Enhancing the Stewardship of Your Forest

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Table of Contents

Preface

The stewardship of private forest land provides countless opportunities for the owners, their communities, and society more broadly. Forest owners who embrace a stewardship ethic may look to their forest to produce a variety of benefits, from solitude to wildlife to timber to maple syrup and more. Yet these forest owners also recognize that stewardship requires deliberate efforts to ensure the desired benefits are sustained. We prepared this bulletin as a starting point to help forest owners understand and initiate the skills they will use as forest stewards. This bulletin will help forest owners better understand how their forests function, what options they have for achieving their objectives, the people and organizations that can guide them, and the actions they can take to help their forests move towards their vision. Thus, this bulletin initiates the process of enhancing forest stewardship and complements the many good publications that provide additional details on how to implement stewardship practices.

This bulletin has grown over the last many years through the input and support of many people. The basis started in the mid 1990's with an effort to develop a FAQ sheet for common questions that landowners posed to Cornell Cooperative Extension educators. Since most simple questions lack a simple answer an article series was initiated. That grew into a joint initiative between CCE and the New York Forest Owners Association (NYFOA) to develop articles on meaningful topics and share those articles statewide through both organizations. This bulletin represents a compilation of edited articles that were developed during the last 7 years. We recognize and appreciate the thoughts and opinions shared by many people in CCE, NYFOA, and NYS Department of Environmental Conservation during this time.

We thank the authors for sharing their material with us. The authors are noted on each chapter. Except as noted in the bulletin, photographs are from the collections of the editors. Other photo credits are due to Tom Barnes, Steve Morreale, Jeff Ward, and Steven Wolf.

PJS, SES, KLS, GRG, & DLB

An Introduction to "Enhancing the Stewardship of Your Forest"

By Peter Smallidge

There are many activities you can do easily and on your own to help improve your woodlot. Through your role as a steward. First though, what is an improvement? Only you can define improvement. Some woodlot owners receive full satisfaction from letting their woodlots mature and develop through natural processes, and most woodlot owners have a special place or two in their woodlot that they never want to see change. These areas do not need to be "improved". Other woodlot owners are interested in increasing wildlife habitat or recreational opportunities. There is no obligation to manipulate your woodlands, but for woodlot owners wishing to make some changes there are several options.

This chapter provides a general overview to the book. More details on the subjects introduced here are available elsewhere in one or more chapters.

Getting Started – Knowing What You Want

The pivotal and perhaps most important step in making your woodlot work for you is to clearly and explicitly state your objectives. Explicitly stating and then writing down your ownership objectives is the step that distinguishes deliberate management from those activities that are happenstance and that will often reduce your future options. Your objectives guide your actions. Clearly stated objectives provide direction, simplify the decision making process, and provide a standard to gauge success. Your management objectives reflect what you value about your forests. These are your tangible and intangible personal values and the values provided to your community as a result of your management activities.

Working in your woodlot can enhance the beauty and enjoyment your land offers.

The first step in making your forest management objectives is thinking about your forest: why you own your forest, what you like about your forest, and how you want your forest to look next year, in ten years, and in the next generation of ownership. Many people own forests because they inherited them; purchased them as a place for privacy, wildlife viewing, or recreation; or purchased them for investment purposes. This is a start for your objectives as it explains perhaps a sentimental value, the value of retreat or seclusion, the value of an investment, or most likely some combination of the three. You may like to visit the part of your forest where you had a pleasant experience, a scenic overlook, the spot where you can always flush a grouse or run a rabbit, or the grove of red oak or sugar maple that will someday help support you in retirement. Finally, the vision of your future forest is probably closely aligned with what you like about your forest. For example, keeping the memorable

spot unchanged, ready access to grouse cover, or an increase in the sawtimber value of your oak or maple stand. Again, your values help define your forest management objectives. These thoughts and visions are the basis of your forest management objectives because they provide the direction and the standards for successful management.

The next step is to talk with a professional DEC forester or private sector forester for help in organizing these objectives into a management plan. Once you have a good idea of what you want (your objectives) you can begin tackling a variety of activities. Below are several activities that can be accomplished by most woodlot owners, and that you can pursue with different levels of equipment and energy.

Walking Into Your Woodlot

One activity that is a great for woodlot owners who are beginning to explore their property and think about forest management is to develop a trail system that gives you easy access. This is an important activity because trails allow for easier travel and thus allow the owners to see their property and think about what they might like to do next. Many private forest landowners comment that establishing a trail system was an important process to begin to manage their woodland.

The trail system can be as simple or elaborate as suits your needs. You can start from scratch or you can expand on an existing network already on your property. The history of your woodlot, your energy, your objectives, and your time will all influence the trails you establish. If your woodlot is fairly young, grew from an abandoned agricultural field, or has never been harvested, then you will likely need to start from scratch. Even if you previously had some logging done, and can use the existing trails, you may need to connect some trails to suit your needs. In any case, spend some time walking around to get a feel for the land and forest. Avoid wet areas, steep terrain, or other features that would make walking or cross country skiing difficult. Check with Cornell Cooperative Extension, DEC forester, or SWCD office for topography maps and aerial photographs that let you see the big picture. Depending on your preference, you might want to emphasize straight sections versus sections with curves. Once you have decided where the trail should be placed, you can flag the trail with plastic ribbon purchased at the hardware store or through a forestry supply company (it's called surveyor's flagging or tape).

Creating trails through your woodlot allows you to enjoy and easily access the forest.

Once flagged, the necessary trail width depends on your equipment and resources. You might decide to simply trim a few branches along the path. If you have a chainsaw and have taken part in a safety course then you might try a more aggressive clearing of the trail. If you are using portions of old logging trails, maybe you or your neighbor has a tractor and brush hog that can clear some of the brush or bramble more quickly. In any event, be careful and enjoy your improved access and new perspective.

In some situations you may be planning to harvest timber or firewood using a forester and logger. In this case, make sure you discuss with the forester and logger your interests in trails for hiking, skiing, bird watching or whatever, and ask to have this taken into account when the skid trails are being established. If the logger is being asked to do extra work then bid prices will likely be lower, but you can have a nice trail system established with little effort on your part. Make sure your forester also provides oversight on re-seeding the skid trails to stabilize soils and prevent erosion.

Improvement Cutting

Improvement cuts fall into a category of forest management known as intermediate cutting, or cutting that occurs during the middle stages of a forest's development. Improvement cuts are done for several possible reasons: (1) to change the mixture of species present by removing undesirable species you wish fewer of; (2) to change how your forest looks, for example you might wish to remove saplings in an area to improve visibility; (3) to improve forest health by removing diseased or dying trees; or (4) to improve growth by reducing competition by thinning the woodlot. You can obviously mix and match your approach, but do so only after reviewing your management objectives.

Selecting trees to remove can be difficult. The specific trees to remove depends on your objectives, but might include diseased trees, trees of poor form, trees with weak wood, or trees that block a view. It's always a good idea to speak with a DEC forester or a private sector forester for assistance. Explain your objectives and have them help you select some trees for removal. If you have a large woodlot and the trees are of moderate size (maybe 8 to 12 inches in diameter) then you might be able to sell some for firewood. Otherwise, you'll need to either hire some to complete the work or complete the work yourself with a chainsaw or by girdling the trees. If you sell firewood (or trade trees in your woodlot in return for firewood) contact a professional forester; there are potential and serious legal and financial pitfalls to be aware of and to avoid.

There's much more to learn about improvement cutting. Start with the chapter on thinning your woodlot.

Learn More by Seeing More

Finally, let me suggest that some of you may find improvements to your woodlot by participating in a Cornell Cooperative Extension volunteer program know as "Master Forest Owner/COVERTS volunteers". This is not for everyone, but if you would like some additional training in basic woodlot management skills and especially if you would like to volunteer your time to neighbors and friends interested in forest management, then this peer-counseling program might work for you.

Master Forest Owner volunteers are trained by Cornell University each Fall.

The Master Forest Owner (MFO) volunteer program is designed to provide private landowners with a "peer" they can talk to about forestry. MFO volunteers are not trained professionals and they cannot offer technical advice, but they own forest land, have

experienced many of the situations their neighbors are working through, and are good listeners who know what resources are available for assistance.

Often a landowner will call the local office of Cornell Cooperative Extension or DEC with a request for assistance with forestry, but they are not ready to meet with a professional DEC forester or private forester. The extension agent or DEC may suggest a free visit from a local MFO to walk through the woodlot. The MFO will see the property, hear the landowner's interests and objectives, and witness some of the things the landowner has been doing. Ultimately the MFO may encourage the landowner to seek a free visit from a DEC forester or perhaps some literature before the forester visits. In the end, the landowner has made a new friend and gotten some good direction and the MFO has also made a friend and learned more about his or her woodlot by walking through other woodlots.

So consider the MFO program. You might be interested in a free visit from a MFO volunteer, someone who has been in your shoes and worried the same worries. You might also be interested in becoming one of those volunteers, especially if you have been active on your property and have a keen interest in helping your community and fellow woodlot owners.

Action Steps – What to Do Next

1. Explicitly state your management objectives. If you have trouble thinking through all this, you might seek a visit from a MFO volunteer. Others may be ready for a free visit from a DEC forester who can help them with their objectives and perhaps a written management plan.

2. Get maps and aerial photographs of your woodlot. Seek assistance with your extension agent, DEC forester, or SWCD office. This will help you see what your land has to offer and help with planning.

3. Spend time in the woods walking around. Note that some sections of your woodlot may be good for some activities and in other areas you might focus on different things. Some objectives are compatible and others are mutually exclusive.

4. Get involved in landowner associations. In Central New York and throughout the state the New York Forest Owners Association (NYFOA) is a group of private forest landowners who share a common interest in managing their woodlands. They have a bimonthly publication, several chapters and related activities, and two annual meetings. Elsewhere in the state similar groups are available also, such as the Catskill Forest Association (CFA) or the Tug Hill Resource Investment for Tomorrow (THRIFT).

5. Finally, before you take any significant action, seek professional assistance from a DEC forester. DEC foresters will make a free visit to your property, they provide unbiased technical assistance, and can help you find answers to questions that will help you maximize the enjoyment you receive from your property.

Get involved with others forest owners by participating in woods walks, seminars, and other types of training. You'll learn how to be a good steward and will link with the network of other forest owners.

Section 1: A Context for Stewardship

1. Getting Started with Forest Stewardship

By Peter Smallidge

Whether your forest or woodlot is mixed among agricultural fields, part of a larger tract of forest, or on the edge of a suburban area, you share something similar with other forest owners who are interested in forestry -- you all had to start someplace. However, getting started can be a barrier for many people to fully enjoy their forest.

People own forests and woodlots for many different reasons and have an equal number of benefits they want to receive from their property. Knowing your reasons and desired benefits are your forest management objectives, a critical first step in getting started. Your objectives are the starting point in forestry because you can't know what you should do until you know what you want to do. Many people think of forest land as a place to produce timber, but many more benefits are also possible.

Practicing good forest stewardship has many benefits.

Actually, most forest owners have objectives that focus more on wildlife, recreation, and aesthetics than selling timber. If you jointly own your property, with your spouse or business partner, discuss your objectives so everyone has the same vision. If you aren't quite sure what your objectives are, then ask yourself some questions: Why do you own the land? What do you like about your land? What do you dislike? What are your needs in 5, 10 or 20 years? Not all of your forest land will necessarily have the same primary objective. One area may be a sugar bush while another area is devoted to wildlife or recreation. The answers to these questions and discussions with some of the people mentioned below will help you clarify your objectives. Having a clear sense, and ideally a written statement, of your objectives is important because your objectives should be the basis for all future activities on your property.

A good activity once you have started thinking about your objectives is to make a list of the people who are available to help you. These people can be divided into two groups, non-technical and technical. Non-technical assistance is provided through volunteers such as the Master Forest Owners who are trained by Cornell Cooperative Extension. Master Forest Owners, or MFOs, are forest owners like you who have an interest and commitment to helping other forest owners get started. They have a wealth of experience from their property and those of other forest owners they have met, and can help give you some ideas. They are also familiar with the people and publications that can help you make a final decision. Additional non-technical assistance is available through groups such as the New York Forest Owners Association or the Catskill Forest Association. These are groups of forest owners who are interested in issues related to owning forest land in New York. Both groups have regular publications and other activities where you can pursue forestry issues important to your woodlot. Your local office of Cornell

Cooperative Extension can help you find a MFO in your neighborhood and they or the Department of Environmental Conservation can help you find the forest owner associations.

Technical assistance is also readily available throughout New York. For general information of forest and woodlot management contact your local office of Cornell Cooperative Extension. They have publications and bulletins with information on a variety of subjects such as tree identification, wildlife habitat, and forest owner planning. Cornell Cooperative Extension will also know of upcoming forest owner workshops that may be of interest to you. If you are interested in aerial photographs, topographic maps, or soils information you should check with you local Soil and Water Conservation District. Finally, for professional forestry advice you should contact your local New York Department of Environmental Conservation (NYDEC) office. The DEC has professional foresters who will visit with you on your property for free to discuss your forest management options. An earlier visit from a MFO may help give you some ideas and questions for the DEC forester. The DEC foresters will have information on cost-share programs and the New York Forest Tax Law. Finally, if you decide to contact a private forester, the DEC forester has a list for your county.

The next thing you will likely want to do, if you haven't already, is to become familiar with your property. Look over the maps and photos you received from your Soil and Water Conservation District. Walk through the woods on some of the old trails and woods roads that may exist. Walk the boundary lines and make sure they are evident so others don't mistake some of your trees for their own. Spend some time talking with those who own the adjacent property. Your neighbors may know something of the history of the area, the history of your forest, and perhaps the previous owner. Ideally you would mutually agree to inform each other of logging activities so there are no surprises.

Once you have started getting more familiar with your property you should work with your DEC forester or a private forester to write a forest management plan. Plan writing is a team effort with your forester, but as the owner you are the final decision maker for what happens on your forest. A written management plan will offer many benefits, including a statement of your objectives, a description of your property, the condition of the forest, the potential benefits you can expect from your forest, streams and soils, unique features, and the types of wildlife habitat that exist. The plan will also let you decide a schedule of activities that are consistent with your objectives. A plan isn't necessarily a complex document, and there may be cost-share money available to offset the cost so check with your DEC forester.

These ideas will hopefully help you get started in the right direction with the management of your forest or woodlot. There are many benefits you can enjoy from your woodlot, and getting started correctly will ensure you can realize all those benefits. Participating in forestry is the fun part, so enjoy the process!

Non-Technical Forest Management Assistance	Technical Forest Management Assistance
Master Forest Owners (MFO)	New York Department of Environmental Conservation Forester (DEC)
New York Forest Owners Association (NYFOA)	Private Sector Foresters
Catskill Forest Association (CFA)	

2. This Thing Called Forest Management - Does it Really Differ from Gardening?

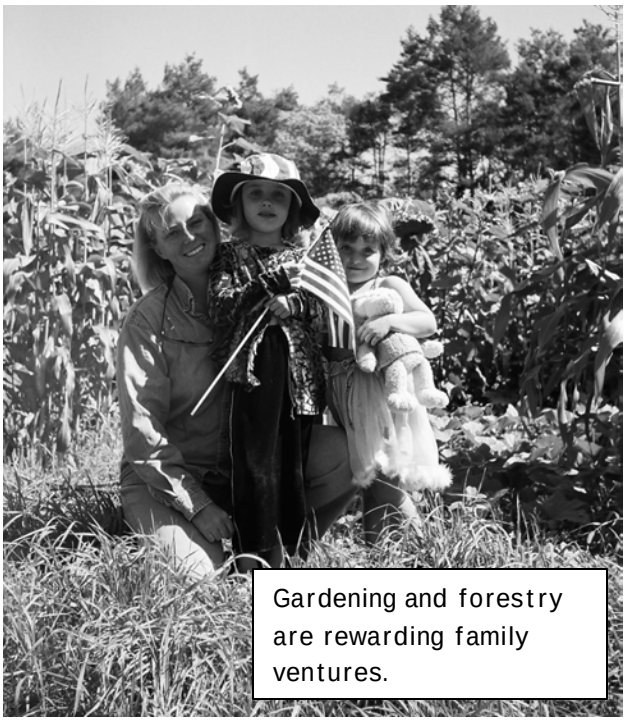
By Peter Smallidge

New York is over 60% forested, and many people have noticed the growing activity associated with forestry and forest management. We think about the importance of forestry, for local economies and environmental concerns. While many people are interested in forest management, most do not realize exactly what is involved nor how it relates to other familiar activities.

Let's start by characterizing forest management as a process focused on the care and tending of forest vegetation, water quality, and the associated wildlife communities. This begins by recognizing landowner's objectives, identifying plans for short- and long-term accomplishments, and includes ample consultation with qualified professionals. This process necessitates decision making about how to accomplish objectives within the numerous constraints of economics, soil suitability, and the surrounding forest areas. As such, forestry and forest management involve many of the same considerations as gardening. But, as you will see, they also differ.

Gardening is truly a rewarding experience. This applies to all types of gardens, from vegetable gardens to flower gardens and butterfly gardens. You spend considerable time during the year thinking about the steps you must take to establish your garden. You think about the crops you want to produce, how each plant can be arranged in your garden to allow for it best growth and development, and the fertility of your soils. Towards the end of the summer, you start thinking about the timing of harvests to collect your produce before frost. At times, you may also have to deal with other factors such as insect pests, weeds, and disease. The planning you complete for your garden is, in many respects, similar to forest management planning.

Forest management is also a truly rewarding experience. Forestry requires you spend time planning, thinking, and decision making. Like gardens, properly managed forests are capable of producing numerous benefits - all from the same acre of ground. Efforts to use forests to attain multiple objectives, such as wildlife, water quality, recreational opportunities, aesthetic qualities, soil fertility, and timber production are known as forest stewardship. Historically, forests were seen only for their timber production value, but this is no longer



Gardening and forestry are rewarding family ventures.

consistent with our understanding of forest stewardship.

The activities and rewards you enjoy from your forest are numerous, but the first step requires you recognize your objectives. A forester, or a Cornell Cooperative Extension volunteer such as a Master Forest Owner, can help you think through your objectives. If you want only to enjoy the solitude of walks through your forest, then your objectives and planning will differ substantially from someone who enjoys bird watching, turkey hunting, and revenue from an occasional well-planned timber harvest that helps pay property taxes.

Forests, like gardens, need to be thinned to allow for optimal growth of the healthiest plants. Here, a crop tree is selected and trees inhibiting its crown are cut. The crown of the crop tree is now freed, allowing for increased growth.

Just like garden plots, forest stands, or areas of forest having similar characteristics, are capable of producing renewable crops. However, different from gardens, forest "crops" can be much more varied, and produce throughout the year (think about cross-country skiing in December, maple syrup in the spring, and the beautiful fall foliage) when managed with a stewardship ethic. Many of these crops are never really harvested or removed, others can be harvested every year, while some, like timber, may be harvested only infrequently - ranging from every few years to several decades depending on your management plan.

In gardens, you must plan ahead, arranging your plants to ensure your corn does not shade your tomatoes and that your carrots have sufficient room to expand. Similarly, in forests, trees need adequate resources to allow for adequate growth. The way that trees are arranged in your forest partially determines the type and abundance of the crops and benefits you can enjoy. Forests that are thick and crowded may be suitable for some types of wildlife, while forests that have been thinned may suit other types of wildlife plus your needs for timber production and/or large-crowned sugapr maple that provides you with brilliant orange fall foliage and abundant sap production.

With gardens, you have the opportunity to test the soil for its nutrient levels, and provide additives like fertilizer or compost to compensate for deficiencies. By amending the soil in gardens, we can grow plants that would otherwise not survive.

We can test forest soils, but due to their greater extent and the economics of investing in

a crop that may be decades from realizing a return, soil amendments are less commonly used. Rather, foresters are trained to match tree and shrub species with the appropriate soil types. For example, oaks may be best suited for droughty soils, cottonwood on stream banks, sugar maple and white ash on well-drained fertile loams, and Norway spruce on heavy or clay soils that are less well drained. Also, while many gardening "mistakes" can be corrected the following year, "mistakes" in forestry may take decades to correct; this gives all the more reason to work with a professional forester.

In the past, many of us have seen or been involved in the harvesting of numerous crops from our gardens. Gardens are typically harvested on an annual rotation. This cycle is based on the developmental stages and physiology of garden plants. Similarly with forests, many of us have seen either the harvesting of a forest or logs on trucks bound for the mill. Your garden looks quite different following the removal of your vegetables, and forests look quite different after trees have been removed. In both gardens and forests, we harvest crops knowing that we depend on plants for food, shelter, and numerous other qualities. Think about the quality of our lives if we didn't have tomatoes, potatoes, green peppers, black cherry, sugar maple, or white pine. We can appreciate the harvesting of gardens and forests knowing that we will replace or regenerate them in the next growing season. For forests, the changes following harvests will also benefit an entirely new suite of wildlife species not found in mature forests. Just as our gardens, our forests can be harvested and regenerated to produce the future crops and benefits we desire.

Forest management is similar in many respects to gardening, but because of the size of forests and the duration we manage them, our strategies are different. Forests are a wonderful renewable resource; some need to be preserved but others need to be professionally managed so we can all enjoy their many benefits.

Where farm meets forest. Forestry, agriculture, and gardening share many similar concerns. All require planning and all provide numerous benefits. Photo courtesy of J. Ward.

