, Raymond hopes to ensure that the herons will have nesting trees far into the future. This summer, he'll be back once again to see how well the birds are faring.

BOB HENKE HAS BEEN AN ARCHAEOLOGIST, COLLEGE INSTRUCTOR, WILDLIFE PROFESSIONAL, OUTDOOR WRITER, AND NEWSPAPER COLUMNIST, AS WELL AS THE TOWN SUPERVISOR OF ARGYLE, NEW YORK.



A Forest in Fragments

Smaller Parcels Can Cause Large Problems

By JOSEPH ADAMS

Parcel maps, known more ominously as tax maps, show the boundary lines of every property in town. In many parts of the state, more and more boundary lines are being drawn on those maps, as existing parcels are divided into two or more smaller ones. Why is there a trend toward smaller parcels? The need to subdivide often comes as owners respond to changing personal circumstances, as in these examples:

- parents break off a parcel for a child to build a house;
- new landowners recognize they paid too much for their place in the country and sell off a piece to recoup some money;
- college tuition for children or medical expenses lead owners who are strapped for cash to tap into the largest asset they own and sell off a building lot.

These situations aren't new, but the historical context surrounding them is. We're on the cusp of the largest inter-generational transfer of forestland in the nation's history. A joint study by the U.S. Forest Service and the Pinchot Institute found that 60 percent of the owners of forestland are 55 years old or older and more than half of those are 65 or older. The aging of the landowner base means that a significant amount of that land is going to be sold or bequeathed in the next 10-20 years. Each of those transactions is a prime opportunity for land to be subdivided. Current owners could themselves try to divide it equitably among several heirs. Or if bequeathed intact to more than one heir, the new owners may have different interests: some may want to own a quiet place in the country, others may prefer cash, which leads to parcels being sold.



BLAKE GARDNER

A fragmented landscape is less hospitable to many wildlife species. It tends to exclude those animals – black bear and bobcat among them – that need large intact tracts of land for survival. What is a barrier to some species is an opportunity to others. In highly fragmented habitats, only those species that are adapted to habitat edges or dependent upon human activity are able to persist. This means that coyotes and whitetail deer have found these conditions to their liking, and their populations have exploded where rural areas have become more suburban in nature.

In doing comprehensive planning for wildlife habitat, Department of Environmental Conservation officials have developed a list of species of greatest conservation need, with the stated goal of keeping these threatened species abundant. Degraded habitat is one of the most serious threats to conserving these species, and fragmentation is cited repeatedly for contributing to degraded habitat.

A patch of good news

There's a difference between patchiness and fragmentation. In an intact forest, open patches of different size are beneficial because they provide a diversity of conditions. An opening filled with grasses, shrubs, or saplings is especially advantageous if the surrounding forest cover is all of a uniform full canopy. It's still a forest, but some of it is in an early successional stage. This patchiness increases the diversity of habitat and provides suitable conditions for those animals (birds, in particular) that couldn't use the full canopy conditions. Diversity is good.

It's only when you construct a road to that patch and build a house, garage, and lawn that it has a fragmenting effect. The existence of one house can then lead to further subdivision because the existing infrastructure makes it more cost-effective to build a second. The built environment and the human activities compromise the habitat not only of the footprint of the house and road but also of the land surrounding them.

Rivers and streams, for instance, can suffer from subdivision and development, because impervious roads and rooftops shed rain and snow and can sweep pollution into previously undisturbed waterways, compromising aquatic species. Another environmental concern is that when forestland is converted to non-forest cover – houses, roads, or commercial development – it no longer stores carbon and contributes to global climate change. Forest edges are particularly receptive to nonnative plant species like buckthorn and honeysuckle; once these invasive species get a toehold, they begin to crowd out the indigenous species.

If all that's not bad enough, the parcelization of land also has economic implications, because smaller parcels of woodlands are more difficult to manage for timber, fuel, and other forest products. Working forests provide good jobs in rural areas and contribute important raw materials, including fuel, pulp for paper, and high-quality sawlogs for construction, furniture, and other valuable wood products. Forests help maintain healthy watersheds, which means clean drinking water, crisp and clear

Maps and aerial photos also tell a related story. The increase in developed acreage – houses and associated infrastructure – is happening at a faster pace than the rate of population growth in the state. What that means is that we are developing the countryside, rather than cities and villages.