3. New York's Forests – Then and Now

By Peter Smallidge

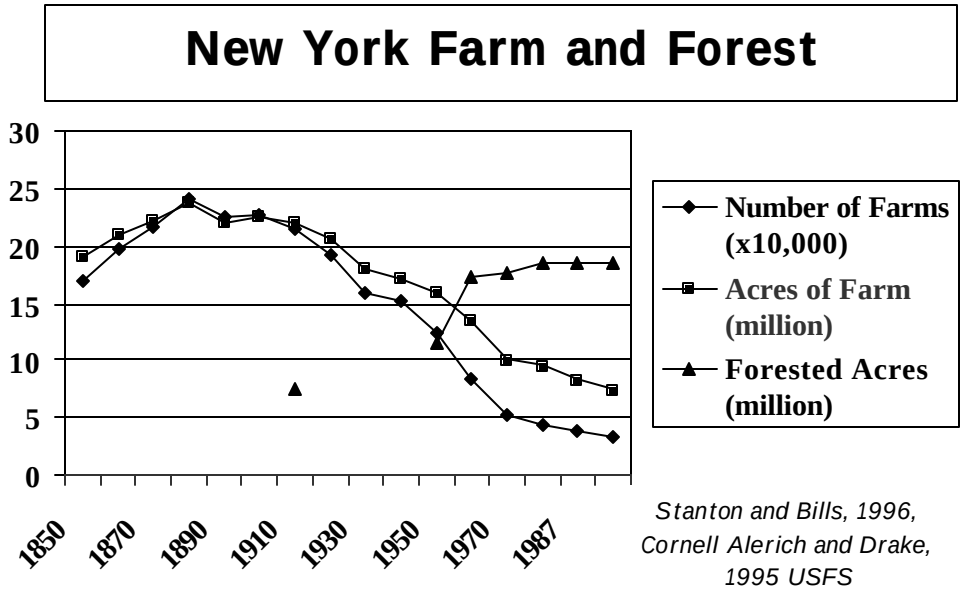
Forests and private forest owners dominate the New York landscape. The forests are beautiful, but different from one corner of the state to another. As interesting is the way New York forests change from north to south and east to west, and the varied history of our forested landscape. By understanding the characteristics of our current forests and how the forest has changed to arrive at its current condition, we can better understand what the forest can provide and how it must be tended.

New York was predominately forested at the time of European colonization. The nonforested areas of our landscape existed as open meadows, pine barrens, lakes, and nonforested wetlands; nonforested areas resulting from soil or topographic features or opened due to a recent disturbance. Our best records suggest that New York forests in the late 1700's and early 1800's were dominated predominately by red spruce and balsam fir at the highest elevations, sugar maple, American beech, and yellow birch on good soils, and oaks, hickory, and American chestnut on the drier and warmer sites. White ash occurred as scattered, infrequent trees mixed with other species on fertile soils. Black cherry occurred on a wide range of sites. Certainly other species occurred, approximately 60 tree species in various areas of the state.

As colonists spread across New York shortly after the Revolutionary War, they cleared land in small patches for subsistence farming. As today, agriculture was important to the early colonists of New York, and as the population grew so did the acres being cropped and grazed. Then as now, New Yorkers used the forest land as sources of lumber and other forest products and as habitat for wildlife, but the early citizens went to great lengths to clear the land of forests as demands increased for agricultural crops.

By late in the 1800's, most of the lands outside of the Adirondacks were being farmed or had been farmed during the previous century. Agriculture continued to dominate the New York landscape, covering 75% (22.6 million acres) of the state. However, many farms were located on soils limited in suitability for agriculture. Beginning in the 1890's, the amount of land in agriculture began to decline and over the next several decades the abandonment of agricultural land peaked and waned depending on a variety of circumstances. On most lands not suitable to remain in agriculture or be used for development, the forest began its return. The early success-ional maples, ash, and aspen with light-weight seeds blew onto agricultural fields starting many of the forests that now cover our state.

By the 1990's, agricultural lands in New York declined from about 75% to 25%



Stanton and Bills, 1996, Cornell Alerich and Drake, 1995 USFS

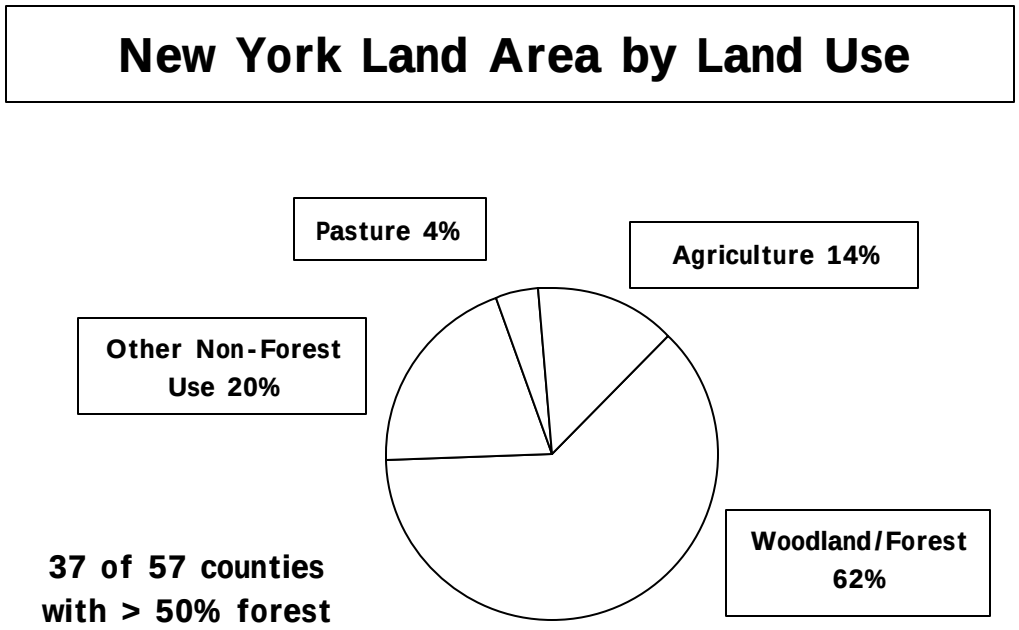
with large shifts in acreage from farm to forest. As the forests developed, many species of wildlife expanded their populations into the newly created habitat. Other species, such as the ring-neck pheasant, were introduced to use the grass and shrub habitats that covered the state. The State Conservation Department (now Department of Environmental Conservation) and the Civilian Conservation Corps (CCC) planted red pine, Norway spruce, and eastern white pine to reforest the state, stabilize soils, and reduce erosion. The forests grew, changing from seedlings mixed among grasses and golden rod to saplings and by 1953 52% of the forests (6.6 million acres, about one-fifth of the state) were classified as seedling or sapling sized forest and almost 20% (2.3 million acres) of the forests were "pole" sized (trees between 6 and 11 inches in diameter at 4.5 ft above ground). In 1953, 30% (3.8 million acres) of the forests were classified as sawtimber (greater than 12 inches in diameter).

You can imagine that the change in the character of the forest was not constant across the state. Areas that seeded into the faster growing but shorter-lived aspen reached pole size sooner, and areas that seeded to sugar maple were slower to reach pole size. Trees in other areas, particularly those having poor soils may not have grown so quickly or as tall. Thus, our forests have a fairly similar "birth date," but differ depending on the first species to invade and survive and the rate they grew. The forests that started from field have changed through time, some of the early invaders have died, leaving an opening filled either by the leafy crowns of their neighbors or by seeds and then seedlings from surrounding areas. Many forests around the state are between 60 and 90 years old, ages that reflect the changing land use and history of disturbances.

A common feature of many forests, a result of them originating at the same time in a given area, is that they are even-aged. Even-aged is a term used by foresters to reflect that even though the forest can have trees of different sizes; all trees are approximately the same age. This feature is both interesting and useful. It is interesting that trees of very different sizes (I have seen trees 4 inches in diameter the same age as trees 10 inches in diameter) are about the same age. It is useful because it helps us understand how to manage the forests. The larger trees are those species or individual trees (due to genetics) able to grow quickly. If we try to manage our even-aged forests by cutting only the largest trees, we remove the genetically best and fastest growing species. We leave behind the"runts of the tree world" that may not be able to utilize the increased soil

and light resources available following a timber harvest.

Our forests today are beautiful, abundant, and productive. Other than the virtual loss of American chestnut by the chestnut blight (caused by the fungal pathogen *Cryphonectria parasitica*), we have all the species present in the 1700's plus a few introduced species -- some of which we would be better off without. Our state is 62% forested, 18.6 million acres of our 30 million total acres. Currently, 53% of the forests are sawtimber, 30% are pole-sized, and 17% are seedling or sapling sized. In a state where agriculture once dominated, now only 7 counties have greater than 50% of their land devoted to agriculture. Twenty-five counties have between 50 and 75% of their land as forest, and 10 counties have greater than 75% forest land. Other than the New York metropolitan area, all counties have greater than 25% forest land. The 8 most abundant tree species (in decreasing order) are sugar maple, red maple, eastern hemlock, eastern white pine, white ash, American beech, northern red oak, and black cherry. A recent economic analysis indicates that the companies that comprise the forest industry employ over 60,000 people, account for 5.6 percent of the state's total manufacturing, and directly contribute $4.6 billion to New York's Gross State Product.



4. From Field to Forest

By Peter Smallidge

New York has an abundance of forest. As you read in the previous chapter, however, the landscape was dominated by agricultural fields in recent decades. The process of field to forest is an interesting story and can help us understand strategies for managing our woodlands that increase their value for timber and wildlife.

The succession of Cornell University's Arnot Forest over 30 years after a chemical wood harvest. Pictures courtesy of USFS Warren, PA.

In the late 1800's, over 75% of New York was in farms, now New York has over 18 million acres of forest land, about 62% of the land area. As farms were abandoned, many acres began the succession from field to forest - a process typically characterized by a series of four stages. In many respects, these stages are similar to those that follow even-aged forest management, such as clearcutting. A variety of labels are used to describe these stages, but commonly they are known as: forest establishment, self-thinning, transition, and mature.

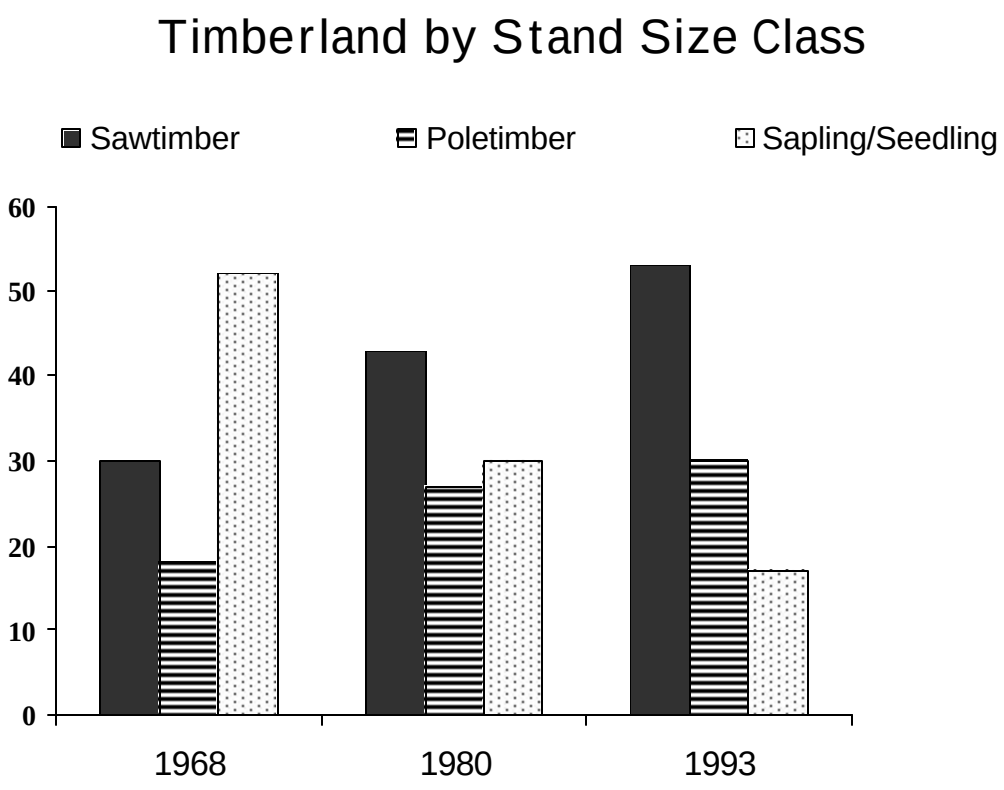
The forest establishment stage starts when land is abandoned after clearing, either by agriculture or harvesting. The first plants established are those that arrive by wind blown seed or other means, can survive in the conditions present, and can grow quickly. The first trees that often colonize an area include aspen, white ash, and sugar maple. The trees that can survive the first few years are adapted to grow quickly and fill the area. Usually within a few years, the area is full of trees and other plants are excluded. In other situations, perhaps where there was extensive erosion, or few mature trees nearby to provide seed, the process may take a much longer time period. Once the area is filled with saplings with overlapping crowns, the stage of forest establishment ends and the self-thinning stage begins.

The self-thinning stage is characterized by intense competition among the trees for resources. These include sunlight, water, and

nutrients in the soil. The species able to grow the fastest will dominate. The slower species either die or persist with slowed growth. During this stage, the density of trees (number of stems per acre) is higher than at any other point. When the forest canopy closes, most understory plants, such as raspberry, die and leave a vacant understory. During this stage, the weaker trees and weaker species die and the forest begins to thin itself. Mortality is highest during this stage of forest succession. It's also during this stage when the lower branches of most trees begin to die and leave behind clear stems. During the end of this stage, the fastest growing trees and the fastest growing species have grown taller than other trees. As weaker trees die they leave openings in the canopy that allow light to enter and an understory to develop. Keep in mind that all trees are approximately the same age, but may vary greatly in height and diameter depending on how they have responded to their environment. Depending on the soil characteristics and tree species present, at the end of the self-thinning stage the average tree diameter may be somewhere between 8 and 12 inches.

Before describing the characteristics of the transition stage, it's worth noting how we can use our knowledge of forest succession to help in forest management. Early in the self-thinning stage, the trees may only be a few inches in diameter and many hundred per acre. These are often too small and too numerous to justify intensive management. However, as the trees grow larger, and the best trees are distinguished from the poorer trees, the best trees can be favored as "crop trees" by thinning around them and increasing their access to soil resources and sunlight. This is also a time to start removing diseased and poor quality trees before they

Figure 1. Distribution of forest stand size-classes during the three most recent US Forest Service inventories. Source, USDA Forest Service Resource Bulletin NE – 132. 1995.



spread pathogens to other trees and before they produce seed. For timber management, the best trees should be retained during these early stages for greater value and to maintain a source of good quality seed for future forests.

The transition stage is characterized by increased variety in the forest. Some species that have a short lifespan, like aspen and pin cherry, may start to die and leave behind small gaps in the forest canopy. These gaps provide increased sunlight and soil resources. Some new tree species can become established. Others, like American beech and sugar maple, may be present as saplings and if located near the gap can utilize the resources made available. In addition to the gaps created by tree deaths, some trees continue to grow more quickly than others in both height and diameter. Together with the gaps, the forest now begins to develop different layers of vegetation. Some wildlife species, like ruffed grouse that prefers thick stands during the establishment and self-thinning stages may be replaced by species such as the wood thrush that prefers multiple layers of vegetation.

Canopy opening in a transition forest

As the forest develops into the transition stage, many trees reach a point where they have commercial value (about 12 inches in diameter for many hardwoods). Some forest owners feel a strong urge to begin selling timber at this point. However, by removing the biggest trees, many future options are sacrificed. When trees reach a commercial size, they have just reached the point when they can begin to accumulate large quantities of wood. These trees, perhaps 50 to 70 years old, if released from competition of neighboring trees will increase substantially in size and value in the next several years. On good soils with good species, a tree may increase 2 inches in diameter in 10 years. Larger trees are worth more than smaller trees because they have more volume (measured as board feet), but also because they are more economical to harvest and process and are more likely to be of higher quality. These larger trees, about the same age as the smaller trees, are a critical source of seed for the next forest. For those interested in the production of high quality timber, this stage is important for concentrating the growth on the best quality trees by removing the inferior quality trees. Too often, the best trees are removed as soon as possible, and the quality of the stand is degraded while future options are lost.

The final stage of forest succession is that of the mature forest. In the mature forest, there are trees of all sizes. If left unharvested, the largest trees (and many smaller trees) would die and either remain standing or they would fall and remove other neighboring trees. This would create large gaps in the canopy that would cycle through the same successional sequence but on a smaller scale. For those interested in harvesting timber, this stage also provides abundant opportunities for income and habitat creation for wildlife. With the aid of a professional forester, qualified logger, and after writing your forest management plan, you can select trees as single stems, small groups, or large patches to create a variety of conditions that allow for the rapid, healthy, and sustainable regrowth of the next forest.

5. What is Sustainable Forestry?

By Peter Smallidge

While many organizations and agencies have defined sustainable forestry to emphasize their desired attributes, all definitions share the essential elements of striving to ensure that the forest resources (with "resources" broadly defined) we as a society enjoy today are available for use now and in the future. Understanding the intricacy of this long-term availability requires an understanding of a number of factors that together make the fabric of sustainable forestry discussions. Foresters, loggers, and landowners have long had the capacity to maintain the productivity of the forest for current and future needs. Historically, the extent to which sustainable forestry was practiced depended on a complex inter-mingling of factors, such as owner attitudes and needs, work force potential, market or regulatory forces, governmental incentives, and local or regional input. These factors remain important, and stakeholders are increasingly recognizing the need to address all aspects of sustainable forestry and not a simplified subset of the issues.

Sustainable forestry manages forests for the present and the future.

What do we sustain?

People usually think first about sustaining the value of the forest that is most important to them. This might be the value of hardwood timber or softwood fiber growing, it might be the diversity of native species present, it might be recreational opportunities provided in the region, or it might be the socio-economic culture that has developed around a local wood using industry. Sustainable forestry addresses all the resources provided by the forest. Someone probably advised you at some point to "not burn your bridges", and this advice is at the heart of sustainable forestry where you strive to retain current options into the future. Retention for the future includes the option for timber or fiber production, the option for certain species or a variety of species, the option for jobs, the option for clean water, the option for recreational resources, and the option for aesthetic qualities. Because forests change, measures of sustainability emphasize the need to keep viable all the options and opportunities and de-emphasize specific qualities of the forest on a specific acre.

Does sustainability happen on every acre?

Sustainable forestry can happen on every acre, but every acre managed under sustainable forestry won't look the same. Part of the explanation for this is the dynamic nature of forests. As forests mature, a landowner's decision to manage the forest and extract certain resources may change the way the forest looks. In addition to extractions there are also occasions for inputs or investments. Extraction often includes timber or pulpwood harvesting that will remove some or all stems from an area as part of a silvicultural prescription. As juvenile forests grow into maturity, investments are often appropriate to ensure the forest produces the desired levels of resources. Sometimes this will include pruning for high-quality hardwoods, trail building for

recreational access, thinning to create specific forest structures, thinning for optimal timber production, or habitat enhancements to stabilize or expand desired wildlife populations. Change is often viewed with resistance, but we know with certainty forests will change even if we don't take any action. A reasonable goal then is to use management activities in appropriate areas and at appropriate times to ensure we retain all our options while producing our desired resources.

Who must be involved in sustainable forestry?

The short answer is everyone. If you recall the factors that influence sustainable forestry, then you can start to generate a list of people, organizations, and agencies that affect the way our forests are managed. Quickly you see that sustainable forestry starts with the landowner and moves through everyone who enjoys the

outputs of forests, such as clean water, and everyone who buys forest products, such as paper. Thus, everyone is affected by the way our forests are managed.

The direct or first tier of decision makers usually involves a forest owner, forester, and logger. The landowner defines the management objectives, the forester prescribes activities that help the forest owner achieve the ownership objective, and the logger implements the prescribed activities. The decisions made by the landowner and the recommendations and practices applied by the forester and logger reflect a second tier of influence. The second tier is more complex and intertwined. Tier two includes the educational institutions available to practitioners and stakeholders, the markets where forest products are sold, the attitudes of owner and family, the local and regional culture about forestry practices, governmental regulations or incentives that affect which and how forest management practices can be applied, and governmental regulations and incentives that affect business practices. The United States holds a belief system in the rights of private property owners that differs from attitudes in other countries that embrace a more significant role of the community in deciding the desired actions on private lands. Even so, the variety of people and stakeholders who influence the social, economic, and political climate around forestry can have a substantial influence on if and how it is practiced.

How do we know if sustainable forestry is happening?

Knowing if sustainable forestry is happening on the ground depends on knowing the condition of the forest and the forest community, the plan for managing the forest, and an acceptable standard of what the forest should look like under sustainable forestry practices. Recognition of these three components is the starting point. Ultimately though, certification of sustainable forestry practices is usually sought through a group that provides or authorizes reviewers. Knowledge of the reviewer and their process permits others a known level of confidence in how thoroughly sustainable forestry practices

were achieved. These three components, together with verification, provide a logical arrangement of information, but the devil is in the details, and different systems view these components in different ways.

Describing the condition of the forest and forest community involves data collection by approved techniques to document the character of the forest, features and habitats of the forest, management policies of the owner/manager, economic and cultural characteristics of the local community, and the political climate of the management area. Traditionally, foresters would focus their data collection just on the characteristics of the forest, but with sustainable forestry data collection now often include input from wildlife biologists, sociologists, community economic development, and other stakeholders.

The plan for managing the forest will necessarily include a broader array of features than were found in more traditional forest management plans. In addition to characterizing forest and wildlife habitats, the sustainable forestry plan may also address, for example, health and safety for forest workers, education programs for practitioners, landscape-level awareness of unique species or habitat, or local/state ordinances that affect certain forestry practices.

The "look" of a sustainably managed forest is more difficult to define. As a basis for considering the criteria of sustainability we must first reject the human tendency to equate visual appeal with the sustainability of ecological or biological health. The experiences that shaped our attitudes of "what's pretty" have no bearing on the health, productivity, or sustainability of the forest. While the visual impacts of forestry practices are a component of sustainability, they should not drive the evaluation.

What then defines success in sustainability? The organizations that endorse and validate sustainability each have their own set of criteria to evaluate properties, owners, or managers on their efforts. Because each forest is different, and thus functions somewhat differently, the criteria include a combination of forest characteristics like biodiversity or forest productivity plus the processes to manage sustainably. The process might include how to measure and inventory soils, vegetation, and insect; the involvement of owners or principles in stakeholder groups; or how to document the acceptable level of change, at a property or landscape scale, in a species that will respond to changes in a forest habitat through time.

Sustainable forestry is a valuable tool and management posture to help ensure we retain for the future the forest resource opportunities we have today. The debate on sustainable forestry is intense, yet those involved usually share a common sense of the value and beauty of the forest.

Clean water and forest products are just two of the many resources provided through sustainable forestry.

6. The Benefits of Forestry Add Value to Your Woodlot

By Peter Smallidge

We all hear how much busier we are currently than in years gone by; so how can you justify the time and energy required to deliberately manage your forest or woodlot? Quite simply, deliberate forest management, versus opportunistic forestry, will increase the benefits and enjoyment you receive from your forest or woodlot.

There are numerous benefits associated with deliberately managing your forest, but they can be lumped into a few groups that include increased revenue and reduced costs, greater recreational opportunities, better control over environmental and forest quality, and improved wildlife habitat. Because you plan for these benefits, know when and where they will arrive, and in what quantity, you are able to take advantage of the opportunities they provide. Also, deliberate forest management provides benefits to your community, such as good water quality, forest cover for wildlife, and a supply of high quality sawtimber. You will want to discuss your desired benefits with a Master Forest Owner volunteer, and work towards them with a professional forester from the DEC or a private consulting forester. Here I give a glimpse of what you might expect.

Increased Revenue and Reduced Costs

Quite often the activities that occur in woodlots are driven by economic considerations. While there is nothing inherently wrong with this, you as a forest owner will want to consider all your options. A timber harvest can provide you with a great deal of money. By carefully selecting and then working with a professional forester, you will know the market value of your timber, gauge the seasonal fluctuations of market prices, remove trees that improve the long-term quality of the forest, and select a certified logger, all of which increases your short and long term revenues. Without planning for a harvest, you might respond to an opportunity to sell timber, yet you probably don't know the current market value of the trees or how to arrange the sale contract with the certified logger to ensure the long term productivity of your forest.

Deliberate forest management can also reduce the costs of doing business. The planning and inspection of your forested property is an example. During the planning and inspection stage, you will undoubtedly have the opportunity to walk the boundaries of your property. Make certain your property lines are clearly marked to help prevent the accidental removal of timber during a timber sale on the adjacent property. And in the event the removal is not accidental, but rather timber theft, the marked property lines will help establish the validity of your claims. Timber theft is a cost you probably want to reduce.

Deliberate forest planning and management can add value to your woodlands.

Recreational Opportunities

Aside from the "in your pocket" values and benefits such as timber harvesting and reducing costs, there are numerous other values or amenities available from your forest. While these might not help you pay your taxes, they make that burden easier because of your fond forest memories. Recreation is one of these amenities, and a primary reason many people own forests. Access is an important part of recreation. Because of the long history of land use in New York (for agriculture and forestry), there may already be access roads on your property. However, inspect the roads to see where they take you and their condition. For example, old

Access roads provide for a primary recreational pursuit – walking in the woods.

farm roads may connect former fields together, but may not take you to your favorite bird watching location, provide a long enough cross country ski trail, or take you to your deer stand. Alternatively, your access roads may have regrown with trees. In either case, you can work with your professional forester to plan and layout access to your property. Road costs vary with terrain and length, but much of the costs may be offset if you coordinate road building with a timber harvest. Make certain your forester knows of your recreational interests to design the road system for ease of use and subsequent maintenance.

Environmental and Forest Quality

The art and science of growing trees and managing forests is by nature (no pun intended) a long-term commitment. Forest management is also somewhat utilitarian, providing goods and services we all depend on for our survival and comfort, but necessarily assumes that utilization does not reduce the land's long-term productivity. Deliberate forest management helps ensure the sustainability of future benefits from forests, and the quality of the forest environment. With the New York landscape dominated by forest cover, many forested watersheds provide water to our cities and to other states. Deliberately planning for the continued maintenance of water quality while enjoying numerous other benefits, is one example of the compatibility of forest use and sustainability.

The quality of the forest, particularly following a timber harvest, is an important consideration of deliberate forestry. This consideration includes the quality of the road system and minimizing damage to the trees you hope to harvest in the future (this is the residual stand) including tree seedlings that were planted or naturally established. Certainly your forest will look different following a harvest, but deliberate planning with your forester to select a skilled and trained logger will increase the long-term benefits you receive and add value to your forest.

Improved Wildlife Habitat

Deliberately managing forests or woodlots for wildlife is one of the most common owner objectives, and is particularly gratifying because a little work can produce great benefits. Wildlife require food, cover, water, and space (collectively known as habitat), with different species of wildlife requiring different amounts and types of habitat. Everything you do (and don't do)

impacts wildlife habitat. The potential wildlife benefits you receive will be greater if you and your forester plan for wildlife habitat based on what is currently available in your woodlot and in all the woodlots in your region. For example, ruffed grouse and chestnut-sided warblers will respond favorably to recent clear cuts in your woodlot, whereas Barred owls and pileated woodpeckers will respond favorably to large areas that retain some large mature trees. If the woodlots and forests in your region are mostly mature, you may want to increase the amount of young forest on your property and discuss this strategy with your neighbors. Also, if you have a stream in your region, you and your neighbors may want to maintain extra forest cover on both stream sides to maintain water quality and provide a forested corridor that some wildlife species need for traveling.

The opportunity for benefits and increased value of your forest are numerous. Careful and deliberate planning and management will cushion your wallet and increase your pleasures now and in the future.

Deer hunters who focus on female deer can improve the health of the forest and the health of the herd.

7. Linking Forest Management to Water Quality

By Peter Smallidge and Rebecca Schneider

Forests dominate our rural, suburban, and even our urban landscapes. People value forests for the diverse benefits they provide. These benefits range from the immediate pleasure of cutting your own firewood for exercise or providing habitat to enhance wildlife viewing. They also extend to the less obvious advantages of helping to maintain clear, clean water and a vibrant segment of the economy through the forest industry.

Most benefits are mutually compatible. Indeed, many people benefit from water, air, and wildlife provided by forests without being aware of the presence of the forests themselves. A driving objective for managing both healthy forests and thus maintaining a healthy water supply is to ensure that the ecological and economic benefits of forests are sustained. Forestry practices are low on the list of water quality threats, and we all benefit by retaining this low negative impact.

How then can land managers and community leaders work with forest stakeholders to retain these valued qualities? Good forest management is a key for water quality and ensuring sustainability of New York's forests. By understanding forestry differences among the New York Forest Owners Association (NYFOA) chapters, the variety of forestry stakeholders and their issues, and considering some solutions we gain a start on ensuring the positive role of forestry in water quality. We hope this will provide a context to understand forest and watershed management issues and thus will spark awareness and dialogue.

Regional Forests in a Statewide Context

We know that forests are a dominant landscape feature statewide, so it's worth assessing their role in the context of NYFOA chapters. The chapters are county-based, but most relate to a distinct population center and / or watershed. NYFOA members can use this information to help in building local awareness for the need of forestry. At least four issues link forests to regional watershed: their economic contribution; what's required for good forest management; the forest stakeholders and their issues, and solutions to help ensure the harmony between healthy managed forests and high water quality.

Forests as a Key Landscape Feature

Although New York is a forested state, to what extent are these forests distributed across the state? We know that forests provide more than economic benefits, but those benefits are most easily quantified to characterize a region and the importance of its forests. NYFOA chapters cover NY, and 7 of the 10 chapter districts with data are dominated by forests

(Table 1). Forest industry payroll in these chapters average more than $100,000,000. This payroll is spread among an average of 230+ forest industries per chapter, but the actual numbers range from less than 50 in the Southern Finger Lakes chapter to more than 1000 in the Lower Hudson/NYC region. Farms are equally important to NY, and woodlots are quite common to farms in all but one chapter. Statewide more than 60% of farms have a woodlot and those woodlots average 20% of the farm acreage. Maple syrup producers each year sell more than $5 million of syrup and related products. Although more difficult to value, consider also the value of the clear, clean water provided by well-managed forests. Everyone who reads this article will, sometime today, use water that originated within a forested watershed. Clearly, forests are ecologically and economically important to the region. We can't ignore what forests offer to the state nor their connection to water quality.

What is Forest Management?

Many different images come to mind when you think of forest management. Often people think of timber harvesting, but this is a tool within forest management. Forest management is a process to manipulate a forest to achieve some desired and explicit end goal. Planting trees, making trails, enhancing wildlife habitat, and cutting trees are examples of active manipulations, whereas passive management lets nature take its course.

A foundation of good forest management is the need to match the management activity with a landowner's objectives. This same rule applies whether the land is owned publicly or privately. Thus, the first step of forest management is for landowners to explicitly state what they hope to achieve and receive from their forested property. For private landowners, the management goals will typically reflect what people like about their property and why they retain it rather than selling it. Overlaid on our decisions for action or inaction is the reality that forests are dynamic; actions are limited in duration and doing nothing will still result in changes through time. Therefore deliberate inactivity is a reasonable part of forest management if the objective is to achieve or maintain a late successional forest.

Forestry affects water quality through soil disturbances that allow water and soil mixtures to pass unfiltered from forests into streams and ponds. Forestry also affects water quality and quantity by changing the number, vigor, and arrangement of trees on each acre. Forestry practices can be applied to reduce or eliminate the passage of soil into streams and ponds and appropriate practices will maintain healthy, vigorous and productive forests that stabilize ecologic and economic functions of watersheds.

Good forest management in watersheds provides cities and towns with clean water.

Forestry Stakeholders - Issues and Solutions

Every citizen of New York is a stakeholder of the forest. Everyone benefits from the aesthetic qualities of forested hillsides, clean water from streams that originated in woodlands, and from viewing wildlife that use young or old forests as habitat. However it is more practical to identify specific groups that we need to work with and we can generally group most New York citizens into one of three key stakeholder groups.

Thinking back to our original question of how to sustain healthy forests, let's focus our attention here on issues of these stakeholders. These are neither comprehensive lists of issues nor are all issues relevant or of equal importance to all stakeholders. Once recognizing some of the stakeholder issues, we can address the actions to take locally and statewide to resolve the pressing issues.

Private forest landowners

Private forest landowners are many and varied. Statewide, approximately half own less than 10 acres of forest land, and as such have different needs and concerns than forest owners with 50 or 500 acre parcels. The issues confronting landowners though, irrespective of property size, often come down to (1) tax rates on lands that benefits both owners and local communities; (2) willingness and ability to take action; (3) education to make informed decisions; (4) costs to implement non-commercial management activities; (5) landowner liability; and (6) finding a qualified professional to assist with management. These are issues because they either reduce the ability of a landowner to bear the cost of ownership or they reduce the owner's satisfaction in being a forest landowner. Either way, if barriers result in parcelization or changes in land use, the consequence can be reduced water quality or the capacity of the land to provide high quality water.

At least four strategies provide solutions to some or all of these issues. One powerful strategy is the use of educational programs to increase awareness of opportunities and the potential for changed behavior. We use education through numerous venues with various partners, from fact sheets and publications to web pages and satellite videoconferencing. Two more strategies are tax or cost-share incentives. Although the availability of these incentives are determined at the government level, landowners benefit by knowing when and how to make use of this incentive. Cost-share incentives are intended to enhance a stewardship attitude among landowners and may result in additional management practices. Finally, conservation easements through various organizations and agencies provide a tool to help landowners ensure the stability of their property and/or receive assistance in the cost of ownership.

Loggers, foresters, and the forest industry

It's easy to lump this group together since they have many common interests. However, they could (likely should) be considered as separate stakeholder groups because they often view issues from different perspectives. However, they quite commonly share a role in working with landowners to ensure the availability of forest products. Issues they often confront include: (1) professional credentials, (2) public acceptance, (3) market share, (4) supply and demand, (5) client stability, and, of course, (6) the bottom line, profit. These are issues because they increase the costs of doing business or they impede the delivery of quality service. This group of stakeholders is not unique in that they seek ways to reduce their operating costs. However they have, to their credit, generally recognized their social license to work with landowners as stewards of the forest resources we all cherish.

The cooperation of stakeholders is vital to the management of water quality.

A number of strategies are available for resolving these issues. Education is one used throughout the forest industry. From the "Trained Logger Certification (TLC)" program, to continuing education of foresters, to business management short courses, the forest industry group is engaged in efforts to sustain the resource while they improve their business, production, and safety capacity. Other strategies include: public awareness and outreach; looking for and developing innovative markets and marketing skills; certification, licensing, and registration; maintaining and enhancing customer satisfaction; support for local, state, and federal efforts to provide a favorable business climate; and seeking a production efficiency and fiscal prudence. These strategies are not unique to the forestry private sector as they seek to refine the way service providers respond to client concerns and needs.

Citizens, local communities, and local government

Citizens and local communities are understandably interested in the way forests are managed, and how management influences water quality. Several other issues related to forest management are of concern, including: (1) scenic vistas, (2) business retention, (3) highway safety and maintenance, (4) biodiversity, and (5) open space. While these stakeholders may neither own forest land nor be a participant in the industry, they sometimes work through their local governments to influence the way private forest lands are managed. Occasionally the symptoms of other land management practices (e.g., land clearing for development) have negative affects on water quality and are associated with forest management because trees are cut. Sometimes a tendency is to the proposed solutions to forestry issues that don't appropriately match the actual problem. This mistaken association drains energy and can be divisive to a community.

Citizens and local communities are vested in the management of their local forests as this influences their quality of life. If inclined to try and influence local forest management practices, several strategies will help. First, work with the forest industry and local forest landowners rather than creating an adversarial situation. Let all involved spend time building a trusting relationship that allows each to understand the positions of others. Don't assume that a problem exists without data to support such a position. Seek the facts of the situation and attempt to separate those facts from value judgments and personal attitudes. Second, focus on the issue of concern and keep focused on the common values you share with others. Seek win-win solutions where all parties are vested rather than pursuing confrontational and legislated actions. Properly applied, forestry can be compatible with the overwhelming majority of citizen and community objectives. Several specific strategies to address citizen and community issues include: education, tax incentives, business retention and expansion, land-use planning, conservation easements, land purchase, "Right to Practice" legislation, and zoning. Finally, the easy and quick solution may not be the best solution.

Summary

Forests dominate the state as a whole and the majority of NYFOA chapters. Forest management, depending on how it is conducted, can impact water quality and watershed protection in both positive and negative ways. The first step in forest management is increased awareness of the importance of this resource and the need to manage it properly. Hundreds of thousands of people representing dozens of stakeholder groups are vested directly in the long-term sustainability of forests, forest management, and thus water quality. Stakeholders bring their own experiences and issues to discussions of forestry, and several strategies are useful in addressing each issue. A

strategy common to all stakeholders and most issues is the use of focused educational programs targeting specific audiences that seek to increase awareness and effect changes in behavior towards current technologies and management practices.

Table 1. Summary forestry statistics within NYFOA chapters.

NYFOA Chapters	All Classes (thousands of acres)	Forest Land (%)	Forest Land (thousands of acres)	Saw Timber (thousands of acres)	Productive Forest Land (Very Good plus Good: 1000's of acres)	Forest Industry Mid-March Employees (1998)	Forest Industry Total Annual Pay ($1,000)	Forest Industry Establishments	Estimated Maple Syrup Value / County	Number of Farms	Farms w/ Woodland	% of Farms w/ Woodland	% of Farm Acreage that is Woodland
Allegheny Foothills	2177.6	61%	1334.4	590.5	136.5	3560.0	$19,149	107.0	$643,306	3,227	2,273	72.5	26.4
Capital District	2364.3	59%	1440.1	757.7	169.4	3403.0	$34,508	104.0	$610,546	2,774	1,781	63.5	20.6
Central New York	3209.1	60%	2010.5	895.4	317.2	6262.0	$101,836	145.0	$492,718	4,256	2,909	67.9	18.5
Lower Hudson	3878.4	32%	2090.0	1058.6	275.8	27287.0	$675,987	1277	$64,580	2,723	1,152	24.7	12.9
Northern Adirondack	6209.1	74%	4669.6	1789.1	1072.6	5670.0	$50,696	160.0	n.d.	4,063	2,980	72.7	29.8
Niagara Frontier	1382.8	38%	545.3	246.4	125.4	5027.0	$98,594	154.0	$628,593	2,362	1,463	61.7	13.4
SE Adirondack	3029.7	79%	2512.4	834.7	202.3	4890.0	$90,153	112.0	$289,077	1,457	1,013	62.1	32.7
Southern Finger Lakes	1108.3	60%	655.6	298.4	140.6	1097.0	$0	41.0	$94,457	1,575	1,116	70.4	23.8
Southern Tier	2912.2	60%	1811.1	1047.4	238.6	2133.0	$7,237	92.0	$688,499	3,346	2,548	75.9	26.4
Western Finger Lakes	3951.7	38%	1572.6	703.3	245.5	5345.0	$22,465	149.0	$176,291	5,974	3,900	63.1	11.9
NYFOA Chapter Averages	3022.3		1864.2	822.2	292.4	6467.4	$110,063	234.1	$409,785	2,887	1,921	63.9	20.8
New York State Totals	30223.2	--	18641.6	8191.5	2923.9	6467.0	$1.1 mil	2341	$3.7 mil	37,770	25,250	--	--

Data for Table 1 from:

- 1995. Forest Statistics for New York: 1980 and 1993. USDA Forest Service. Resource Bulletin NE-132.
- *Canham, H. O. and K. S. King*. 1998. Just the Facts: An Overview of New York's Wood-Based Economy and Forest Resource. Empire States Forest Products Assoc. and NY Center for Forestry Research and Development. SUNY – ESF, Syracuse, NY 13210.
- htpp://www.nass.usda.gov/census

Section 2: First Things First as a Forest Steward

8. Thinking Through Your Forest Management Objectives

By Peter Smallidge

The chapters thus far have given a broad background to the types of issues and interests that exist within private forests. The beauty of private forests is that each has its own set of ownership objectives – objectives that serve as milestones towards the accomplishments of the owner. Do you know what your ownership objectives are?

The quality and character of the forest and woodlots you where live and work will depend on what you do, or don't do, with these lands. Refining your forest management objectives will help you maintain or improve the quality and character of your forest. The pivotal and perhaps most important step in deliberate forest management, as with other decision making processes, is to clearly and explicitly recognize your objectives. The range of services available to help you recognize your forest management objectives illustrates the great value placed on this step.

Multiple objectives are possible. Consider the needs and desires of all family members.

Clearly stated objectives provide direction, simplify the decision making process, and provide a basis to gauge success. Your management objectives reflect what you value about your forests. These are your tangible and intangible personal values and the values provided to your community as a result of your management activities. Thus, the secret to successful forest management is to have explicit and realistic objectives. But what is involved and what assistance is available to help?

The first step in making your forest management objectives is thinking about your forest: why you own your forest, what you like about your forest, and how you want your forest to look in 5, 10, 20, or more years. Many people own forests because they inherited them, purchased them as a place of sanctuary, or purchased them for investment purposes. This is a start for your objectives as it explains perhaps a sentimental value, the value of retreat or seclusion, the value of an investment, or most likely some combination of the three. You may like to visit the part of your forest where you had a pleasant experience, a scenic overlook, the spot where you can always flush a grouse or run a rabbit, or the stand of red oak or sugar maple that will someday help support you in retirement. Finally, the vision of your future forest is probably closely aligned with what you like about your forest. For example, keeping the memorable spot unchanged, ready access to grouse cover, or an increase in the sawtimber value of your oak or maple stand. Again, your values help define your forest management objectives. These thoughts and visions are the basis of your forest management objectives because they provide the direction and the standards for successful management.

The next step is to ensure your objectives are mutually compatible and realistic for your forest. This is where some people start to have trouble, but there are several sources of assistance available.

Master Forest Owners

One source is a group of forest landowners like you who are volunteers and forest ambassadors trained by Cornell Cooperative Extension as Master Forest Owners (MFOs). MFOs are not foresters, they are forest landowners trained as volunteers. They can help you think through your forest management objectives, and can point you in the correct direction for self-help or professional services. Typically, MFOs will schedule with you a half-day visit to your forest, listen to your forest management values, and help you think about your forest management options. Your MFO can suggest Cornell Cooperative Extension publications available to address some of your specific needs. Contact your county's Cooperative Extension office for useful forest management publications or for the name and phone number of your local MFO.

Organizations that many MFOs and other forest landowners belong to are the New York Forest Owners Association (NYFOA) or Catskill Forest Association (CFA). NYFOA and CFA are active, landowner based organizations full of good information and good people. Forest landowners that are members of NYFOA and CFA often lead woods walks or may be available to discuss forestry with you.

Department of Environmental Conservation

A second option for assistance in stating your forest management objectives is the NYS Department of Environmental Conservation public service foresters. The DEC public service foresters are trained professionals, and will visit with you free of charge to discuss your forest management objectives. As professionals, DEC foresters can provide technical guidance on forest management questions. Like MFOs, the public service forester is a good listener and will help you think through your objectives. The differences between MFOs and DEC foresters are complementary. An MFO can not make forest management prescriptions, but probably can visit with you sooner than a DEC forester and can relate to you as a forest landowner. Although the MFO will likely recommend you contact a DEC forester, the MFO will help prepare you to optimally utilize your time with a DEC forester.

Depending on your interests and needs, the MFO or DEC service forester may suggest you engage a professional private consulting forester. Because private consulting foresters provide fee-based services, land owners are best positioned if they have their objectives well defined. You can call the DEC in Albany for the phone number of the closest DEC forester or for a list of consulting foresters.