Why is this a problem?

To answer that question, let's define two words that go hand in hand – parcelization and fragmentation. One is a cause, the other an effect. Parcelization refers to the division of land into smaller and smaller lots over time. Fragmentation is the effect on the land when parcelization leads to development. As this happens, formerly intact landscapes become broken up by clearings for houses, yards, and roads.

"A fragmented landscape is less hospitable to many wildlife species."

swimming holes, and good trout fishing. And, of course, New York's forests offer a vast array of recreational opportunities, including hiking, birding, skiing, hunting, and snowshoeing. Chopping up New York's rural landscape presents many challenges to maintaining its rural character and economy.

All is not lost

The good news, however, is that there are still many large blocs of relatively intact forestland in New York. Conservationists, the forestry community, and many large landowners share the common goal of keeping the forest intact. Landowners have the power to minimize fragmentation, and there are a variety of steps that can be taken to maintain the viability of New York's forests. Here are some steps you can take:

- Talk about the future. It's wise to discuss your goals for your property with your family, including your wishes for the land beyond your ownership: your desires, your heirs' interests, potential estate tax obligations, and the economics of land ownership should all be discussed. Annual family meetings to discuss the property can be very helpful in keeping forestland intact.
- Consider conserving your land in order to keep it intact. The story on conservation easements on page 56 shows how other landowners have used these tools to avoid dividing land.

When that's not possible – when subdivision is the only solution to life's circumstances – there are ways to accommodate

new construction while at the same time protecting the values forests provide. The problems of fragmentation are largely a function of the way landowners develop their land.

- If you are thinking of subdividing your land, consider clustering house sites while keeping the majority of the land intact.
- As you explore your land, identify any significant natural or cultural features. Do not encroach on these areas when choosing sites for houses and roads.
- Choose a building site as close to existing roads and utilities as possible, keeping roads and driveways short. Keep clearing to a minimum, as a forested landscape protects land from erosion better than an open landscape.
- If your roads cross streams, bridges are preferable to culverts because they leave the natural streambed relatively intact. If you do install culverts, be sure they are big enough to handle high flows of water. Also be sure to leave vegetated buffers between any construction and streams.

An intact forest performs so many beneficial services. However, as family circumstances change for landowners, subdividing forestland is sometimes unavoidable. By carefully considering your options, you can minimize or avoid the problems associated with forest fragmentation.

JOSEPH ADAMS IS A FREQUENT CONTRIBUTOR TO NORTHERN WOODLANDS MAGAZINE.

The parcelization and fragmentation of New York's landscape presents challenges to maintaining the rural character and economy of the state. Inset: Black bears need large tracts of unfragmented forest.



NORTHERN WOODLANDS

GERRY LEMMO



Emerald ash borer



Asian longhorned beetle

Deadly Insects

Early Detection Can Save Thousands of Trees

New York is host to populations of three devastating insects:

Emerald ash borer was first detected in 2009 in Cattaraugus County, and by January 2011 had been found in four other western New York counties and the Hudson Valley (including land within Catskill Park's Forest Preserve). This deadly insect has killed millions of ash trees in the Midwest, and it kills ash trees within a few short years of infecting them.

Asian longhorned beetle has been found in Long Island and all New York boroughs except The Bronx. It attacks many species of hardwoods, and has not yet been controlled in Brooklyn and Queens.

Hemlock woolly adelgid has been destroying hemlocks in the Hudson Valley since the 1990s. More recently, it has been found in Watkins Glen State Park and other sites in the Finger Lakes.

Alert citizens can make a difference. If you see any signs of the insects shown here, please call 866-640-0652. The infestation of Asian longhorned beetle in Worcester, Massachusetts, required the destruction of nearly 30,000 street trees and has transformed that city. If it weren't for an alert resident who captured an insect and brought it to authorities, the destruction could have been worse. Don't let it happen here.