Northeast Decision Model (NED)

A third source of assistance to help with your forest management objectives is a US Forest Service software package called the Forest Stewardship Planning Guide module of NED (ver. 1.1). NED is a cluster of computer modules from the NorthEast Decision (NED) model for forest management that runs well on most computers that will run Microsoft Windows. You can download a free copy of the Forest Stewardship Planning Guide from the World Wide Web or call to receive a copy by mail. The Forest Stewardship Planning Guide will help you think about your management objectives, perhaps show you some options you hadn't thought of, and help you select mutually

compatible objectives. Other NED modules focus on forest growth simulation, wildlife habitat suitability, and forest health.

NED software training sessions are often provided through Cooperative Extension.

Summary

To bring this to closure, let's specify a realistic set of forest management objectives. From the examples here, blended to illustrate management with multiple objectives, you may desire to (1) keep the big trees where you saw your first pileated woodpecker; (2) maintain at least 10 acres as suitable cover for grouse and rabbits, and (3) produce high quality red oak sawtimber. Your objectives may not all be accomplished from the same acre, but it's very likely they are all possible from your forest.

These then are the basics and the support sources to help you state your objectives and start the management of your forest. Remember, knowing your forest management objectives is an important part of deliberate forest management planning that will help you get the most from your forested land.

9. Developing a Woodlot Stewardship Plan

By Peter Smallidge

The planning that you do for your woodlot or forest is not a difficult process and provides numerous benefits for woodlot owners. If you have planned a vacation or a wedding, then you are capable of the planning necessary to get the most from your woodlot.

The planning process will involve some thinking on your part, discussions with your spouse, children, or co-owners, collection of resource materials, and working with a forester for technical and professional assistance. These are easy but necessary steps; the good news is that much of this can be accomplished for free or with minimal expense. The expenses you do incur may be tax deductible depending on your situation and will be offset by gains in the efficiency of management and the benefits you receive from your property.

Before you begin developing your plan, think about why you own your woodlands and what you value most about them.

The starting point for a management plan is for you to identify your ownership objectives. These objectives describe what you want to get from your property, either the material goods such as timber or the opportunity for experiences such as privacy, recreation, or hunting; maybe all these and more. A good starting point is to ask yourself a few questions: Why do you own the property? What do you like? What do you dislike? What do you need (or want) in 5, 10, or 20 years? When you discuss the answers to these questions with your spouse or others, you will be able to identify what you want to accomplish. A forester can help you evaluate your objectives and whether they are compatible with the resources on your property.

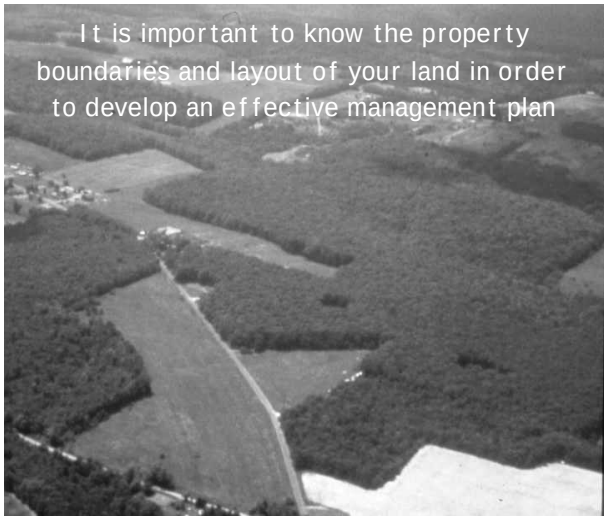
A plan for your woodlot provides benefits that are aesthetic, economic and logistical in nature. A plan allows landowners to integrate seemingly complicated objectives such as timber harvesting, habitat enhancement for specific wildlife species, and recreational trails. Planning ensures that management activities move towards and include the landowner's objectives and provide the optimal variety of desired benefits. For landowners who seek IRS recognition as an active participant or proof of the intention of an activity, a management plan can document the role of the landowner in the management process or the intent of certain activities. Examples include fencing to exclude deer from regeneration, and thus allow the landowner to enjoy certain tax provisions not otherwise possible.

A typical management plan has four sections. The first section is a statement of the landowner objectives. It's important that these are the objectives of the landowner and not the objectives of the forester helping the landowner. The second section describes the property. This would include: a legal property description; an assessment of the condition of the different areas or management units for timber, wildlife, recreation, or other uses; characterizations of the soils, especially any limitations of use such as poorly drained or stony soils; The third section

would be a work plan or calendar of scheduled events. You'll likely want a fairly detailed plan for the current and next year, but then more general targets for the following 5 and 10 year time frame. Each year you can check the tasks completed and revise the current year plan. Part of the schedule might include the tools, equipment, or resources you'll need to complete some task. The fourth and final section is an appendix that includes any number of things from maps, to historic records, aerial photographs, old pictures, list of trees or birds seen on the property, etc.

You have likely recognized that the planning process will be easiest with some outside assistance. Fortunately, there are numerous tools, people, and organizations you can access. One useful tool is a computer software program called "NED" that is available for free from the US Forest Service web site or by phone. NED helps you visualize the relationship among your objectives. Another tool is the Cornell Cooperative Extension bulletin, "Wildlife and Timber from Private Lands: A landowner's guide to planning", available through your local county extension office as #147-IB-193. People who can help include a corps of trained forest owning volunteers, the Master Forest Owners, who you can reach through your local Cooperative Extension office or at the MFO web site. The NYS Department of Environmental Conservation has a program called "public service foresters" who will visit your property and prepare a stewardship management plan with you free of charge. Also, you can contact a consulting forester or an industrial forester for assistance with a plan, though they may charge a fee or expect some future relationship for their services. Organizations that can assist include the New York Forest Owners Association and the Catskill Forest Association whose membership includes regular publications focused on the need of landowners. The websites for these organizations and others for maps, aerial photos, and web-based private landowner resources are provided as links from the Cornell University Forestry Extension web page.

Once you have your plan, use it to your full advantage. Use the schedule of activities to plan the yearly events, perhaps when children are home for the summer or in-laws come to visit.



Use the description of the different management units to think about places to put hiking trails, picnic areas, or potential bird watching locations. Take the advice of your carefully chosen forester to help you evaluate offers from someone who shows up at your door and wants to buy your timber -- if your plan doesn't call for a timber sale then you're likely better off to let the offer pass.

A management plan is a useful tool that will serve you for years to come. It's a critical starting point for the long-term stewardship of your wooded acreage.

10. Working with Foresters

By Peter Smallidge

Some good advice for a landowner who plans to conduct any management activity in their forest is to seek advice and counsel from a forester. This section discusses the process a landowner should use to select a forester and what factors to consider when deciding how to pay a forester for services. The logical basis for the recommendation to seek assistance is consistent with advice to the homeowner who seeks counsel from a plumber, electrician, attorney, or a tax preparer for assistance and guidance. In all these situations, we need technical information and perhaps assistance with complex decision-making. Typically, our efficiency and the results improve when we get advice from a professional. We almost always pay for these services.

The exception to the "pay for services" rule is when a DEC public service forester visits a woodlot. In those cases, the DEC forester arrives pre-paid through your state and federal tax dollars and provides services free of any additional charges. Public-sector foresters will provide many important services, such as a developing a stewardship management plan based on your objectives and thus giving you a benchmark against which you can assess future management decisions. Because of time constraints and work-load demands, DEC foresters must limit the variety of services they provide. Thus, at some point, you may need to locate a private-sector forester.

Types of Foresters

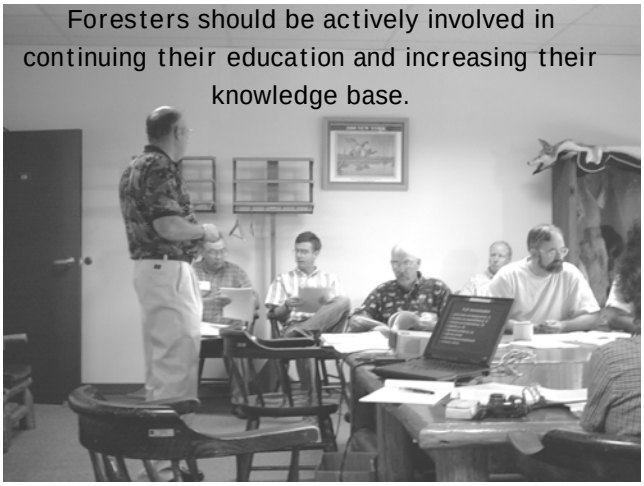
Even though there is no legal definition of a forester in New York, the profession recognizes a forester as a person who has completed college-level training that has a forestry focus. This education most often includes a 4-year degree, in a science-based curriculum that emphasizes courses that often include tree identification, forest ecology, forest management, soils, forest measurements, silviculture, wildlife management, hydrology, harvesting, recreation, and more. Other foresters have a 2-year degree, with more limited course work. All foresters should expand on their original education with continuing education through universities and professional societies. Foresters work in either the public sector, as described above, or the private sector. Foresters in the private sector include consultants whose primary business is providing services to landowners or industrial foresters who work for the forest industry and provide services to landowners as part of the process of supplying wood to the mill. All foresters are important to forestry in New York. The landowner pays the

consultant a fee and the industrial forester is paid by the mill. Landowners should consider both consultant and industrial foresters when looking to develop a relationship with a private sector forester. The extent to which any forester can service the specific needs of the landowner depends on many factors, such as technical ability, conflicts of interest, business philosophy, personal ethics, landowner resources to invest, and the landowner's ability to communicate their ownership objectives to the forester. New York is fortunate to have exceptional foresters available from public and private sectors, but landowners will need to find the forester who is best suited to their needs.

A deceptive group of people will try to present themselves as a forester wanting to help the landowner. These people are actually timber brokers, loggers, or perhaps trained foresters who de-emphasize their forestry skills to work as brokers. This group of people seeks only to maximize their own profits with disregard for the landowner's objectives. In some cases they will purchase trees from a landowner and re-sell the trees, even without cutting them, to another person or company. This leaves the landowner disconnected from the person who ultimately cuts the trees and perhaps with little control over how and when the timber is harvested. In other cases these individuals will offer "forestry services" to the landowner, then sell the timber to themselves or a subsidiary company at below market prices and charge the landowner a fee to supervise the harvest. Thus, the landowner most importantly may not achieve their true ownership objective, likely won't have their forest treated sustainably, and seldom comes close to realizing the actual market value for their timber. When hiring a forester you are buying a service and buyer: beware.

Loggers are critical to many forestry processes, and unfortunately they are often maligned. Loggers are trained to harvest trees in a safe and effective manner. They can often construct skid trails and haul roads, which your forester should locate, that you can subsequently use for hiking or skiing. However, loggers are not trained to give technical advice on how to sustainably manage your forest to meet the full range of your ownership objectives. Your forester, and many educational web sites, can help you think about the process of selecting a logger.

Finding a Forester for You



Foresters should be actively involved in continuing their education and increasing their knowledge base.

Your forest is valuable to you for its monetary, recreational, and aesthetic qualities. Just as you wouldn't hire someone for your company or business without asking for a resume and references nor should you hire the first forester you meet. By considering several foresters, you improve the odds of finding one that will best suite your needs. What factors should you use to evaluate foresters and which foresters do you evaluate? Select a forester based on a combination of factors. These factors include:

- educational background,
- involvement in continuing education,

- participation in their professional forestry society,
- work experience,
- references,
- visits to their previous jobs,
- a demonstrated commitment to sustainable practices,
- certification through a professional society or independent organization, and
- their personal interactions with you.

Price for services is an issue, but use this as a secondary consideration after you are satisfied with the other factors. It isn't possible to emphasize one criterion over

Good professional foresters provide competent technical assistance. Photo courtesy of S. Wolf.

others on the list. Review your candidates thoroughly and proceed with diligence. It's helpful to call several recent landowner clients, but the landowner may not be able to effectively judge all aspects of sustainable forestry. The best way to accumulate the information needed to evaluate several foresters is to write down what you want the forester to do based on the stewardship plan prepared by the DEC forester and then ask several foresters to submit a letter of intent or brief proposal outlining the services they would provide and for what price. Foresters who are eager to serve landowners will be happy to comply with such a request.

With hundreds of foresters in New York, who should you ask for proposals? Finding potential foresters in your region is a straightforward but daunting task. Here are five strategies that if used together, will help you build a list of potential private sector foresters. Websites for each are listed in the "Additional Information" or "Resources and Recommended Publications" section of this booklet or your local Cornell Cooperative Extension office can help you contact these sources.

1. Start with a copy of the DEC Cooperating Forester Directory from your local DEC office or their website. Those listed meet minimum eligibility requirements but the directory isn't a complete list of foresters in the state.

2. Go the Society of American Foresters webpage and look for Certified Foresters in your area. Foresters are certified by SAF based on education, work experience, statement of work ethic, and a written exam that evaluates competency. Additionally, many NY consulting foresters are members of the NY Institute of Consulting Foresters or the Association of Consulting Foresters.

3. Talk with other forest owners and look for advertisements in forest owner magazines. Potentially good sources of information are members of the statewide forests landowner association the New York Forest Owners Association (NYFOA) or regional groups such as the Catskill Forest Association (CFA) and Tug Hill Resource Investment for the For Tomorrow (THRIFT).

4. Ask for a free visit and consultation with volunteers in Cornell's Master Forest Owner program. These landowner-volunteers are trained by Cornell Cooperative Extension to provide non-technical assistance. They have typically experienced, and overcome, the same problems you're currently dealing with.

5. Attend landowner workshops and woodswalks to meet with the foresters who are investing time in supporting the landowner educational needs.

As you can see the process to collect names isn't trivial, but it is a critical step before you request proposals.

Hiring a Forester

Once you've selected your forester, how do you negotiate and foster a relationship? Foresters will encourage you to have a contract with a logger, and similarly they should be receptive to a contract with you. There are several issues to consider within a contract but that discussion is beyond the scope of this article. Fundamentally, the contract should identify the parties involved and the property, the terms of payment, constraints or requirements on the parties, and the services to be provided. Be sure to review any contract with your attorney.

In the forestry profession there is considerable discussion and debate about service fees. There are two categories of service – one is timber sale design and administration and the other is broadly grouped as forest management activities. One of the most contentious issues among foresters is payment for assistance with timber sales. I won't address pay scale or amount, but rather payment method.

Some, but not all, industrial foresters won't charge you directly for services because they may expect the timber to be sold to their mill, and under some circumstances this is a desirable working relationship. Many mills have been established for decades and seek long-term sustainable relationships with forest owners. Some mills have well-qualified and credentialed foresters who can provide a variety of services.

Among consultants the most common payment method is as a percentage of sale or "on commission." Payment on commission means some percentage of the timber sale value goes to the forester; the more high-value timber that is cut the more money the forester makes. If you decide to hire a forester using commission, know that you can negotiate the rate of commission and that you need not be bound by the "usual" rate. Most consultant foresters will be able to describe what they see as advantages to payment on commission.

An increasingly common payment method and one that has several advantages for landowners is to pay on a flat rate, such as per hour or per acre, rather than pay a commission for timber sale assistance. The advantages of flat rate include the following:

1. Avoiding the potential for a conflict of interest. The potential exists because the forester makes more money if they administer a sale where they designate a greater number of high value trees and a lesser number of low value trees for harvest. Foresters won't inherently favor high-value trees, but a flat rate avoids the perception for a conflict of interest.

Foresters should be eager to serve the landowner and help obtain forest management objectives

2. With flat rate, a forester receives fair compensation at a known rate for any and all services. A forester

deserves fair compensation because they can provide important and valuable technical assistance. Because timber sales involve similar skills (e.g., inventory, planning, tree selection) regardless of the quality of the timber, a flat rate ensures fair compensation for the forester and a stable price for the landowner. Note that the sale of low value timber to improve the forest may require more time for marking and marketing and thus perhaps higher costs than high value sales.

3. A flat rate allows a forester to provide services to a landowner without a timber sale or with a sale involving low value trees. Some foresters won't work with landowners who want to cut cull trees or other low value trees. Payment on commission of sale isn't possible if the only desired service is to update a management plan, mark boundaries, designate trails, girdle habitat trees, or plant open land.

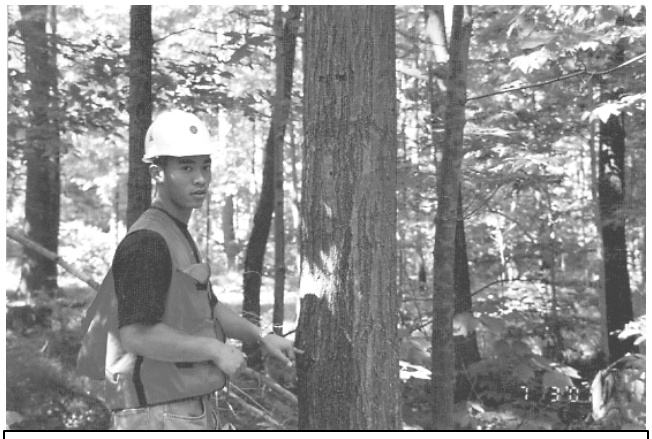
Good forestry, or bad forestry, can happen with any type of forester or payment method. The landowner needs to emphasize their desire for the use of sustainable practices that meet the goals for the property. Through a combination of the process to find a forester, a contract with a forester, and clear communication of your goals, find a strategy that ensures the sustainability of your forest resource.

Summary Points

When working with a forester, start with a free visit by a DEC forester. You might actually be well served to talk with a MFO volunteer before a DEC forester visits so you learn about some educational resources and focus your questions to make efficient use of the DEC forester's time. In addition to the DEC public sector foresters, private sector foresters include consultants who seek landowners as clients and industrial foresters who ensure their mill has a sufficient supply of wood.

If you decide to hire a forester from the private sector it is in your best interest to solicit proposals from a number of foresters who describe what they will do to further your stewardship plan and what credentials for employment they would bring to you.

When you discuss method of payment, know that most private consultants and some industrial foresters will suggest that the usual way to pay foresters is as a commission or percentage of a timber sale. There are other options than payment on commission, so landowners can consider working with an industrial forester or hiring a consulting forester using a flat scale based on time or services. An increasing number of foresters and forest owners are deciding not to establish a relationship based on a commission.



Finding the right forester will help you ensure the health, productivity, and sustainability of your forest.

11. A Little Extra "TLC" for New York's Forests

By Peter Smallidge, Kevin King[1], and Laurel Gailor[2]

During the last few years, New York forest owners have gained a new option in their desire for sustainable forest production and rural communities have gained from increased professionalism. What is this new option? A group of loggers who voluntarily developed and participate in the New York Logger Training, Inc., Trained Logger Certification (TLC) program.

Loggers who complete TLC, several hundred so far, are committed to keeping their skills honed and increasing their knowledge about logging productivity and forest ecosystems. Loggers are also making a commitment to continuing education, as the program requires continuous training to maintain certification. As a result, these loggers are better able to meet the stewardship needs of forest owners. Traditionally, New York loggers have received on the job training through their employers or co-workers. While this traditional approach has been sufficient for some training needs, several loggers from across the state felt a need to recognize efforts for increased levels of professionalism. These loggers knew first hand the hazards of working in the woods, the need to work efficiently, and the need to be environmentally aware of the forest resource we all use. They recognized the potential to educate themselves and others through a statewide effort.

The logger training effort began in 1989 with a group of timber harvesters concerned with the need to provide a formalized training and recognition program which would make limited training resources go farther. In 1994, New York Logger Training was incorporated to coordinate the delivery of educational resources to timber harvesters that will improve their technical skills, and will foster the implementation of environmentally sound harvesting practices. The goal of this training and certification program is increased productivity for loggers, increased use of best management practices (BMPs), and a safer working environment. Together, goals should lead to increased profits for loggers and forest owners while increasing the quality and value of forested lands.

The TLC program includes three core components which are: Standard Adult First Aid and CPR; Environmental Concerns; and Chain Saw Operation, Safety, and Productivity. Each component is a one day session and forms the basis of the initial certification. New York is divided into five area, each with a regional chair and committee organized to arrange local

The TLC program gives loggers training in chainsaw operation, safety and maintenance.

educational programs. The continuing education part of Trained Logger Certification requires loggers to maintain their first aid and CPR certification as well as take additional

[1] Empire State Forest Products Association
[2] Cornell Cooperative Extension of Warren County

approved courses during a five year period on a variety of topics, such as small business management, sustainable forestry, or advanced chain saw safety. TLC loggers, rapidly growing in numbers, represent another group of resource professionals that forest owners should seek when considering a timber sale.

Of the core components, Environmental Concerns has the greatest direct impact on forest owners and our forest resources. This component addresses the management practices that are necessary and appropriate to ensure the continued productivity and vigor of forests and how the components of forest ecosystems interact. The Environmental Concerns component covers a large number of topics that help loggers understand why foresters make certain decisions. Loggers better understand, for example, the silvicultural marking guides used to determine which trees should be cut during a preliminary versus a final harvest to ensure the long-term growth, regeneration, and health of the forest. After completing this component, loggers have improved knowledge of how forest management practices help maintain water quality and logging aesthetics and why different practices are used in different situations.

The Chain Saw Operation, Safety, and Productivity component provides a "hands-on" session that covers the relationship between safety and productivity. Specific topics addressed in this component include safety protection precautions and equipment, chain saw maintenance, safe chain saw operations, and several tree felling techniques. Currently, accredited workshops are offered by trained and certified professional logging instructors who themselves have a rigorous training and certification program to complete. The Chain Saw Operation, Safety, and Productivity component benefits forest owners as well as loggers. This safety training has reduced the insurance costs for companies and logging supervisors, reduced damage to the trees left standing after logging because of increased skill in felling trees, and provides land owners with fewer concerns about the safety of those working in their woods.

The Standard Adult First Aid and CPR component is provided through the American Red Cross or other local providers, and also meets the first aid requirements of the Occupational Safety and Health Administration (OSHA). Numerous topics are covered, including Good Samaritan Laws, anatomy, cardiac arrest, strains and sprains, transport of injured people, shock, burns, and over a dozen other first aid situations.