Don't move firewood. It is illegal to transport firewood more than 50 miles from its source. Help contain the spread of any undetected insects.

Report any suspected presence of these insects. Call 866-640-0652

PHOTOS FROM TOP: KENNETH R. LAW, USDA APHIS PPQ; INSET: HOWARD RUSSELL, MICHIGAN STATE UNIV.; PA DCNR FORESTRY ARCHIVE; INSET: LARRY R. BARBER, USDA FOREST SERVICE; CT AG EXPERIMENT STATION ARCHIVE. ALL COURTESY OF BUGWOOD.ORG.



Hemlock woolly adelgid



Birds in the Brush

THE LOWDOWN ON GROUND-NESTERS

BY BRYAN PFEIFFER / ILLUSTRATION BY ADELAIDE TYROL

THE OVENBIRD WAS AGITATED. AND WHO COULD BLAME HER? I HAD UNWITTINGLY WALKED TOO CLOSE TO HER NEST.

She and her mate had chosen a nest site in a rich stand of old hardwoods. Foamflower, miterwort, and early saxifrage were in bloom up to my ankles. Forest openings were carpets of violets. Maidenhair fern, the most elegant plant in the woods, reached its semicircular fronds toward the sun.

The ovenbird is an unwarbler-like warbler. Olive above and heavily streaked below, this songbird looks more like a miniature thrush than a member of that glittering, lyrical family of birds, the warblers, or *Parulidae*. The one dashing feature on the ovenbird is its orange racing stripe – edged in black – running from the forehead to the nape. When excited, the ovenbird will sometimes raise the feathers on its head, making its point with a pumpkin-colored Mohawk hairdo.

My approach certainly made these ovenbirds excited. The female prepared to defend her nest. The male flew to a sugar maple at the edge of his territory and began shouting, with a full crescendo, his penetrating TEA-cher! TEA-cher! TEA-cher! TEA-cher! – one of the most enduring and revealing sounds of the northern hardwoods.

What isn't so revealing, however, is the ovenbird's nest site; it's hidden on the forest floor. And that is hardly unusual among birds. A good number of our songbirds, even those ordinarily foraging high in trees, nest on the ground or a few feet above in the shrub and sapling layer. Their presence provides convincing evidence that life in healthy woodlands – everything from songbirds to salamanders – does not thrive by tall trees alone.





Black-throated blue warbler eggs

because they breed in tree-less areas of the arctic.

Consider as well some birds that nest in the ground. Oceangoing petrels squirm into burrows at the seashore. Alcids – murres, razorbills and guillemots, the so-called “penguins of the north” – nest on seaside ledges or in rock crevices, although one of the most famous alcids, the Atlantic puffin, prefers burrows. Belted kingfishers excavate horizontal burrows into vertical banks near water.

More surprising, however, are the numerous members of bird families that we normally associate with lofty trees – vireos, wrens, thrushes, warblers and certain sparrows – that nest on or near the ground. After all, these birds belong to the great order *Passeriformes*, or Passerines, the perching birds, so named for their having four toes – three facing forward and one (the inner, corresponding to our big toe) facing backward – designed for perching on branches. (Feet are important in bird taxonomy – consider the finer points of the hawk’s foot or webbing on a duck’s foot.)

It would be easy to not notice that birds nest at different levels in the woods. You might think that since a bird can fly, it can nest at whatever height it wants – if it doesn’t find a place at its desired height of two feet, it will just move up to eight feet. It doesn’t work that way in the bird world.

Recall from high school biology class the lessons on ecological niches. We all know that living things are opportunistic. They’ll go where they can find food or nutrients, where they can survive and reproduce. In the woods, few vacancies go unfilled – from canopy to soil. Yet how do songbirds survive down there? It would seem that ground-nesting species are at a certain disadvantage to their more arboreal cousins. Raccoons, skunks, opossums, coyotes, foxes, rats, mice, house cats, and even humans are well-known, ground-dwelling predators of bird eggs and young. But ground-nesters prosper nevertheless. And like any creature, they adjust to life in the leaf litter with some clever adaptations – rang-

To be sure, the planet is sprinkled with ground-nesting birds: loons, most duck species, geese, sandpipers (the solitary sandpiper, which uses deserted songbird nests in trees, is a notable exception), gulls, terns and jaegers, just to name a few. Many of these birds nest on the ground because they like to be near water’s edge or simply

ing from camouflage to outright trickery.

Rewind to that pair of ovenbirds. Their backs were the color of fallen leaves. The female, somewhere on the forest floor, blended in like a leaf in a forest. That’s a shared strategy for ground-nesters: their uppersides tend to be the color of their habitats – brown, tan, olive, or green.

The hermit thrush, which nests on or near the ground in softwoods or mixed woods, is olive-brown on its back. The mourning warbler, nesting low in the shrub in open deciduous woods and wetland edges, may be bright yellow below, but gray and green uppersides make it more obscure to predators above.

The male black-throated blue warbler, which nests in the shrub layer in hardwoods, is metallic blue above – not exactly the right color for hiding in hobblebush. But the female black-throated blue is downright drab for a warbler – overall gray-green. And if you’re a black-throated blue warbler sitting on eggs all day, not being blue helps you and your offspring stay alive. This sexual dimorphism – the more cryptic female plumage in many, not all, songbirds – is a wise adaptation in any nest location, high or low in the forest.

Even though I could hear that male ovenbird shouting at me, I never actually saw him. Ovenbirds have another advantage that enhances their protective coloration. Most birds reveal their location when they move, flitting from leaf to leaf or hopping across the ground. Ovenbirds don’t hop; they walk stealthily. Countless times I’ve heard a calling ovenbird, louder than anything in the woods, sitting somewhere on a branch at eye-level, yet for all intents and purposes invisible.

Even so, this female ovenbird made herself quite visible. She actually walked toward me, not at all concerned that I might notice her near the nest. In fact, as it turned out, this was all part of her plan. She wanted to be seen. So I stepped closer. She then did what any self-respecting ovenbird with eggs would do. She drooped both wings as if they were broken. And with her wing tips dragging the ground, she began to walk away.

It was a smart move on her part. Lots of birds – killdeer and ruffed grouse (also ground nesters) among the most noticeable – do this broken-wing trick. It’s called a distraction display. By feigning an injury, the bird believes the intruder will pursue an easy prey with a busted wing. Some birds will feign exhaustion. Others will scoot like a rodent.

In any event, when the actor draws the predator a sufficient distance from the nest, the performance reaches its finale: the bird flies off in full health to return to her nest, which presumably is now out of the predator’s sight. Sleight of hand (sleight of wing, rather) has come to the forest.

This drama is played out on the ground or in the



Ovenbird



Black-throated blue warbler and nest

shrub layer of our forests every year at nesting time. We walk over, alongside, and under it with every ramble in the woods. Some of the best proof of birds nesting at various heights in the forest came in 1961 from the Canadian-born ecologist Robert MacArthur. He demonstrated that the vertical complexity of forest vegetation – the diversity of heights and density of foliage at those heights – is directly proportional to breeding bird diversity. MacArthur called it “foliage height diversity.” It’s classic reading in college-level ornithology. Grasslands have exceedingly low forest height diversity; shrublands have more; and tropical forests with multiple canopy layers have the highest.

To oversimplify, animals – no matter where they live – need food, water, and shelter. More specifically, birds need nesting sites, perches for resting or singing, and vegetation structure for finding food. A forestland owner needs nothing more than common sense to realize that the higher the vegetative diversity, the higher the species diversity. “As the understory becomes more simple, the bird species complexity becomes more simple,” says William McShae, a wildlife biologist with the Smithsonian Institution’s Conservation and Research Center in Front Royal, Virginia.

In the woodlands of McShae’s Virginia, and in Pennsylvania and other states, wildlife biologists are seeing declines in ground-nesting bird species. The culprit is a native herbivore that harms songbirds indirectly: the white-tailed deer. The loss of larger predators such as wolf and cougar has contributed to a rise in whitetails. And an overabundance of deer can eviscerate understory vegetation. They literally eat songbirds out of house and home.