The TLC program is gathering momentum among loggers throughout New York. In addition to the loggers who have completed initial certification, hundreds have also complete two of the three components of the

Loggers in the TLC program learn how their chosen practices impact the forest ecosystem.

training program. Many loggers have expressed their appreciation for the program. For example, after one Forest Ecology and Silviculture workshop (which covers the Environmental Concerns component standards) held in Warren County, participants reported a high level of usefulness of topics such as the

importance of aesthetics, skills for interacting with the public, and an improved understanding of the ecology of forested wetlands and watersheds. Sessions in Warren County have drawn loggers from many parts of the Adirondacks, from those who recently joined the ranks of loggers to loggers who have been working in the woods for over four decades.

The TLC program is valuable in that it provides benefits to loggers, forest owners, and the rural communities that include New York's forests. The strength of the program is that it is a cooperative effort on the part of timber harvesters, forest industry, government, and academia. For more information about New York Logger Training, Inc. and the Trained Logger Certification Program, contact Muriel D. Karp, Director of Communications at the Empire State Forest Products Association. Forest owners interested in forestry education programs should contact their county office of Cornell Cooperative Extension.

Loggers who have completed the NY Logger Training Program are an important addition to the team that makes forestry sustainable.

12. Timber harvesting as a stewardship tool – opportunities and pitfalls.

By Peter Smallidge

As a forest owner, the time may come when you need to know some basic guidelines pertaining to the sale of timber from your property. Many people acquire woodland with no intention of selling any timber, but eventually someone will knock on your door and offer to buy some of your trees. In the event you decide that cutting some trees might be useful, how do you know the best action to take and the best sequence of events? As a forest owner, you will want to have some basic knowledge of the timber sale process and those who have an interest in your woodland.

Apprehension about a timber sale often results because most owners (1) don't know the value of their timber and don't want to sell too cheaply; (2) fear their woodlot or forest will be ruined as a result of timber harvesting; or (3) think that timber harvesting causes environmental damages. While all these fears can be true, you can avoid them through careful planning and selecting competent professionals as service providers. Ultimately, you or <u>your</u> agent needs to control the timber harvest. Sales that are "logger's choice" are rarely in the best interest of the forest owner. Think about it this way, if you have a yard sale or a garage sale and someone offers you $4000 to pick and chose from throughout your house you would (or should) say no, then why give someone unrestricted access to your timber.

Forest owners enjoy their woods, but may be confused by opportunities and risks associated with cutting trees.

Why should you cut trees?

People who want to cut your trees will have an arm-length list of reasons why you should cut your trees. Ultimately, because you own them, you get to decide if, when, and which trees to cut. Timber harvesting, or cutting trees, is best considered as a tool to help a forest owner move closer to their

Cutting trees can reduce competition for sunlight. Leave the trees that have the most vigorous crowns.

long-term ownership objective. Harvesting is a means to an end.

Select a logger who is trained and who carries about the quality of their work.

Many people think of timber harvesting as something that forest owners do to make money. You can make money from cutting trees, but before you agree to cut trees you should have a management plan that describes why you own the forest and what you want from the forest. One thing you might want is money, but maybe also a place to hunt, a place for solitude, or a place to bird watch. With your management plan in hand, you and your forester can decide if a timber sale will move your forest and you towards your desired goal. Timber harvesting can be used to create certain types of wildlife habitat, to establish a trail for hiking or skiing, to regenerate a forest, to improve forest health, or to create a certain aesthetic quality. Often, as a result of these goals, revenue is generated. Harvesting with the sole purpose of making money is usually a shortsighted and unsustainable practice.

Forest owners often say "I have some 14" diameter maple (or cherry or whatever)…is it time to cut them?" Again, cutting trees is a means to an end. Those trees <u>can</u> be cut, they are of marketable size, but they <u>should</u> be cut only if it brings the forest owner closer to their personal goals of ownership.

<u>Who's a forester and who's a logger?</u>

The three groups of people involved in a timber sale are the landowner, the forester, and the logger. The sale works best, from the landowner's perspective, if each of these people are involved and if each knows their appropriate role.

The landowner needs to have a clear understanding of why they want to sell the trees, what they want the forest to look like after the sale, and what tax or legal constraints they need to address. A good forester, one who represents all the interests of landowner, can help the landowner by discussing the options associated with these considerations. The landowner should be in charge of the whole process, but may delegate some of the details to the forester.

A forester is someone trained professionally to grow trees and healthy forests in a way that meets the landowner's goals. That said, there is no legal definition of a forester in New York. Other states define foresters through licensing and certification. The profession of forestry recognizes foresters from 2- and 4-year schools of forestry. Foresters who can help with various aspects of a timber harvest include public foresters with the NYS DEC and private foresters who are consultants or who work for a wood-using industry like a sawmill or a paper mill. Another group of people are timber brokers who buy and resell. Timber brokers focus on their own profitability and not on the landowner goals. Avoid timber brokers. Credentials for foresters might include Certified Forester® through the Society of American Foresters, membership in the Society of American Foresters, membership in the Association of Consulting Foresters, or inclusion on the NYS DEC list of Cooperating Foresters. Foresters should annually participate in professional

development training. Beyond the credentials, ask for a resume, references, and visit with some recent clients. A good forester is vital to guide you through the management of your forest. A bad forester will leave you feeling devastated.

The logger is the person who cuts the trees and transports them from the forest to the mill for processing into boards or pulp. You should expect a high level of professionalism from your logger. Loggers achieve and demonstrate professionalism through personal experience and various training programs offered throughout the state. Loggers have the opportunity to take training classes through NY Logger Training, Inc., a group that strives to help loggers work safely, efficiently, and with sensitivity to ecological aspects of forests. Your forester will know loggers in the area, and should have a long list that can be solicited for services. Forest owners should visit some recent harvest sites and see the types of work that the loggers have done. A good logger can ensure that the forest left behind after the harvest is healthy and with minimal damage to soils and trees. A bad logger can cost you more money that you make.

How are trees sold?

Trees are sold typically as a specific number of stems for a certain sale. Because all trees aren't created equally, a forester will tally the trees to be cut by species and diameter so a buyer will know what they are buying. With diameter and species information, the forester can estimate the number of board feet for each species. A board foot is a volume of wood defined as 1" x 12" x 12", or an equivalent volume in different shape. Different assumptions are used to estimate the actual number of board feet that can be cut from a tree or log. These assumptions result in different measuring "scales", such as *Doyle* or the *International ¼"*.

The actual value of trees or logs depends on many factors, such as the species, their size, the total volume, difficulty of access, and amount of defect in the wood.

The value of standing timber, or stumpage, is typically reported in MBF or "thousand board feet" (M is from the Latin *milli* or thousand). A tree that is 16 feet long and 16" in diameter has an estimated 75 bd. feet (.075 MBF) by Doyle scale and 106 bd. feet (.106 MBF) by International scale. The difference between scales doesn't matter if you compare sale bids as dollars from one prospective buyer versus dollars from another prospective buyer. The scale used does matter if you pay for services by the board foot or are paid for timber by the board foot. Your forester can help you understand the differences if you use sale methods.

What's in a timber sale contract?

The timber sale contract is a necessity and a good contract will protect both the seller and the buyer. All timber sale contracts have many similar features but no two contracts should be the same. Because most forest owners infrequently sell timber, they should have their attorney review their sale contract. The small investment is worth the cost.

A timber sale contract will have four basic parts:

1. The opening section identifies the buyer (logger or sawmill) and seller (forest owner) by name and address. It should include the name and address of anyone who is acting as an agent of either party, such as a forester who might represent the seller. The opening section should also specify the relationship between buyer and seller, specifically whether the logger is a subcontractor or employee of the forest owner. Check with your attorney for liability and tax implications, but often the contract should specify the logger as a subcontractor who carries their own liability and workers compensation insurance.

2. The section on property description should describe the location of the property and the area of the property that is included within the sale. This section would document how the property boundaries are marked, how the sale boundary is marked, and assure the buyer that the seller has authority to sell the timber. The actual timber being sold is described here in general terms, such as number of trees and total board feet, and reference can be made to an addendum that gives more detailed data of the trees marked for sale. Finally, this section should include the terms of payment, the schedule for payments, and how long the sale is active.

3. The next section defines the constraints or expectations of both parties. From a forest owner's perspective, this section might include details for the number and types of BMPs (water bars for example) to use, any penalty for damage to residual trees, whether marked non-merchantable trees should be cut (they should be!), the amount of the performance bond, and the transferability of the contract to others.

4. The final section might include maps of the sale area, detailed data on the trees to be cut, a glossary of terms, or other defining information that will make the contract more clearly understood by both parties.

Samples of timber sale contracts are available through the DEC and from the Cornell Forestry Extension web page. Other sale contract language may include the condition of the road and landing following the harvest, the payment style and schedule, penalties for harvesting unmarked trees, the height of trees tops left in the woods, and the amount of the performance bond. Remember also that the stipulations you add to the timber sale will reduce the amount of money you receive. Require the stipulations that are appropriate, but discuss the consequence of each one with your forester. For example, tree tops left in the woods are unsightly to many people, yet lopping tops so they can't be seen is time consuming, dangerous, and costly. By not lopping tops you reduce risk to the loggers, save time and money, provide habitat for some wildlife species, and may protect some tree regeneration from deer browsing.

Knowing What You Have

A current inventory of timber by species, volume, and value is indispensable. Timber harvesting involves making a decision, which trees to cut and which to leave, that will affect the woods for many decades to come. Timber values vary immensely by species, size and location of trees, time of year, and many other factors. A black birch tree may be worth $5 while the same size black cherry nearby perhaps $300.

An inventory will tell a landowner what they have and whether their forest can provide the products and amenities they desire.

You will need to have your forester conduct an inventory of your woods to know what you have. The forester will need this information to develop a timber sale contract that protects and advances your interests. Knowing what you have gives you a starting point and your ownership objective or goal is the ending point. Whether or not to cut trees depends on whether cutting will move you towards your goal.

The inventory is important even if you don't plan to sell trees. A maple syrup producer needs to know how many sugar maple trees are present and their diameter. A song bird enthusiast will want to know the variety of tree species and sizes, plus the abundance of cavities and snags. Deer and turkey hunters will be interested in the abundance of mast, seeds such as acorns, beech nuts, and cheery pits. In all case, the rate of growth of the trees will be important to understand the health of the forest. The inventory provides knowledge and this gives the forest owner the power to make informed decisions. Either leave the forest alone because it's doing fine by itself, or cut some trees to provide a combination of products and improved conditions for the forest.

Types of Timber Sales

The common types of timber sales include the lump sum sale, the scaled sale, and the percentage sale. In a lump sum sale, all trees sold are paid for prior to being harvested. The scaled sale and percentage sale depend upon measuring the logs during harvest or after logs are delivered to the sawmill. The logs are usually 'scaled' or measured on the landing in a scaled sale and at the sawmill for a percentage timber sale where the landowner is paid a percentage of the mill tally.

The lump sum sale, or a variation of it, has distinct advantages for many forest owners. The variant is that the total value is estimated, but the actual value depends on the volume delivered. The owner is paid the estimated value before any cutting occurs, but settles the exact value after the harvest is over based on the scale of the logs. The variant will allow a forest owner who qualifies as being in the trade or business to use the more favorable capital gains treatment for IRS purposes and thus give additional tax advantages over passive owners or investors. Check with a tax consultant on the details of being a "material participant" and the distinctions between 631(a) and 631(b) capital gains treatments.

Having payment before cutting helps the forest owner ensure they will be paid. Advance payment also gives the forest owner the ability to stop the harvest activity during mud season or for other reasons without concerns about cash flow. The good reasons for a landowner to sell on percentage are few and far between. Loggers should be paid fairly for the important, difficult, and often dangerous

job they perform. This doesn't mean though that the forest owner should share the profit of their property. Service providers, whether logger or forester, will offer many reasons why a percentage or commission relationship is good, but the typical basis for their logic is that it gives them more money.

Taking Some Initial Steps

The first step before you consider selling timber is to make sure a timber sale is consistent with your written forest management plan. This is especially true if you are approached by a logger, timber buyer, or procurement foresters to sell your timber. Selling timber too soon may not allow you to achieve your management objectives. Your management plan should describe the timing, location, and intensity for a timber harvest.

Many people are available from various organizations and agencies to help forest owners understand their options for management. An unbiased but professional source should help you decide if a harvest is appropriate.

Once you decide to sell timber, the next step is to locate competent help from the key players. An initial contact might be a Master Forest Owner (MFO) volunteer through your county association of Cornell Cooperative Extension or a Department of Environmental Conservation professional forester. A MFO volunteer can give you information and help you contact reputable people, while a DEC professional forester can provide the same information and give you technical advice. You will also likely need to make contact with a consulting or industrial professional forester who will help you find a logger. A forester who puts your timber out to bid will make sure you get a fair price for your timber. Find a forester who will represent your ownership interests in addition to making you money. Ask for references, and check them, before you begin working with a forester and a logger. Many forest owners find it to their advantage to have their forester mark their timber and then put it out for bids from several reputable loggers. When you select the logger consider both the value of the bid and the reputation of the logger to do good work. One indicator of a conscientious logger is whether they've participated in the New York State "Trained Logger Certification" program.

Water quality, scenic vistas, and any special place need special attention during a harvest.

A primary issue to discuss with your forester before any trees are marked, is how the timber sale meshes with your management objectives. If you are

interested in wildlife then discuss leaving large mast trees for wild turkey, making small patch cuts and leaving large downed logs for ruffed grouse, or leaving or creating snags for cavity nesting birds. If you are interested in recreation and property access, discuss ways to route the skid and haul roads so you can use them for skiing, hiking, or bird watching. These are a few of the options you can explore to get more than cash from your timber sale.

Additional topics to discuss with your forester and logger are environmental and stewardship concerns. These are important to maintain the health and productivity of your forest and woodlot. If you have "classified wetlands" or streams special precautions must be taken before harvesting trees in and adjacent to these areas. (Note - legal restrictions may apply in some situations, consult your DEC forester) Make certain your forester and logger consider the need to encourage the regeneration of desirable tree species. Too often poorly planned timber sales take only the best trees or biggest trees and leave behind the poor quality trees to provide seed. Discuss the time of year that harvesting will occur and the need to avoid skidding trees during the mud season to minimize damage to soils and to control erosion. Be certain your property boundaries and the harvest area boundaries are marked.

Summary

Having a timber sale on your forested property can be an exciting and profitable event that, if done correctly, can increase your ownership enjoyment without reducing the environmental quality of the land and waters. However, a timber sale is not an activity you should hastily pursue. The actions you take in your forest will be evident for decades and will determine the future benefits you and others receive from your forest. A timber sale will be your signature on the land. Several good brochures and sample timber sale contracts are available through your local office of the DEC and several good publications through your county association of Cornell Cooperative Extension. For more information on timber sales and forest management, visit www.dnr.cornell.edu/ext/forestrypage

Additional Reading

A guide to logging aesthetics: practical tips for loggers, foresters, and landowners. GT Jones. 1993. Natural Resources Agricultural Engineering Service (NRAES, formerly Northeast Regional Agricultural Engineering Service). www.nraes.org PO Box 4557, Ithaca, New York 14852-4557 Purchase price $7.00 plus S&H. (607) 255-7645.

Conducting a successful timber sale. MG Richenback. 2003. University of Wisconsin-Madison, UW Extension, Department of Forest Ecology and Management. http://clean-water.uwex.edu/pubs/timbersale/ available on-line as a 1.6 MB .pdf

Timber management for small woodlands. Goff, G.R., J. P. Lassoie, and K. M. Layer. 1994. IB #180. Cornell Cooperative Extension Information Bulletin. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. (607) 255-2080.

Section 3: Things to Do and Things to Avoid

13. Woodlot Thinning to Achieve Landowner's Goals

By Peter Smallidge

Private forest landowners love their forests and woodlands and often have a long-term vision for their property. Sometimes the love for the forest seems incompatible with cutting trees or logging, a much-maligned activity. However, in many circumstances, a landowner's vision and goal is best achieved through the judicious and well-guided cutting of trees. Thinning trees from your woodland is a process of cutting low vigor or undesired trees. Thinning may well serve the landowner's interests because it can enhance the growth of the desired species and trees and generally improve the health, vigor, and quality of the residual forest. Thinning differs from the non-sustainable practice of selective cutting where the big trees are cut to let the little ones grow. Thinning also differs from regeneration cuttings that establish the next forest through natural reproduction of seedlings from desired species.

What are your decided objectives for your forest? Thinning will be based on these predetermined goals.

Call (and Think) Before You Cut

Landowners should heed the adage "haste makes waste" when they consider cutting trees. All trees are not created equal, and the selection of trees as the winners and the losers during a cutting operation depends on the vision you have for your woodlot. A stewardship plan for your property will guide you and the foresters and loggers you hire when it's time to start cutting trees. The stewardship plan, prepared for free by your local DEC forester, describes your vision for your property, the types of forests you have, the quality of the soils, the wildlife that might exist, a schedule of activities, and outlines these features on a variety of useful maps. In anticipation of working with a forester to prepare a stewardship plan, you and anyone else who has a vested interest in the property should think about your vision(s), your motivation for obtaining and retaining the property, what you like and dislike, and those areas you would like to see changed. Ask yourself if there are barriers to fully enjoying your property. What resources do you have to invest, such as time on weekends, a tractor or ATV, chainsaw, money to hire assistance, local youth groups looking for conservation projects, etc. If

you would like some guided assistance in thinking about these questions or tips on landowner educational materials, contact a Master Forest Owner volunteer through your county's Cornell Cooperative Extension (CCE) office for a free visit or see who's in your county from the MFO web site. So, before you begin cutting, think about your vision and call for assistance.

Improvement Cutting

Improvement cuts, which include thinning, are done for several possible reasons: (1) to change the mixture of species in the woods by removing undesirable species; (2) to change how your forest looks, for example you might wish to remove saplings in an area to improve visibility; (3) to improve forest health by removing diseased, insect infested or dying trees; or (4) to improve growth and reduce competition by freeing the crowns of desired trees. Think of your forest like your garden. Your garden produces crops such as flowers for butterflies or tomatoes or carrots for human consumption. If your gardening objective is butterflies you favor certain species that you likely wouldn't favor if your gardening objective was vegetables. Your garden is most productive and healthy when you ensure that each plant has plenty of sunlight and that heavily diseased plants are removed. You tend or culture your garden by weeding and thinning long before you expect to produce a crop. If you pick your crop early, for example when your beefsteak tomatoes are the size of golf balls, you miss out on the quality and quantity you would receive if you waited until the tomatoes matured. Forests are similar to gardens because they are groups of plants that grow in soil, require sunlight and nutrients, and produce things (like beauty, wildlife habitat, and timber) that we want.

Work with a DEC forester when selecting which trees to cut

Improvement cuts fall into a category of forest management known as intermediate cutting, or cutting that occurs during the middle stages of a forest's development with the purpose of improving and shaping the current forest. In contrast, regeneration cutting practices are designed to produce the next forest and applied when the forest or groups of trees are mature. Because many NY forests developed on abandoned agricultural land or as the result of previous heavy cutting, trees in our forests are often all about the same age even-though they may be of different sizes. The variation you see in tree diameters results from differences in the growth potential of one species versus another and the competitive struggle for sunlight and soil resources among trees. For example, black cherry and eastern white pine can grow very fast and need full sunlight while American beech, sugar maple, and eastern hemlock can survive in shade and often grow more slowly. You can shape the future of the forest if you allow full sunlight to the crowns of certain species and trees by cutting adjacent trees that create shade. The destiny of your woodlot, and thus the trees you cut or retain, should depend on whether you want to someday produce wildlife food crops (like acorns or cherries), timber, aesthetic vistas, or some combination of these goals. What you want to produce determines the species you should favor versus the species to cut.

Selecting the specific trees to cut can be difficult. The specific trees to remove depend on your objectives, but might include diseased trees, trees of poor form, trees with weak wood, or trees that block a view. It's always a good idea to speak with a DEC forester or a forester from the DEC list of *Cooperating Foresters* for assistance. Explain your objectives, review your stewardship plan and have them help you select some trees for removal. If you have a large woodlot and the trees are of moderate size (maybe 8 to 12 inches in diameter) then you might be able to sell some for firewood. Otherwise, you'll need to either hire a logger to complete the work or complete the work yourself with a chainsaw or by girdling the trees. If you sell firewood (or trade trees in your woodlot in return for firewood) be certain you contact a forester, as there are potential and serious legal and financial pitfalls to be aware of and to avoid.

The cutting part of the improvement might be with a chain saw, or it might be by girdling the tree with a hand axe or chemical agents. Using a chain saw requires special skills and training, but can provide the benefit of firewood. Girdling doesn't require as much equipment and simply means that you take a hatchet or axe and frill around a tree enough to shave the bark and inner wood in a complete circle. You can also girdle a tree with a chain saw. Girdling breaks the connection the tree crown has with the roots, and eventually kills the tree. Effective girdles don't need to be very deep, but some species like beech and red maple may not die as quickly as desired with girdling. Girdling also leaves behind a standing dead tree; so don't use this practice in areas you or other people frequent because of the potential hazards. You can hasten the process by applying an appropriate herbicide into the frill. Whether chain saw, axe, or herbicide you are using a tool that deserves respect so be careful.

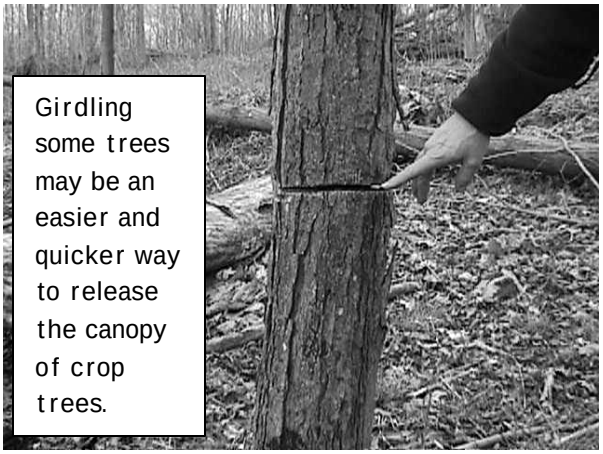
Crop Tree Management

Crop tree management is a type of improvement cutting that focuses on "crop" trees, or trees to leave until you are ready to regenerate the next forest. Anyone who has thinned a carrot patch to encourage growth can understand crop tree management. The concept is actually fairly simple whether applied in a garden or woodlot, but the process requires some time and effort to achieve the optimal result. This is a good strategy for landowners interested in playing an active role in the management of their property, but requires some work.