Biologists have confirmed that regions with high deer populations have compromised understories, which has negatively affected many bird species.

But deer aren’t the only understory-clearing culprits. In the Northeast, in places where deer densities aren’t as high, sugarbush owners sometimes clear forest understory vegetation, making it easier to get around to trees and buckets. Residential landowners with small woodlots sometimes clear understory plants, creating a comfortable, park-like aesthetic, but depriving a class of songbirds of crucial habitat. It means fewer birds in the woods, at the feeders and, as a result, perhaps an increase in insect pests.

Having lured me into her one-act play (and away from the nest), the female ovenbird felt the tug of her eggs. It was cool and rainy that morning, so she couldn’t leave her eggs uncovered for very long. I backed off. And she began a slow, stealthy walk toward her nest.

That nest is how the ovenbird gets its name – and it is perhaps the most important example of how songbirds can survive on the ground. The ovenbird walked to the base



Slate-colored junco

ROY W. PILCHER

of a clump of Christmas fern. She had inadvertently revealed the location of the supreme priority in her life at that moment. Her nest was a small dome woven from older fern fronds and leaves. With its front entrance, it looked like a classic domed oven. Inside were five tiny, pale eggs. There can be few better bird hiding places in the woods.



Ruffed grouse

STEVEN D. FACCO

Nest location and camouflage are critical to ground-nesters. And it seems to work well for them. Consider studies in which researchers place artificial nests with eggs at different locations in the woods – on the ground, in the shrub layer, and higher in the canopy. The results show consistently that the nests placed in the shrub layer and canopy are hit by predators more often than those located on the ground. It seems to be an easier place to hide a nest.

Think of the winter wren. Actually, try finding one. Despite its explosive song, which is an extended series of excited trills and



Hermit thrush

STEVEN D. FACCO

buzzing, this little brown bird regularly eludes bird-watchers. Finding its nest is like finding money in the woods – it’s hidden in a tree cavity, under a stump, or in the exposed roots of a tip-up. The black-and-white warbler, much more obvious with its zebra pattern and nuthatch-style foraging habits, conceals its nest at the foot of a log or stump,

among a tangle of exposed roots or in some depression. The Nashville warbler may feed in plain view out at the tips of conifer twigs, but its nest is tucked away under a clump of sedge, grass, or other vegetation.

Never would I have found that ovenbird nest had I not been clever enough to hide and watch the female walk to it. Even better was watching her step into the nest and settle on her eggs.

But it was time to leave her alone. I turned and started my walk out of the woods toward breakfast. The male ovenbird began singing again. Scarlet tanagers and rose-breasted grosbeaks, two of the showiest birds in these woods, were singing and glowing in the canopy. But walking that morning through those woods, my thoughts were with the invisible ground nesters – probably only a few steps away.

BRYAN PFEIFFER IS AN AUTHOR, WILDLIFE PHOTOGRAPHER, GUIDE, AND CONSULTING NATURALIST WHO SPECIALIZES IN BIRDS AND INSECTS. HE LIVES IN PLAINFIELD, VERMONT.

ResourceGuide

WHERE TO GO FOR FORESTRY ASSISTANCE

Cornell University Cooperative Extension County Offices			
1	Orleans	12690 Route 31, Albion NY 14411	585-798-4265
2	Cayuga	248 Grant Avenue, Education Center, Auburn NY 13021-1495	315-255-1183
3	Saratoga	50 West High Street, Ballston Spa NY 12020-1992	518-885-8995
4	Genesee	420 East Main Street, Batavia NY 14020-2599	716-343-3040
5	Steuben	3 East Pulteney Square, Bath NY 14810-1557	607-664-2300
6	Allegany	5435 A County Road 48, Belmont NY 14813-9758	716-268-7644
7	Broome	840 Upper Front Street, Binghamton NY 13905-1500	607-772-8953
8	Putnam	1 Geneva Road, Terravest Corp. Park, Brewster NY 10509	914-278-6738
9	Greene	6055 Route 23, Acra NY 12405	518-622-9820
10	Ontario	480 North Main Street, Canandaigua NY 14424-1099	585-394-3977
11	St. Lawrence	1894 State Highway 68, Canton NY 13617-1448	315-379-9192
12	Schoharie	173 South Grand Street, Cobleskill NY 12043-1696	518-234-4303
13	Otsego	123 Lake Street, Cooperstown NY 13326-0121	607-547-2536
14	Cortland	60 Central Avenue, County Office Bldg, Rm 105, Cortland NY 13045-5591	607-753-5077
15	Erie	21 South Grove Street Suite 320, East Aurora NY 14052-2398	716-652-5400
16	Cattaraugus	28 Parkside Drive, Suite A, Ellicottville NY 14731-9707	716-699-2377
17	Chemung	425 Pennsylvania Avenue, Elmira NY 14901-1793	607-734-4453
18	Montgomery/Fulton	Johnstown Prof. Office Comp., 55 East Main Street, Johnstown NY 12095	518-762-3909
19	Delaware	34570 State Highway 10, Hamden NY 13782-0184	607-865-6531
20	Herkimer	5657 State Route 5, Herkimer NY 13350-9721	315-866-7920
21	Columbia	479 NYS Route 66, Hudson NY 12534-9706	518-828-3346
22	Washington	415 Lower Main Street, Hudson Falls NY 12839-2629	518-746-2560
23	Tompkins	615 Willow Avenue, Ithaca NY 14850-3555	607-272-2292
24	Chautauqua	3542 Turner Road, Jamestown NY 14701-9608	716-664-9502
25	Ulster	10 Westbrook Lane, Kingston NY 12401-3824	845-340-3990
26	Hamilton	Piseco Common School, 1722 New York Route 8, Piseco NY 12139	518-548-6191
27	Sullivan	64 Ferndale-Loomis Road, Liberty NY 12754-2902	914-292-6180
28	Niagara	4487 Lake Avenue, Lockport NY 14094-1139	716-433-8839
29	Lewis	5274 Outer Stowe Street, Lowville NY 13367	315-376-5270
30	Franklin	355 West Main Street, Malone NY 12953-1817	518-483-7403
31	Oswego	3288 Main Street, Mexico NY 13114-9596	315-963-7286
32	Orange	18 Seward Avenue, Suite 300, Middletown NY 10940-2499	845-344-1234
33	Dutchess	2715 Route 44, Millbrook NY 12545-0259	845-677-8223 ext.136
34	Schuyler, Tompkins, Chemung, Tioga, Cortland	208 Broadway, Montour Falls NY 14865	607-535-7141
35	Madison	100 Eaton Street, Morrisville NY 13408-1209	315-684-3001
36	Livingston	158 South Main Street, Mount Morris NY 14510-1595	716-658-3250
37	New York City	183 Madison Avenue, New York City NY 10016	212-340-2900
38	Wayne	1581 NYS Route 88N, Newark NY 14513-9739	315-331-8415
39	Chenango	99 North Broad Street, Norwich NY 13815-1386	607-334-5841
40	Oneida	121 Second Street, Oriskany NY 13424-9799	315-736-3394
41	Tioga	56 Main Street, Owego NY 13827-1588	607-687-4020
42	Yates	417 Liberty Street, Penn Yan NY 14527-1130	315-536-5123
43	Nassau	5 Old Jericho Turnpike, Jericho NY 11753	516-433-7970
44	Clinton	6064 Route 22, Plattsburgh NY 12901-9601	518-561-7450
45	Suffolk	423 Griffing Avenue, Riverhead NY 11901-3086	516-727-7850
46	Monroe	249 Highland Avenue, Rochester NY 14620-3036	716-461-1000
47	Schenectady	107 Nott Terrace, Suite 301, Schenectady NY 12308-3170	518-372-1622
48	Onondaga	The Atrium, Suite 170, 2 Clinton Square, Syracuse NY 13202-1045	315-424-9485
49	Rockland	10 Patriot Hills Drive, Stony Point NY 10980	914-429-7085
50	Rensselaer	Ag & Life Sciences Building, 61 State Street, Troy NY 12180-3412	518-272-4210
51	Westchester	26 Legion Drive, Valhalla NY 10595	914-285-4620
52	Albany	24 Martin Road, Voorheesville NY 12186-0497	518-765-3500
53	Warren	377 Schroon River Road, Warrensburg NY 12885-9601	518-623-3291
54	Wyoming	401 North Main Street, Warsaw NY 14569-1091	716-786-2251
55	Seneca	308 Main Street, Waterloo NY 13165	315-539-9251
56	Jefferson	203 North Hamilton Street, Watertown NY 13601-2597	315-788-8450
57	Essex	PO Box 388, 3 Sisco Street Suite 1, Westport NY 12993-0388	518-962-4810