Crop tree management (CTM) is a useful management strategy especially for the private forest landowner who has: more than a passing interest in their woodlands, the ability to identifying trees by species, clearly stated objectives, spent some time talking with a forester, and a desire to become more integral to managing his or her land. CTM is a nice because you can try it in a small area and see if you like it before you start working on more acreage. CTM differs from improvement cutting by focusing

Crop tree management releases the crown of desirable trees to increase their growth.

more on the trees you leave than on the trees to remove. Both are suitable in certain situations.



Girdling some trees may be an easier and quicker way to release the canopy of crop trees.

The exciting part of crop tree management is that you, the landowner, can define the criteria for your crop trees. In one part of your woodlot, perhaps where you like to watch squirrels and turkeys, you might select crop tree criteria to favor tree species that produce fruits (called mast) these wildlife eat. So, you might favor species such as black cherry, oaks, walnut, and hickory. In another part of your woodlot where the ground is more fertile you might set criteria for timber production and favor black cheery, oak, sugar maple, and white ash. In addition to wildlife and timber, other criteria might include aesthetics (fall color, unique shape, unusual species, etc.) or water quality.

Carrying out crop tree management is straight forward, but again requires some time and effort to learn these new skills. First, you should walk through a small section of your woodlot several times getting a feel for the trees you have to work with. Then, select trees that meet your criteria. Try to select the trees with healthy crowns with full or nearly full exposure to sunlight. You might use plastic flagging tape to mark the trees whose crowns touch or come close to your crop tree. Your goal is to free the crop tree crown on all four sides so it is free to grow. Use a different color flagging for the trees to be removed. Do this over an acre (one acre is a square with sides that are 209 feet long) with a goal to select between 50 to 75 crop trees in woodlots with semi-mature trees (10 to 14 inches), and more trees in forests having smaller trees. If the amount of flagging looks like more cutting or girdling than you are comfortable with then reduce cutting by selecting fewer crop trees or by freeing some crop trees on only two sides. If two or three crop trees are growing together you can think of them as a group and thin around the group.

The end result of crop tree management will be crop trees that have the best chance to grow because of reduced competition from neighbors. Your crop trees will have the best chance for good health, seed production, and foliage development. Also, if you cut the neighboring trees rather than girdle them, then you will have some firewood in the process as well. Some forest owners are using the cut trees as a substrate to grow gourmet mushrooms for personal use or to sell in local markets.

Improvement cutting and crop tree management are tried and true strategies that can benefit forest owners whose objectives support the need to cut trees. However, as previously mentioned, don't confuse this with selective cutting where the biggest trees are cut to "let the little ones grow".

14. What's My Tree Worth?

By Peter Smallidge and Gary Goff

Many woodlot owners wonder about the value of one or more of their woodland trees. While the actual fair market value is what someone will pay based on a competitive bid process, you can easily learn what factors log buyers consider. The simple answer for the highest tree value is to concentrate growth on your best trees by cutting smaller and deformed trees, grow your best trees as large as possible, and work with a qualified professional forester and competent logger. Always check references on foresters and loggers.

The value of a tree in a woodlot depends on the volume and quality of the tree, but also on other factors related to accessibility and marketability. In managed woodlots, bigger trees usually have higher quality and thus much greater value. Firewood cutting or improvement thinning should remove the smaller and less well-formed trees. It's energy well spent to carefully thin around your best trees to concentrate growth on them.

One large, high quality tree is worth more than two small, low quality trees.

Foresters and log buyers consider both tree diameter and merchantable height when estimating tree volume. Diameter is typically measured in inches at four and one-half feet about ground and merchantable height (height to the first major defect like a large branch or fork) in feet or numbers of logs. These measures are used to calculate the tree volume in number of board feet by one of a couple mathematical formulas. A common formula is for the International Quarter Inch equation which estimates tree volume in board feet = [(0.16 x D x D x H) + (Q x D)] for trees between 15 and 19.9 inches in diameter with Q, the scaling factor equal to 1.5; D, the diameter, as inches; and H, the height, as the number of eight foot sections. So, a 17 inch tree with two 8-foot sections would have an estimated volume of about 118 board feet. For trees smaller than 15 inches in diameter Q equals 1.0 and for trees having diameters of 20 inches and larger Q equals 2.0.

Tree quality, or tree grade, depends on the number of defects in a tree that limit the types of products the tree could produce. A tree of low quality might have several knots, limb scars, wounds, splits and be only useful for firewood or making pallets. A higher quality tree would have few if any of these defects, and the highest quality trees may reach veneer quality. Judging tree grade is a complicated process best done by a log buyer who's bidding on your sale. They know what their mill is capable of sawing and thus adjust their bid to reflect mill capacity and their markets. One large tree of high quality is worth more than

two smaller trees of low quality, so again, keep growing those large diameter high quality trees.

Accessibility and marketability also influence the value of a tree. You can imagine a higher tree value in a woodlot having 60 versus 10 trees per acre. This higher volume per acre increases logging efficiency and thus reduces costs. Other factors that influence logging efficiency are terrain, woodlot distance to public road, local market demand for the species, and landowner requirements for logging quality and tolerance to damage of remaining trees. The logging costs associated with accessibility and marketability are difficult to pin down, but should be factored into the bid you received from your logger.

Many state forestry agencies prepare a stumpage price report or a timber marketing report that lists reported prices paid to landowners for standing timber. These reports usually give prices per thousand board feet (MBF). From our example above with a tree having 118 board feet, if the tree was black cheery growing in east-central NY with an average price of $930 per MBF ($0.93 per board foot) the tree has an estimated standing value of $110. If the same sized tree was sugar maple with an average price of $430 per MBF ($0.43 per board foot) the estimated standing value would be $50. If the tree was 22 inches in diameter, it's estimated value increases to $175 for black cherry and $81 for sugar maple. A modest increase in size often results in a large increase in tree value.

From a woodlot owner's perspective, understanding tree value requires some time and effort, but can help you make informed decisions. Large diameter trees of high quality will always be worth more than smaller trees, and advise to prematurely cut a woodlot or to cut only the largest trees usually means the woodlot owner is losing money in both the short-run and the long-run. It's always best to start with a written management plan that describes your woodlot objectives and goals and then work with your forester to select a trained logger.

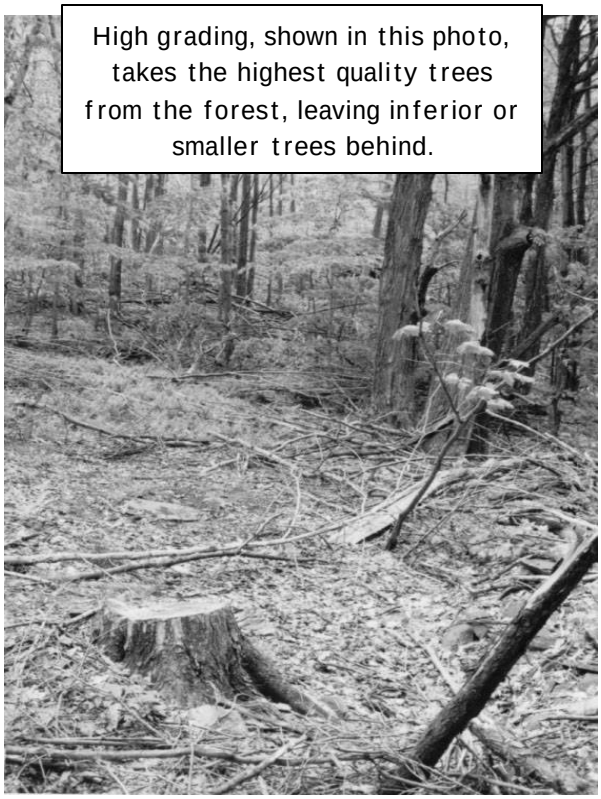
Foresters and forest owners can use a scale stick to estimate the size and then value of a tree.

15. Forestry Practices to Avoid: Just Say No to High-Grading

By Peter Smallidge and Michael C. Greason[1]

Currently the prices paid for timber in New York woodlots are good and harvesting activity has increased during the last decade. However, what may surprise many forest and woodlot owners is that some forestry techniques can limit options for future benefits and enjoyment -- both in the long run and short term. While well-planned timber harvesting can increase your benefits, "high-grading" and related practices should be avoided.

Cutting the best trees (those of highest value) and leaving the low value, often diseased or malformed trees, is too common. This type of forestry is called high-grading, where the highest grade (or value) trees are removed. By cutting only the largest and most valuable trees you remove those best suited to that site. The trees that are less well adapted remain as the next forest and the seed source for future forests. The financial gain of high-grading exists only briefly, yet ownership objectives can be sacrificed for decades. A similar analogy from livestock is the farmer or stable manager who shoots the blue ribbon bull or winning race horse and uses the losers for breeding stock. The quality of the herd, just as the quality of the forest and woodlot, declines rapidly!



High grading, shown in this photo, takes the highest quality trees from the forest, leaving inferior or smaller trees behind.

In addition to high-grading, similar practices exist with different names. High-grading is often disguised under the name of "diameter-limit cutting". This is a practice that removes all trees above a certain minimum diameter. In some rare situations diameter-limit cutting is appropriate. For example, if old pasture trees are shading the growth of young hardwood saplings. Often however, diameter-limit cutting removes trees of commercial value (above 12 or 14 inches in diameter) before these trees can attain a more valuable size and add seed and seedlings to the forest. Selective cutting (generally not recommended) differs from the selection system of silviculture (a legitimate technique) and is another technique where high-grading can occur. Selective cutting, as commonly practiced, involves selecting the highest quality trees and cutting them. (Technical note: selective cutting by definition can include other activities such as improvement cuts) The selection system involves someone professionally trained in silviculture to

[1] MCG is retired Chief of Private Land Services, NYS DEC. Now private consulting forester.

select trees from all age and size classes, both high and low quality to produce an uneven-aged forest. Diameter-limit cutting and selective cutting are often rationalized by arguing to remove the bigger trees so the smaller trees can grow. However, the smaller trees may be undesirable species, poor form, or poor heath. By any name, high-grading degrades the value of the forest regardless of the "logic" used by foresters or loggers trying to make a quick buck.

Why does high-grading happen? A common cause for high-grading is greed to maximize immediate profits. Beginning in the early 1970's, demand for high-value timber increased and sawmills could pay more for certain species. Thus, markets for high-value trees grew stronger while markets for low value trees did not. Further, it costs about the same amount of money to cut and haul a $10 tree as it does to cut and haul a $300 tree of the same size. Another factor is that taxes on forest land not under the NYS 480-a Forest Tax Law can create financial hardships that encourage landowners to maximize immediate profits. The result is that more immediate profit is gained by cutting only the highest value trees, but left behind is a legacy of low quality trees and under-productive forests. This knowledge helps explain high-grading, but doesn't excuse it.

What are the consequences of high-grading, is it really that bad? One result is that the trees that are left behind won't grow as quickly as better quality trees and the time until the next harvest is lengthened. In addition, the next harvest will remove the low quality trees previously left so the value at the next harvest will be reduced. If you magnify the practice of high-grading across a region, assuming the demand for wood products remains steady, then more acres must be harvested to meet the same demand. While timber harvesting is not bad, accelerated harvesting is not in the best interest of our natural resources and conflicts with a growing demand by the public for accountability of natural resource management. As the value of the land to produce timber crops decreases, the incentive to subdivide and develop increases.

Although high-grading usually leaves a forest of tall trees behind, there are other hidden ecological costs. Because the healthiest trees with the fewest defects are removed, the overall health

Cut the junk first. Leave high quality trees to continue growth and produce offspring.

of the forest is reduced. The remaining trees may be more susceptible to the effects of insects, pathogens, strong winds or ice-storms and less able to recover after these disturbances occur. Often high-grading emphasizes cutting of a few species and leaves behind other species. This reduction in tree species diversity can have negative consequences for wildlife that depended on the harvested species for food or shelter. Species such as red oak, sugar maple, and black cherry are economically valuable and produce seeds that are valued by wildlife. In any particular year, only one or a few species may produce an abundant crop of seeds. If those species were removed by high-grading, wildlife

that used those seeds will need to find alternative food sources and that seed source may be permanently gone from the woodlot.

So what can you do to avoid high-grading? One step is to work with competent and professional loggers and foresters. When you select a new refrigerator or car you likely consider several features, including price, reputation, service after the sale, and other long-term benefits. You'll certainly go see what the refrigerator looks like. You should use at least these same criteria when you select your forester and logger. Ask for references, find out if the forester participates in continuing education programs and whether the logger has completed the "Trained Logger Certification" program, make a visit to forests or woodlots where they have worked, and know that the best price may not provide the best treatment for your land. The logger who out bids his competitors for a timber sale by a few percent may be more efficient or may not devote enough effort to ensure your property is left in good condition. Similarly the forester or logger who promises you maximum short-term profit likely doesn't have in mind the best interests for you and your land. The consequences of selecting an incompetent forester or logger will exist longer than a bad choice on a refrigerator.

Select a competent, reliable forester and logger to work with you in your forest.

Another step to avoid high-grading is to have a written management plan. Your management plan will state your objectives and help keep you on track. The harvesting schedule in your management plan will help you decide when harvesting is appropriate. Just because a forester or logger offers to cut your timber doesn't mean it's the best time for your interests. The value of trees increases greatly as trees get bigger, and it's probably a safe assumption that good markets will continue to exist for high quality trees (although markets fluctuate). You may be advised that the trees are "over-mature" or "need to be cut". Know that these labels are subjective and they are only accurate in the context of your ownership objectives.

Third, look for creative solutions to remove the low value trees at the same time the high value trees are harvested. A harvest that removes high-value and low-value trees provides financial benefits from the high- and low-value trees and improves the quality of the residual forest. One way is to have the forester mark and the logger skid the low value trees to the log landing. Then you can cut them yourself for firewood, or sell them to a firewood processor. This will require extra effort on the part of the logger and forester, which means you might not make as much money, but the benefits, including even greater profits, will exist a few years down the road.

Finally, get assistance from people focused on your interests to help you develop long-term objectives and management plans. Master Forest Owner Volunteers are forest owners trained through Cornell Cooperative Extension to provide nontechnical assistance to forest owners. They can help other you think through your management objectives and provide sources of information. Also, NYS Department of

Environmental Conservation public service foresters are available for free consultation and can provide technical expertise and guidance on forest management. Both of these groups of people can provide free, unbiased information and advice that will help you avoid some of the pitfalls of practicing short-sighted forestry. The Catskill Forest Association and New York Forest Owners Association are landowner groups dedicated to helping other landowners enjoy their forest land. Contact your county office of Cornell Cooperative Extension or the nearest DEC office for more information. The DEC and the Society of American Foresters maintain lists of foresters with certain credentials. These lists include people who have made certain investments in their professional development, but in no way do the lists assure competency. Links to the DEC forestry offices, the SAF Certified Forester program, and an article on how to select a forester are available on the Cornell University Forestry Extension web page.

What can you do if your woodlot was previously high-graded? In simple terms, you need to have a vision for what you want your forest to look like and then a planned set of actions to move you towards that goal. High-grading often happens incrementally, where the first entry removes the very best trees and months or a few years later the rest of the valuable trees are cut. Once you get started on correcting past exploitations your actions, which should link directly to your ownership objectives, depend on what you have to work with in your forest. A lightly high-graded forest may need only some thinning around the best trees and steps to ensure the forest can be effectively regenerated when the time comes. A heavily high-graded forest may no longer have the tree species you desire which will require you to create openings that you then plant to your desired species. The size of the openings and the species to plant will depend on the specifics of the site. A competent forester and your willingness to invest time and probably money are necessary to move a high-graded forest back to a sustainable forest.

Because the biggest trees are cut during a high-grade, there is often substantial damage to the smaller trees.

16. Understanding and Preventing Timber Theft

By Peter Smallidge and Michael C. Greason[1]

With timber prices rising, more people are reporting that trees have been stolen from their forest land. Because many forest owners don't know when or if they have been victimized, it's difficult to determine just how common this problem has become. There are many honest loggers and foresters that work in the woods, but enough dishonest people to warrant you take preventive steps. Here are some thoughts and strategies to help protect your forest and trees.

There are two general categories of timber theft. One category is when you have made an arrangement with a logger or timber broker who deceives you into thinking you are being paid what you deserve for your timber. Typically this is not illegal, and your best strategy is to seek counsel from unbiased people before you agree to a timber sale. You can get preliminary assistance from a Master Forest Owner volunteer through your county office of Cornell Cooperative Extension. Your local DEC office has unbiased professional foresters who can assist and who can help you find a private consulting or industrial forester and a Certified Logger. The second category of timber theft, and the focus of this article, is when someone takes trees from your property without permission. The thieves may access your land from your neighbor's property, may steal trees from your property during a scheduled timber harvest on your land, or may steal trees from your property in your absence especially if you're an absentee forest owner.

What can you do to prevent this? There are several steps you can take that will reduce the potential of your property as a target and increase your ability to establish claims if you become a victim. These steps include marking your property boundary, talking with neighbors, marking trees for cutting before you conduct a timber sale, not accepting money if you suspect timber theft, and checking references before you hire a forester or a logger.

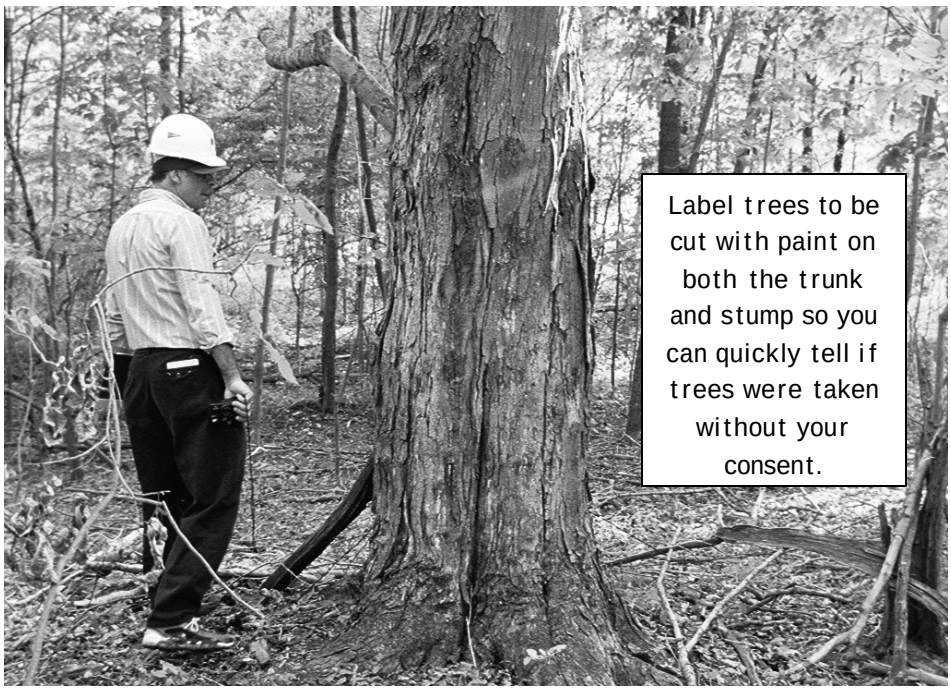
The first line of defense against timber theft is good communication.

[1] MCG is retired Chief of Private Land Services, NYS DEC. Now private consulting forester.

An important, yet frequently overlooked step is for you or someone you hire to clearly mark your property's boundary lines whether or not you ever plan to harvest timber. If you do not post your land, blazed and painted boundary lines make it easier to prove criminal intent and can be effective in discouraging a dishonest logger from attempting to steal your trees. Thieves who call themselves loggers or foresters may initiate a legitimate timber harvest on your neighbor's property with the intent of gaining access to your timber. Knowing your boundaries and making them visible are good preventive measures.

Talking with your neighbors will help you know when logging is going to occur in your area and you can let your neighbors know when you are planning a harvest. Ask your neighbors to tell you if they plan a timber harvest and that you will return the favor. If your neighbor is planning a harvest, take the time to introduce yourself to the logger and offer to walk the property lines with the neighbor and the logger so there are no misunderstandings. An honest logger will appreciate your assistance and a dishonest logger will know you are not an unsuspecting potential victim. Also, you, your forester, or your friend should inspect your property during and several days after the neighbor's harvest looking for signs of illegal entry or cut trees. If your neighbors expect advance notice from you of logging on your property, they will know how to respond if they see logging activity on your property. If you talk with your neighbors, you will know to expect loggers and know if none are expected. Call your neighbors or the DEC if you see unusual activity in the woods.

Having a forest management plan, being an active forest manager, using professional foresters, and working with loggers from the "Trained Logger Certification" program can protect your forest and prevent your property from being used to steal your neighbors' trees. Select good foresters and loggers by checking references and credentials. Also, mark trees with paint prior to a timber harvest. Mark trees at chest height so loggers will know what trees to cut and also mark those trees at ground level so you will know if a tree was cut without your knowledge (be suspicious of loggers who carry paint cans). You can mark the perimeter of the area being harvested to limit access to other areas of your forest land. Also, include in your sale contract your policy for cutting unmarked trees. For example, some timber sale contracts will stipulate that unmarked but cut trees will be valued at $100 per tree plus three times the stumpage value. Discuss with your forester your expectations for regular



Label trees to be cut with paint on both the trunk and stump so you can quickly tell if trees were taken without your consent.

inspections during your harvest and a post harvest inspection. Your forester should be familiar with reputable loggers, and those who have completed the "Trained Logger Certification" program.

Unfortunately all these preventive steps won't guarantee some of your timber will not be stolen. If you happen onto a theft in progress, immediately contact your county sheriff and the DEC Bureau of Conservation Investigation (see numbers below). If the logger claims to have accidentally gotten onto your property do not accept money for trees taken because you won't be able to establish the timber removal was theft and you don't know the value of the trees that were taken. It is the responsibility of the logger, forester, and property owner where harvesting occurs to know where property boundaries are located, even if unmarked, to avoid this situation. If you are walking through your forest and notice stumps you didn't expect you should call the DEC. You will likely have to hire a private consulting forester to estimate the value of timber stolen, but this will help ensure you are fairly compensated. The state attorney general's office is increasingly able to respond to and prosecute timber theft.

This red oak was left behind when state police interrupted a timber theft. The log illustrates the quality of the trees stolen.

Timber theft is a concern for everyone involved in good forestry. Several groups have worked together to produce a video on timber theft, including New York Forest Owners Association, the Department of Environmental Conservation, Catskill Forest Association, Empire State Forest Products Association, and Cornell Cooperative Extension. If you would like to see a copy of the video, contact either: your local NYFOA chapter; the NYFOA general information hotline number; Catskill Forest Association; or your local DEC office. Strengthened legislation coupled with increased public awareness and forest owner and logger education can reduce this growing problem.

17. Enhancing Wildlife Habitat: A Primer

By Gary Goff

Most NY forest owners value the wildlife on their land more highly than its timber potential. Fortunately, management for either objective can be quite compatible for the other. That is, few sacrifices need be made to enhance both objectives simultaneously.

Wildlife management is a broad topic that fills volumes of texts. The purpose of this section is to introduce a few important concepts that can be the basis for further study. Fortunately scores of excellent publications have been written for forest owners interested in enhancing their lands for wildlife.

The basis of all wildlife management is on creating or preserving HABITAT. Habitat equates to home and consists of the necessities of life that are food, water, and cover. Technically there is no such thing as "good wildlife habitat". Habitat has little meaning as a general term, but is best associated with a single species or perhaps with a community of species that live in the same geographic region. Examples of wildlife communities would be the set of species that live in a wetland or a mature northern hardwood forest.

As a woodland owner, your goal may be to supply quality habitat for a favored wildlife species. How good or suitable the habitat is will be determined by the quantity, quality, spacing, and availability over time of the food, water, and cover your land can supply. Let's use the gray squirrel as an example of the species for which you might wish to supply "good habitat". Squirrels need adequate food supplies 12 months of the year. Spring foods can consist of tree flower and leaf buds, summer foods might be mushrooms, seeds and berries, and favorite fall and winter foods are apples and nuts. Stable squirrel populations are dependent on a variety of different foods in each season as the quantity of any one food item will vary year by year. Water is seldom a problem for squirrels, but the provision of a pond, a stream pool, or the deepening of a seep can help ensure a year round supply. Squirrels need nesting cover and winter denning cover. Both of these are best supplied by hollow den trees. The last factor to consider is the spacing or juxtaposition of food, water and cover throughout your woods. The more interspersed these habitat components are, the larger the population of squirrels the woodlot can support as each squirrel have all his habitat needs within a relatively small home range.

If you want to attract gray squirrels to your forest, you need to provide habitat that offers a year round food supply.

All habitats have a carrying capacity

A common goal of forest owners is to optimize the number of "favored" wildlife species on their land. That generally means they want to increase the population size. To do so then the habitat needs to be improved to support more individuals. Just as a pasture will support only a certain number of livestock, a woodlot will only support a limited number of any one wildlife species. This number is called the carrying capacity, or the number animals of a species that an area of land can support over a period of time. The focus of management should be on the habitat limiting factor, i.e., the one habitat component that is limiting the growth of the population or not allowing the carrying capacity to increase. Using squirrels once again as an example, winter dens are often

Turkeys range over 10 square miles to find sufficient food and shelter.

the limiting factor in relatively young woodlots because there are few old, mature trees with suitable cavities. In such woodlots, squirrels build leaf nest that are inferior to cavity dens. In this circumstance, the owner might decide to build artificial dens out of wood or old auto tires.

It is often impossible to supply all the habitat requirements of a species on one ownership parcel. Deer have a home a home range of at least 600 acres, a flock of wild turkeys may range over 10 sq. miles in search of food and cover, and mated pairs of barred owls defend a home territory of 675 acres. Therefore, it is best to focus on providing the habitat component that is in shortest supply in the "neighborhood". To identify the missing component, conduct a driving or walking tour adjacent ownership parcels and/or obtain an aerial photo of the area and look for missing components, such as conifer cover, open grasslands, wetlands, mature forests, etc.

Forests are an ever changing ecosystem

In the previous example the woodlot would develop large, old trees in time. This points out another important factor to consider, when choosing appropriate habitat management practices. All woodlots are part of an ever changing ecosystem, i.e., an interacting system of plants, animals, soil, microorganisms, and climate. Nature generally follows a fairly orderly and predictable process whereby one plant community is gradually replaced by another over time. This process is called natural succession. In time, as young forests become older, more and more trees will become larger and start to decay, thereby supplying cavity dens for squirrels and a multitude of wildlife species dependent on tree dens. Here, time works well for the person interested in squirrels. However, the owner interested in early succession-stage wildlife, such as ruffed grouse and cottontail rabbits would not be pleased with the transformation of a brushlot (good grouse habitat) to a mature forest over time. His objective might be to hold succession at its current stage or even to set it back to a combination of brush and grasslands. It's true that everything a forest owner does (or doesn't do) affects the wildlife.

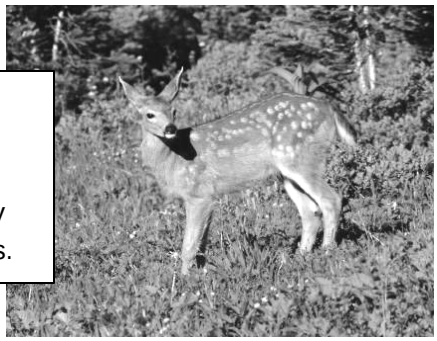
Nature's way of setting back succession is commonly through what humankind calls natural disasters, i.e, floods, wind and ice storms, fire, and insect or disease epidemics. Beavers are perhaps a bit more acceptable to our way of thinking, but the results are the same. Each of these forces can rapidly transform a mature forest to a brushlot in a matter of hours or perhaps months. Such vegetative changes are followed by a corresponding change in the wildlife community inhabiting the area. Landowners use chainsaws, brushhogs, controlled burns or perhaps herbicides to set back succession to a plant community of a size, age and species composition that provides improved habitat for desired wildlife species.

Obtaining adequate regeneration is critical to successful habitat manipulation.

Regeneration is the process by which forests are replaced or renewed by natural or artificial means. Cutting or planting vegetation is undertaken to change the age, size, vigor, species, or form of the vegetation that makes up the current brushlot or timber stand. The goal is to provide better cover or food for desirable species. While the goal is usually laudable, success is often difficult to achieve. A multitude of variables intervene and often lay waste to the best plans. Deer, rabbits and voles typically gobble up plantings. Droughts raise havoc with new tree plantings. Tree and shrub species must be well matched to site characteristics. Successful natural regeneration through seeds or sprouts is greatly influenced by deer populations, site characteristics, availability of seed sources, competition with other vegetation, timing or season of the cutting or harvest, and existence (or absence) of advanced regeneration. Luck will not win the day as there are just too many variables that must be controlled and correctly factored into a management plan. Do everything you can to ensure successful tree or shrub regeneration, as failure is just too expensive in terms of squandered time, money, resources, and opportunity.

What's a forest owner to do?

As described earlier, help is available through scores of affordable publications and videos written for private forest owners. A few suggestions appear at the end of this booklet. Beginners should work out a simple, inexpensive, not time consuming plan of work that is virtually fool proof. It's important to develop the process of determining the habitat limiting factor and devising a management activity to supply the missing component. Always work with nature in a manner that complements natural succession rather than attempting to overpower it. Once experience breeds confidence, the complexity, and expense of time and effort can increase to address more demanding goals. An example of a relatively high success habitat improvement project is the building of bluebird houses. Most "bluebird" projects describe the habitat needs of bluebirds and provide some excellent construction designs for safe, species specific houses. Projects involving the creation of water or wetland habitats are usually moderately complex and "expensive", but often bring immediate and rewarding results as a new wildlife community moves into the newly established ecosystem.



Deer often interfere with plans for regeneration by eating seedlings.

Finally, perhaps the most ambitious and challenging endeavor of a forest owner interested in wildlife habitat improvements is coordinating sawtimber management and eventual harvests with wildlife management goals. The size of the operation and the magnitude of change often from a mature woodland to seedling-sized trees will bring about a significant change in the appearance of the woodlot and its suitability for various wildlife species. Still, the change can bring about some great opportunities to diversify the woodland vegetation and thereby provide a greater variety of habitat suitable to a greater variety of wildlife species. Also, many wildlife species depend on a variety of successional stages of forest at various stages of their life and through the seasons. As an example, wild turkeys benefit greatly from having a combination of open fields, brush and mature woodlots composed of mixed hardwood species in their home range.

Summary

1. Get to know the life cycle and habitat requirements of wildlife species of interest.

2. Understand your forest holding and adjacent ownerships to judge the area's habitat suitability for species of interest. A site visit by a Master Forest Owner/COVERTS volunteer can be a big help at this stage of planning.

3. Identify habitat-limiting factors that seem to be restricting population growth of desired wildlife species.

4. Start with relatively sure-fire, low-in-put management practices to gain confidence.

5. As practices become more complex and demanding, learn to work with nature toward achieving your goals.

6. Plan to work diligently toward achieving successful regeneration, as changes in vegetation composition will influence your forest for decades.

7. Set goals that are compatible and complementary, such as timber harvests that create new habitat for desirable wildlife species and provide other attributes such as access roads, scenic view, wildlife-observation locations, and funds for management equipment.

For more information, see the "Additional Information" portion of this booklet.

In order to attract desired species, you need to know about their life cycle and habitat requirements.

18. Creating Woodland Pools for Amphibians and Other Wildlife

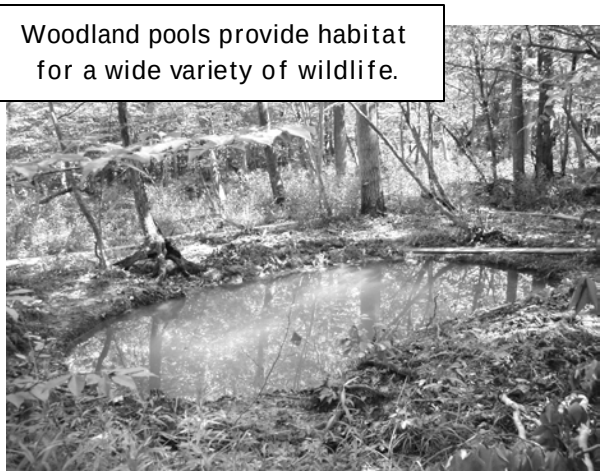
By Kristi Sullivan and Steve Morreale

Much of our forestland today exists on lands that have been intensively managed in the past, either as working forests or agricultural land. The result is that these lands often are somewhat uniform and may lack elements of habitat complexity – large, fallen dead trees, pit and mound topography, and pools or ponds of water that form naturally when the forest floor rises and falls – that add diversity to wildlife habitat. By following the steps outlined ahead you can create woodland pools, enhance habitat complexity and provide a haven for wildlife.

Woodland Pools and Wildlife

Woodland pools are valuable to most species of wildlife and essential to some. With an increasing concern about amphibian health and population declines, the role of these valuable forest refuges is becoming more evident. Amphibian such as the spotted salamander, Jefferson salamander, wood frog, and others, breed and lay eggs in these ponds. Though these species do not live in water year-round, they are dependent upon water to complete their life cycles. Many other species of wildlife may benefit from the presence of woodland pools. Insects like dragonflies, damselflies and water boatman find refuge in the water. Aquatic reptiles such as the painted turtle or northern water snake may inhabit woodland pools, especially those in sunny forest openings. Many snakes, and mammals such as shrews, voles, mice, skunks and raccoons, may feed on the insects, amphibian larvae (tadpoles) and eggs, frogs, or salamanders found in or near the water. Turkeys as well as songbirds may stop at woodland pools to feed on insects or nest in lush vegetation nearby. Other species, such as deer, may feed on succulent plants growing near the water's edge or stop by for a drink.

Woodland pools provide habitat for a wide variety of wildlife.



The creation of woodland pools is an easy way to provide habitat for a broad array of wildlife species. These pools, or ponds, can replace some of the valuable habitat that has been lost as a result of past land-use practices and add diversity to wildlife habitat in your area.

Ten Steps to Creating Woodland Pools

There are many factors to consider when creating woodland pools. Do you have a workable location? How will you construct your woodland pools? What features can you add to make your pools attractive to wildlife? Below are ten steps to guide you in making your decisions.

1. Determine if you have an adequate water source

There are three main sources that may provide water for your woodland pools – surface run-off, groundwater and precipitation. Your pond may be fed by one or more sources and their inputs may vary seasonally.

Groundwater is water that is found underground in cracks and spaces in soil, sand and rocks. The

top of the area that is saturated with water is called the water table and may be deep or shallow. Rain or snowmelt can raise the water table, whereas the water table may recede during dry periods. Groundwater flows through spaces in the soil and may come to the surface as springs or seeps. If the water table at your site is consistently higher than the maximum depth that you expect your pond to be then groundwater may provide a good source.

Many small amphibians, like this wood frog, require habitat that will be constantly moist and cool throughout the year.

Surface water run-off is water that flows down slope following a rain event or as a result of snowmelt. Surface water can often provide a reliable water supply, particularly when the soils on-site are impermeable clay. When selecting a location take precautions to choose an area that will not receive polluted agricultural or suburban surface water run-off. A woodland pool that is polluted is a hazard to the animals that are attracted to it.

When considering a placement site, it is a good idea to monitor the site for a full year before beginning construction. Take notes on the wetness of the site during different seasons and record any areas where surface flow is evident and could be intercepted. By digging several small test pits that are at the maximum depth that you expect your pond to be, you can monitor the groundwater level in the pit throughout the year.

2. Consider the topography

When choosing a location for your woodland pool, topography should be considered. A steep hillside slope, for instance, will probably not hold water. A flat area on the crest of a mountain ridge may hold water provided that the soils are impermeable and precipitation is adequate to fill the pool during some period during the year. However, by strategically locating your pool at the base of a slope, you have the opportunity to intercept the maximum amount of surface run-off.

3. Consider the landscape

The success of your ponds as amphibian habitat and habitat for other wildlife will be determined largely by the surrounding landscape and availability of source habitats nearby. Because of their limited size and need for moist, cool habitat conditions, many frogs, toads and salamanders have limited dispersal abilities and are unable to move great distances over dry, hostile terrain. In addition, although most amphibians depend on water to complete some part of their life cycle, many also spend a considerable amount of time in the forest. A woodland pond that is isolated from other areas of forest by roads, development or other disturbances will not attract as many species as a similar pond located in a forested landscape with limited disturbance. By locating new ponds close to other ponds, wetlands, or streams, plants and animals will be able to colonize more rapidly. Consider developing a cluster or complex of ponds instead of just a single pond.

4. Decide how you will construct your pools

There are several options for constructing pools and ponds. For larger ponds, you may want to hire a contractor with experience in pond construction. Constructing a pond for wildlife, however, requires elements that typical fishing or swimming ponds do not include. Therefore, it is

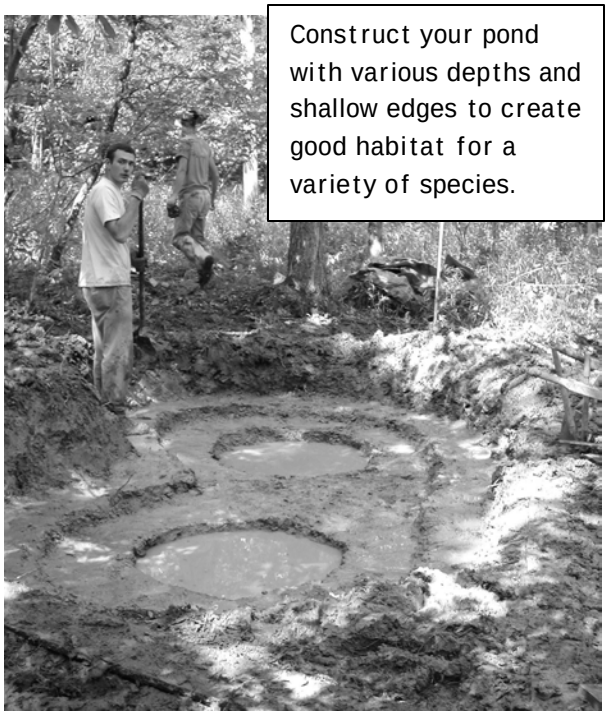
important to discuss the details of your goals with the contractor to ensure the success of the project.

At times it may be possible to install a pool or pond as part of an ongoing timber harvest or other activity. Skid trails that will be abandoned can provide the opportunity to create a woodland pool. By dropping the blade on the bulldozer, a logger can excavate a shallow 1-2 ft depression that can develop into a shallow pool.

Another way to construct small woodland ponds while minimizing disturbance to the surrounding area is to dig your ponds by hand. Although labor intensive, this method can be very successful. To follow a specific design that you are planning you can use a large plastic tarp and draw your pond design with a permanent marker. Cut small holes along the lines and insert small flags to mark the perimeter of the pond and areas of similar depth. Then lift the tarp off of the area and use the flags as your guide. By beginning with the deeper areas first you can prevent water from filling in your shallow areas while you are still digging.

5. Plan to create variable depths and hydro-periods

Pond depth, size and hydro-period (length of time water is present during the year) can all influence the plant and animal community. Some animals, such as wood frogs, only require standing water for a few months in the spring and early summer to allow their eggs to hatch and tadpoles to metamorph to young froglets. Other species, like the green frog, require permanent water to complete their 2-year cycle as tadpoles. By providing a mixture of different sizes and depths within a single pond, or among a group of ponds, you can create a mosaic of



Construct your pond with various depths and shallow edges to create good habitat for a variety of species.

permanent, semi-permanent and seasonal pools. This approach mimics natural habitats, providing habitats for a greater variety of plants, invertebrates, amphibians, reptiles, birds and mammals than a single pond of uniform depth.

6. Include shallow, sinuous edges

Pond edges should be sinuous and shallow when possible to support abundant semi-aquatic vegetation and allow wildlife to easily access the water. Low, flat islands can be incorporated into your design to add basking sites for frogs and turtles and nesting sites for birds.

7. Beware of fish

If you wish to provide the best habitat possible for frogs, toads and salamanders then fish should be excluded from your woodland pools. Fish are voracious consumers of frog and salamander eggs and larvae and will exclude many species. Animals like the wood frog and spotted salamander need to be on the move searching for food regularly in order to complete their transformation to land in just one season. These species are highly visible to foraging fish.

The addition or accidental introduction of fish into your pond will likely exclude many species like the spotted salamander that are prone to predation.

8. Add organic matter

When woodland pools are constructed, retain the organic topsoil layer and reapply it over the finished product. Leaf litter, sticks and logs can also be added to provide hiding places and food for invertebrates, as well as attachment sites for frog and salamander eggs. Rocks, roots, stumps and logs can also be added or retained around the pond perimeter or nearby to provide hiding places for amphibians, reptiles and small mammals.

9. Add plants

You can also add plants to newly constructed ponds to stabilize the soil, attract insect food and provide cover and an additional source of organic material. As vegetation diversity is increased, the numbers of wildlife attracted to the area may increase as well. Native, local species should be used because they are adapted to the local climate, soils and surrounding plant and animal communities, and are more likely to do well. Avoid planting invasive species such as purple loosestrife that can take over a site and minimize benefits to wildlife.

10. Enjoy!

Our woodland pools at the Arnot Forest attracted green frogs before they were even completed! Within the first year, the spotted salamanders, wood frogs, and green frogs colonized and laid eggs in the ponds. The result is that we have hundreds of wood froglets hopping around the ponds. Eastern newts have also moved into the ponds, and pickerel frogs, garter snakes, and a wood turtle have been spotted along the perimeter. You too can create a wildlife oasis and enjoy interacting with the animals you attract!

19. Managing Birds in New York

By Kristi L. Sullivan

New York State is home to 454 species of birds, 242 of which have bred in New York. Some species, such as black-capped chickadees and tufted titmice, are permanent residents and live here year-round. Others breed in New York during the spring and summer and migrate to sunny South or Central America to spend the winter. These birds, such as the wood thrush, ovenbird, and warblers, are called "Neotropical migrants". Other birds, such as the American robin or rufous-sided towhee, breed in New York and migrate to a more southerly state for the winter. Such birds are termed "short-distance migrants". A number of species, such as the tundra swan or black-bellied plover, migrate through New York on their way from their winter grounds to their breeding grounds and simply use the state as an occasional rest area. Once in a while, an individual bird or flock of birds that have no official place in New York are blown off-course en route to their destination and we are fortunate enough to be able to view them. Such birds, like the northern wheatear and yellow-billed loon, are termed "accidental" and are a rare sight to behold.

New York has a variety of landforms with a diversity of topographic and climatic conditions. Because of the diversity of New York's physical environment, from the Atlantic Ocean to the Great Lakes, the coastal lowlands of Long Island to the high peaks of the Adirondacks, the state supports a varietyof vegetation types and provides habitat for many different kinds of birds. If you want to view the whole host of species that reside in New York, you will need to do some traveling. However, your backyard, forest la nd or open field may support dozens of bird species and provide endless opportunities for observation without leaving home at all!

If you want to attract a desired species to your forest, such as this tufted titmouse, you need to understand its behavior and habitat needs.