NYS Department of Environmental Conservation Offices

58	Central Office/Division of Forest Protection	625 Broadway, Albany NY 12233	581-402-8545
59	Region 1 – Stony Brook	SUNY at Stony Brook, 50 Circle Road, Stony Brook NY 11790	631-444-0345
60	Region 2 – Long Island City	1 Hunter’s Point Plaza, 47-40 21st Street, Long Island City NY 11101	718-482-4949
61	Region 3 – New Paltz	21 South Putt Corners Road, New Paltz NY 12561	845-256-3033
62	Region 3 – Wappingers Falls Sub-Office	Stony Kill Env Ed Center, 79 Farmstead, Wappingers Falls NY 12590	845-831-8780
63	Region 4 – Schenectady	1130 North Westcott Road, Schenectady NY 12306	518-357-2068
64	Region 4 – Stamford Sub-Office	65561 State Highway 10, Suite 1, Stamford NY 12167	607-652-7365
65	Region 5 – Ray Brook	1115 NYS Route 86, PO Box 296, Ray Brook NY 12977	518-897-1211
66	Region 5 – Warrensburg Sub-Office	232 Golf Course Road, PO Box 220, Warrensburg NY 12885	518-623-1265
67	Region 5 – Northville Sub-Office	701 South Main Street, PO Box 1316, Northville NY 12134	518-863-4545
68	Region 6 – Watertown	317 Washington Street, Watertown NY 13601	315-785-2239
69	Region 6 – Potsdam Sub-Office	6739 US Highway 11, Potsdam NY 13676	315-265-3090
70	Region 6 – Lowville Sub-Office	7327 State Route 812, Lowville NY 13367	315-376-3521
71	Region 6 – Herkimer Sub-Office	225 North Main Street, Herkimer NY 13350	315-866-6330
72	Region 7 – Syracuse	615 Erie Boulevard West, Syracuse NY 13204	315-426-7403
73	Region 7 – Cortland Sub-Office	1285 Fisher Avenue, Cortland NY 13045	607-753-3095
74	Region 7 – Sherburne Sub-Office	2715 State Highway 80, Sherburne NY 13460	607-674-4036
75	Region 7 – Kirkwood Sub-Office	1679 NY Route 11, Kirkwood NY 13795	607-775-2545
76	Region 7 – Altmar Sub-Office	2133 County Route 22, Altmar NY 13302	315-298-7467
77	Region 8 – Avon	6274 East Avon-Lima Road, Avon NY 14414	585-226-5366
78	Region 8 – Bath Sub-Office	7291 Coon Road, Bath NY 14810	607-776-2165 ext. 36
79	Region 9 – Allegany	182 East Union Street, Allegany NY 14706	716-372-0645
80	Region 9 – Falconer Sub-Office	215 South Work Street, Falconer NY 14733	716-665-6111
81	Region 9 – West Almond Sub-Office	2524 County Route 2A, Almond NY 14084	585-466-3241
82	Region 9 – Buffalo Sub-Office	270 Michigan Avenue, Buffalo NY 14203	716-851-7200

By CASTLE FREEMAN, JR.

More than most locations, Central Park is a place in mind. Not surprising: the park was created to be exactly that, by planners who believed New Yorkers stood in particular need of Nature in their lives. Central Park was to be something new, at least in part: not a common, not a garden, but a forest in the city. There, walking beneath the park's carefully selected and tended trees, the beleaguered city dweller, normally cut off by his hurried, overcrowded existence from the profound and enduring consolations of the natural world, could find a version of them ready to hand. He could find a forest, not for lumbermen, not for hunters, not for campers or hikers – but for philosophers.

Central Park is a small green hole in the large gray doughnut that is Manhattan Island. Planned and laid out by landscape architects beginning before 1857, it covers over a square mile of the 22-square-mile island. This is a piece of real estate that, transformed into office towers, shops, restaurants, apartment buildings, and townhouses, would have a value approximately equal to the value of the planet Neptune, if Neptune were made of solid gold. Instead, for 150 years, the park has been reserved, set apart as a kind of zoo for trees. Its trees are valued, scrutinized, enjoyed. They are known in a way that their wild counterparts are not, cannot be. The latter are *part of* Nature. The trees in Central Park *represent* Nature. In the park, Nature is acknowledged, upheld, and protected from itself.

But not always.

On the night of August 19, 2009, a very strong and very fast-moving storm blew over New York City from the west, with wind speeds reaching 70 m.p.h. (Hurricane-force winds start at 74 m.p.h.) The storm was of the kind weathermen call a “downburst.” The same storms come to the Vermont foothills, where I live, every few years. They're sudden, capricious, highly localized events, and they are no joke. In the woods here, following the passage of one of these storms, big oaks and maples seem to have been seized by their upper branches and violently twisted, ripping their crowns off and flinging them aside, splitting and shattering. Other trees are simply plucked up by the roots and thrown down.

That's the kind of calamity that visited Central Park this past summer. The morning after the storm, New Yorkers were stunned by the devastation. *The New York Times* ran the story on Page 1, with a photograph that showed bewildered Manhattanites picking their way through the leafy wreckage like refugees fleeing a bombed-out village. It took a couple of days for park authorities

to understand the magnitude of the disaster. Early estimates were 100 trees destroyed in Central Park, but that figure soon doubled as it was extended to include trees still standing but damaged beyond saving. About ten percent of the park's mature trees were destroyed.

As in greater and lesser storms, the worst destruction on August 19 was among the oldest, tallest trees. In Central Park, that meant oaks and tulip poplars. Most of the biggest of those trees were thought to date from the turn of the last century, though a couple were certainly much older and might have been planted at the park's creation before the Civil War.

I lived in New York for a while many years ago, though not near Central Park. My time in the city was a dark period in its long history. Street crime was epidemic. In those days, you didn't venture into Central Park without a military escort. Not having a military escort at the time, I didn't go to the park a lot. I did occasionally, however, of course, and I well remember the splendid trees, particularly the London plane trees. Akin to sycamores, they weren't among the oldest trees in the park, but they *looked* old.

With their odd piebald bark and massive trunks, they looked like they belonged in Sherwood Forest, spreading their heavy, low branches over the heads of Robin Hood and Little John.

Many of those plane trees are gone now. They couldn't take the wind. According to one report on the park's killed plane trees, “it seems they just exploded.”

To be sure, an event like the August 19 storm in Central Park would be a misfortune in any forest, but in a forest where every tree is appreciated and celebrated, in a pet forest, a forest for philosophers, the hit is somehow – not worse, but different. More complex, harder to measure. It has a collective aspect, a historic aspect. Overnight, trees that have formed the setting for some part of the daily lives of, quite literally, millions of people are gone forever. Change the setting, change the life. In Central Park, the storm's debris has been cleaned up. New trees have been planted and more will be, no doubt many more. Our grandchildren will have their philosophical hours assisted by trees like the ones lost this summer in the park. For us, though, it's still a place in mind, but it's a different one now.

CASTLE FREEMAN, JR., IS A WRITER LIVING IN NEWFANE, VERMONT. HIS NOVEL *ALL THAT I HAVE* WAS PUBLISHED IN MARCH, 2009, BY STEERFORTH PRESS.