Guilds

A guild is a group of animals within a community (e.g., deciduous forest, meadow, emergent wetland) that uses similar resources in similar ways. Birds are often placed into guilds based on their food preference or feeding habits. For example, some birds eat seeds (gramnivores), some are insect-eaters (insectivores), and others are fruit-eaters (frugivores). Some insectivores glean insects from the foliage of vegetation, while others "hawk" insects from the air. Some birds feed at ground level, while others feed in the forest canopy or sub-canopy. Birds are also placed into guilds based upon their nesting habits. For instance, some birds build their nests on the ground, some locate their nests in the forest canopy, some nest in shrubs, and others nest in tree cavities. Thinking of birds in terms of the guilds to which they belong helps us to understand the reasons that a particular bird or group of birds may or may not be present in a particular habitat.

Habitat Types

Your property may contain a variety of habitat types including forest, shrubland, grassland, or wetlands. The habitat type will largely determine the kinds of birds that live there. For example, red-eyed vireos, scarlet tanagers and black-throated green warblers live in the forest. Indigo buntings, gray catbirds and song sparrows prefer shrubland. Grassland, such as hayfields, pastures, and fields at airports, support species such as the eastern meadowlark, vesper sparrow, savannah sparrow, and bobolink.

Habitat Structure

In addition to the type of habitat that is present, the structure of the habitat also will influence the kinds of birds inhabiting an area. For instance, within grassland habitat, eastern meadowlarks prefer grass-dominated fields with thick layer of dead grass and scattered shrubs and forbs for perches. Bobolinks nest in older grassland where vegetation is sparser and dominated by grass and there is a mix of forbs and small shrubs. Grasshopper sparrows prefer fields with short bunch grasses, patches of bare ground, and shrubs or fences for perching. Each of these species prefers grassland habitat with a slightly different structure.

Likewise, vertical structural diversity and patch diversity are very important considerations in managing for forest birds. Vertical structural diversity refers to a forest with a well-developed overstory, understory, shrub, and herbaceous layer. Maintaining vertical complexity within the forest allows a variety of birds to coexist. Many birds divide habitat vertically. For example, ovenbirds, scarlet tanagers, and chickadees are all found in mature forests, but ovenbirds feed mostly on the ground, tanagers prefer the canopy top, and chickadees like intermediate heights. More species are able to coexist in a forest with multiple layers than in a forest where all the trees are the same height. Vertical diversity is greatest in forests with a large variety of trees of different ages. Within similar forests, vertical diversity is greater in areas with few deer. Large deer populations often browse and remove the lower layers of vegetation.

Horizontal diversity, or patchiness, refers to the variety, size, and shape of both living and nonliving organisms across an area. Typically, the greater the horizontal diversity, the greater the diversity of birds. Patches can be created by groups of trees of different age and size classes, stands of different types of trees (coniferous versus deciduous), or openings in the forest canopy. Patches may be created naturally (e.g. fire, wind-throws), or they can be created through active forest management.


The purple finch's preferred habitat is coniferous forest.

Other special features within a habitat can provide additional elements that benefit birds. For instance, rotting logs on the ground attract insects and fungi, providing food for birds. Standing snags, provide cavities for nesting and additional feeding sites.

Area Requirements

Many migratory songbirds require very large areas of habitat. Such birds are termed area-sensitive species. Typically, area-sensitive species are thought to be forest inhabitants. However, some grassland species, such as the upland sandpiper or Henslow's sparrow, require grassland areas of 100 acres or more. Most area-sensitive grassland species in New York have declined significantly over the past 30 years, due to a decline in the amount of large, contiguous acreage of grassland habitat available for nesting. This loss of habitat was predominately due to changes in agricultural technology including earlier and more frequent mowing, reversion of farmland to forest, and suburban development.

Area-sensitive forest songbirds, such as the ovenbird, red-eyed vireo, and scarlet tanager, may be absent from small forest patches and reach their greatest abundance in forested areas greater than 250 acres. When larger forests are fragmented into several smaller forests, the habitat needs of these species may not be met, and they may become less abundant or absent altogether. Forest fragmentation results primarily from human modification of the environment. When large forests are fragmented into several smaller forest areas by suburban development or agricultural activity, several changes occur. First, the proportion of edge habitat increases. Subsequently, densities of nest predators such as the American crow, common grackle, raccoon, and opossum increase. These species prey upon both eggs and nestlings. Populations of the brown-headed cowbird, a brood parasite, also increase. Cowbirds never build their own nests but instead lay their eggs in the nests of other birds, which often raise the cowbird young at the expense of their own. Because the cowbird is a relatively "recent" immigrant from the midwest, many eastern forest songbirds have not evolved behavioral strategies to be able to cope with brood parasitism.

The fragmentation of forests causes an increase in edge habitat and also increases the abundance of nest predators such as raccoons.

Habitat Mixture

Although some species require extensive areas of forest, others need a mixture of habitat types. The wild turkey requires several habitat types and a flock of turkeys may use thousands of acres during the year to meet its needs. For example, they display in fields or open woods during the spring breeding season. Turkeys often nest in brush piles created from logging harvests or blow-downs. During the spring and summer, turkeys feed on grasses, forbs, seeds, and insects found in fields and forest clearings. However, in the fall, they feed in mature forests containing mast-producing trees, such as oak and beech. Fruits of dogwood, grape and black cherry also serve as fall food for turkeys. During winter they rely on fruits and nuts left over from fall and on green plants and insects found in and around spring seeps, where groundwater emerges at the surface along hillsides and lower slopes.

Observing Birds on Your Property

As noted, the types of birds that will inhabit your property will depend upon the type of habitat, habitat structure, and size of the area. As

time goes by and plant succession progresses, bird communities will change. Species that were once common may no longer be present or may be less abundant. New species will appear. Habitat management can help to maintain habitat for a specific species or groups of species. For example, periodic mowing or burning can be used to keep fields from succeeding to shrubland. Timber harvest can be used to create early successional forest or forest openings. Timber stand improvement can be used to allow more light into the forest floor, encouraging the growth of shrubs and understory trees, and increasing vertical diversity. Snags can be left whenever possible to provide homes for cavity-nesting birds.

To safeguard habitat for area-sensitive species, you can avoid creating edge habitat. For area-sensitive grassland birds, fields can be maintained in a shape that will minimize the amount of edge. For instance, square fields have less edge than long, thin rectangular fields. When clearcutting, manage in large blocks of 40 acres or more, if possible. Many species that inhabit early-successional shrub/sapling habitat do better in large clearcuts, and one large clearcut will create less forest edge than several small clearcuts. When large clearcuts mature, they then provide large blocks of habitat for mature-forest birds.

One of the easiest ways to improve bird habitat on your property is to favor trees and shrubs that produce seeds or fruit. Juneberries, dogwoods, sumac, elderberries, cherries, grapes and blueberries all produce fruit that will be eaten by birds. Birch, alder, and hemlock are just a few species that produce seeds eaten by birds. Food-producing trees and shrubs can be planted or, if they are already present, can be encouraged to grow. Most fruit-producing shrubs require some sunlight to produce fruits. Thinning of mature trees can allow more sunlight to penetrate to the forest floor or understory, thereby increasing fruit production.


Elderberries

Summary

There is no one correct way to manage for birds on your property. An unlimited number of options exist, none of which will benefit all species. Management practices that encourage some birds will discourage others from using an area.

If your property contains habitat that is of special value to birds, such as a 100-acre grassland field, a wetland, or other habitats that are rare or unusual in New York, focus on maintaining those areas. Of the bird species that are decreasing in the northeastern United States, 76 percent inhabit grassland or shrubland habitat. Since the early part of this century, a great deal of farmland has been abandoned and much of the open land that once existed has grown into forest. Therefore, if your property contains grassland or shrubland habitats, you might try to maintain them. In addition, you could manage your property in the context of the surrounding region. For instance, do you have the only large, contiguous expanse of forest in the area?

Although the amount of forest land has increased since the beginning of the century, suburban development has fragmented our forests into smaller habitat islands. By maintaining large, unfragmented forests, you can contribute to the regional diversity of birds by carefully managing your forest to minimize fragmentation.

Consider the needs of birds in your timber plans. For instance, maintain snags and downed logs whenever possible, and encourage vertical diversity when practical. Manage stands to include a diversity of tree species that provide a variety of food and nesting options. By considering the needs of birds when you manage your property, you will be rewarded with endless opportunities for observation, the ecological benefit of insect pest control, and the satisfaction of knowing that you are helping to safeguard the future of New York's birds.

Additional Information

From Getting Started with Forest Stewardship:

If you would like additional information you can contact Cornell University Department of Natural Resources (607/255-2814) and request the "Extension Forestry General Information Packet". Also, contact your local office of Cornell Cooperative Extension for publications such as the Conservation Circular "Assistance for New York Forest Owners" or Information Bulletin 193 "Wildlife and Timber from Private Lands: A Landowner's Guide to Planning".

From Field to Forest:

For publications and contacts for a Master Forest Owner Volunteer and DEC professional forester in your area. Publications that may be of particular interest include: Timber Management for Small Woodlands (#147IB180), and Managing Small Woodlands for Wildlife (#147IB157). For those interested in crop tree management, contact the USDA Forest Service at (304) 285-1592 for "Crop Tree Management in Eastern Hardwoods" publication number "NA-TP-19-93".

From What is Sustainable Forestry?:

For more information on certification of forests visit the Oregon State University web site at http://www.cof.orst.edu/

An overview and comparison of forest sustainability monitoring efforts from across the country is available through the USFS Northeastern Area at http://www.na.fs.fed.us/sustainability

From Determining Management Objectives:

For more information call NYFOA at (800) 836-3566 or CFA at (914) 586 - 3054.

You can download a free copy of the Forest Stewardship Planning Guide from the world wide web at http://www.fs.fed.us/ne/burlington/ned/index.htm

From Developing a Woodlot Management Plan:

Additional details are available in the Cornell Cooperative Extension bulletin #147-IB-193. For more assistance contact the nearest DEC or CCE office. A slide show version of this article is available at the Cornell Forestry Extension web page at http://www.dnr.cornell.edu/ext/forestrypage

Master Forest Owners can be reached through your local Cooperative Extension office or at the MFO web site http://www.dnr.cornell.edu/ext/mfo

You can contact a consulting forester or an industrial forester for assistance with a plan:

New York Forest Owners Association http://www.nyfoa.org

Catskill Forest Association http://www.catskillforest.org

Several helpful resources exist to help you with the process. A good publication is the CCE bulletin, "Wildlife and Timber from Private Lands: A landowner's guide to planning", reference #147-IB-193. NYS DEC foresters will visit your property and prepare a stewardship plan free of charge.

For more assistance contact the nearest DEC or CCE office.

From Working with Foresters:

Websites to help locate potential foresters and help you work with foresters:

Cornell Forestry Extension www.dnr.cornell.edu/ext/forestrypage

Master Forest Owner volunteers www.dnr.cornell.edu/ext/mfo

DEC Private Land Services www.dec.state.ny.us/website/dlf/privland

New York Forest Owners Association www.nyfoa.org

Catskill Forest Association www.catskillforest.org

Society of American Foresters, Certified Foresters www.safnet.org

New York Institute of Consulting Foresters http://www.berk.com/~NYICF/

Association of Consulting Foresters www.acf-foresters.com

From Working With Loggers:

New York Logger Training web site:
http://www.nyloggertraining.org/home/default.asp

If you would like more information on timber harvesting practices, contact your county association of Cornell Cooperative Extension and request "A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters and Landowners" (publ. no. 123NRAES60) for $6.00 or look for it on the web at:
http://www.cce.cornell.edu/publications/natural-resources.cfm

From Thinning To Achieve Landowner Goals:

For assistance with improvement cutting or information on woodlot management, you should call your county office of Cornell Cooperative Extension or call the local NYS-DEC Forestry office. Ask about the CCE publications on woodlot management. The US Forest Service crop tree management guide is available at http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_index.html

To view different ways to thin your woodlot, and especially what the forest looks like you can tour virtual woodlots at Cornell University's Arnot Forest www.dnr.cornell.edu/arnot or Penn State University at www.virtualforest.psu.edu.

Publications on woodlot management are available through your local office of Cooperative extension and technical assistance is typically provided free of charge through the state forestry agency (see table on page 94)

From What's My Tree Worth?:

Additional articles on woodlot management are available on the Cornell University Extension Forestry web page at www.dnr.cornell.edu/ext/forestrypage/

From Timber Sale Considerations:

A guide to logging aesthetics: practical tips for loggers, foresters, and landowners. GT Jones. 1993. Natural Resources Agricultural Engineering Service (NRAES, formerly Northeast Regional Agricultural Engineering Service). www.nraes.org PO Box 4557, Ithaca, New York 14852-4557 Purchase price $7.00 plus S&H. (607) 25-7645.

Conducting a successful timber sale. MG Richenback. 2003. University of Wisconsin-Madison, UW Extension, Department of Forest Ecology and Management. http://clean-water.uwex.edu/pubs/timbersale/ available on-line as a 1.6 MB .pdf

Timber management for small woodlands. Goff, G.R., J. P. Lassoie, and K. M. Layer. 1994. Cornell Cooperative Extension Information Bulletin. Bulletin No. 147IB180. Resource Center, Cornell University, 7 business & Technology Park, Ithaca, NY 14850. (607) 255-2080.

From Forestry Practices to Avoid: Just Say No to High Grading:

For more articles on forest management, a virtual tour of sustainable forestry practices, and links to agencies and organizations to assist you, visit the Cornell University Forestry Extension page at www.dnr.cornell.edu/ext/forestrypage/

From Working In Your Woodlot:

Crop Tree Management in Eastern Hardwoods.
http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_index.html

Know Your Trees. J. Cope and F. Winch. 2003 (revised). Cornell Cooperative Extension 4-H Bulletin. Ref. No. 147J85. Resource Center – MW, Cornell University, 7 BTP, Ithaca, NY. 14850. (607) 255-2080.

Stewardship of Northern Hardwoods: A Forest Owner's Handbook. K. Adams, D. Allen, P. Manion, and L. Abrahamson.1995. State University of New York – College of Environmental Science and Forestry. 125 Illick Hall, Syracuse, NY. 13210. $10.00. (315) 470-6745.

Timber Management for Small Woodlands. G. Goff, J. Lassoie, and K. Layer. 1995 (revised). IB #180 Cornell Cooperative Extension Information Bulletin. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. $5.50. (607) 255-2080.

Wildlife and Timber from Private Lands: A Landowner's Guide to Planning. D. Decker, J. Kelly, T. Seamans, and R. Roth. 1990. IB # 193. Cornell Cooperative Extension Information Bulletin. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. (607) 255-2080.

From Enhancing Wildlife Habitat:

Bluebirds in New York. Silverman, B.G. and M.E. Krasny. 1989. 4-H Member's Guide. 21pp. Cornell Cooperative Extension, Dept. of Natural Resources, Fernow Hall, Ithaca, NY 14853. $2.50. (607) 255-2115.

Enhancing Wildlife Habitat: A practical guide for forest landowners. Hobson, S.S., J.S. Barclay, and S.H. Broderick. 1993. NRAES-64. 172pp. NE Reg. Agr. Eng. Service, Cornell Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853. $30.00 (607 / 255-7654)

Enhancement of Wildlife Habitat on Private Lands. Decker, D.J. and J.W. Kelley. 1998 (rev.). IB #181. 42pp. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. $7.50 (607) 255-2080.

Managing Small Woodlands for Wildlife. Gutierrez, R.J., D.J. Decker, R.A. Howard, Jr., and J.P. Lassoie. 1987. IB #157.32pp. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. $3.00 (607) 255-2080.

Managing Woodlands for Wildlife. (author) 24-min. video. Minnesota Extension Service, Univ. of Minn., (612) 624-1223.

Wildlife Notebook: Sketches of selected wildlife in New York. Decker, D.J. 1988. IB #210. 76pp. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. $5.50. (607) 255-2080.

Wildlife and Timber from Private Lands: A Landowner's guide to planning. Decker, D.J., J.W. Kelley, T. Seamans, and R. Roth. 1988. IB #193. 55pp. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. $5.50 (607) 255-2080.

From Preventing Timber Theft:

If you would like to see a copy of the video, contact either: your local NYFOA chapter; the NYFOA general information hotline number (800) 836-3566; Catskill Forest Association (914) 586-3054.

From Managing Birds in New York:

Bull's Birds of New York State. Emmanuel Levine, editor. 1998. Cornell University Press. (607) 277-2211.

Wildlife and timber from private lands: a landowner's guide to planning. Decker, D.J., J.W. Kelley, T.W. Seamans, and R.R. Roth. 1983. IB #193. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. 56pp. (607) 255-2080.

Enhancement of wildlife habitat on private lands. Decker, D.J., and J.W. Kelley. 1998 (rev.). IB #181. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. 42pp. (607) 255-2080.

Managing small woodlands for wildlife. Gutierrez, R.J., D.J. Decker, R.A. Howard, Jr., and J.P. Lassoie. 1984. IB #157. Cornell Cooperative Extension, Distribution Center, Ithaca, NY 14850. 33pp. (607) 255-2080.

Conserving grassland birds: managing agricultural lands including hayfields, crop fields, and pastures for grassland birds. Jones, Andrea L. and Peter. D. Vickery. 1997. Massachusetts Audubon Society. 17pp.

Conserving grassland birds: managing small grasslands including conservation lands, corporate headquarters, recreation fields, and small landfills for grassland birds. Jones, Andrea L. and Peter. D. Vickery. 1997. Massachusetts Audubon Society. 16pp.

Conserving grassland birds: managing large grasslands including conservation lands, airports, and landfills over 75 acres for grassland birds. Jones, Andrea L. and Peter. D. Vickery. 1997. Massachusetts Audubon Society. 17pp.

From Yellowthroats to Woodpeckers." *The Conservationist*. Keller, J. 198. "July-August, 1982.

Directory of Organizations and Resources and Recommended Publications

Association of Consulting Foresters www.acf-foresters.com

Catskill Forest Association (CFA) (914) 586 - 3054 http://www.catskillforest.org

Cornell Cooperative Extension http://www.cce.cornell.edu
- Listing of Natural Resource Publications
  http://www.cce.cornell.edu/publications/natural-resources.cfm

Cornell Forestry Extension: http://www.dnr.cornell.edu/ext/forestrypage

Cornell University Department of Natural Resources (607) 255-2115
http://www.dnr.cornell.edu/
- Cornell University's Arnot Forest www.dnr.cornell.edu/arnot

Master Forest Owners/COVERTS (MFO): http://www.dnr.cornell.edu/ext/mfo

New York Department of Environmental Conservation (NYS-DEC)
http://www.dec.state.ny.us/
- Albany (518) 457-7370
- Lower Hudson River area: Capt. Dorothy Thumm (914) 332-1835
- Eastern, northern, and central New York: Capt. Lawrence Johnson (518) 357-2035
- Western New York: Capt. Gary Bobseine (716) 851-7007.

DEC Private Land Services www.dec.state.ny.us/website/dlf/privland

New York Forest Owners Association (NYFOA) (800) 836-3566 http://www.nyfoa.org

New York Institute of Consulting Foresters http://www.berk.com/~NYICF/

Oregon State University http://www.cof.orst.edu/

Penn State University http://www.virtualforest.psu.edu

Society of American Foresters, Certified Foresters www.safnet.org

Tug Hill Resource Investment for Tomorrow (THRIFT) (315) 376-5595
http://www.tughillresources.org/

United States Department of Agriculture (USDA) Forest Service (304) 285-1592
http://www.fs.fed.us/

USDA Forest Service Northeastern Research Station http://www.fs.fed.us/ne/burlington/

United States Forest Service (USFS) http://www.na.fs.fed.us/

State	Extension Forestry - Cooperative Extension Service	Public Service Forestry - State Forestry Agency	Web Sites
Connecticut	(860) 774 - 9600	(860) 424 - 3630	www.canr.uconn.edu/ces/forest/
Delaware	N.A.	(302) 739 - 4811	http://ag.udel.edu/extension/
Maine	(207) 581 - 2885	(207) 287 - 1073	www.state.me.us/doc/mfs/fpmhome.htm
Maryland	(301) 432-2767 ext 323	(410) 260-8531	www.agnr.umd.edu/ces/
Massachusetts	(413) 545-2943	(617) 626-1472	www.umass.edu/forwild/
New Hampshire	(800) 444-8978	(603) 271-3456	www.ceinfo.unh.edu/forest.htm www.dred.state.nh.us/forlands
New Jersey	(732) 932 - 8993	(609) 984 - 3860	http://www.rce.rutgers.edu/
New York	(607) 255 - 2115	(518) 402 - 9425	www.dnr.cornell.edu/ext/forestrypage www.dec.state.ny.us/website/dlf/privland/
Pennsylvania	(814) 863 - 0401	(717) 787 - 2106	http://www.extension.psu.edu
Rhode Island	(401) 874-2900	(401) 539 - 2356	http://www.uri.edu/ce/index1.html
Vermont	(802) 656 - 2913	(802) 241 - 3675	www.state.vt.us/anr/fpr/forestry/steward/
West Virginia	(304) 293 - 2941	(304) 558 - 2788	http://www.wvu.edu/~exten/

Recommended Resources and Publications

Cornell University Department of Natural Resources
"Extension Forestry General Information Packet"

Cornell Cooperative Extension
"Assistance for New York Forest Owners"

Information Bulletin #147-IB-193 "Wildlife and Timber from Private Lands: A Landowner's Guide to Planning"

"A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters and Landowners" (publ. no. 123NRAES60) for $6.00. On the Internet at http://www.cce.cornell.edu/publications/natural-resources.cfm

USDA Forest Service
"Crop Tree Management in Eastern Hardwoods" – Publication Number NA-TP-19-93
or access the World Wide Web:
http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_index.html

"NED" – To order call (802) 951 – 6771 or access the World Wide Web at the US Forest Service web site:
http://www.fs.fed.us/ne/burlington/ned/product.htm