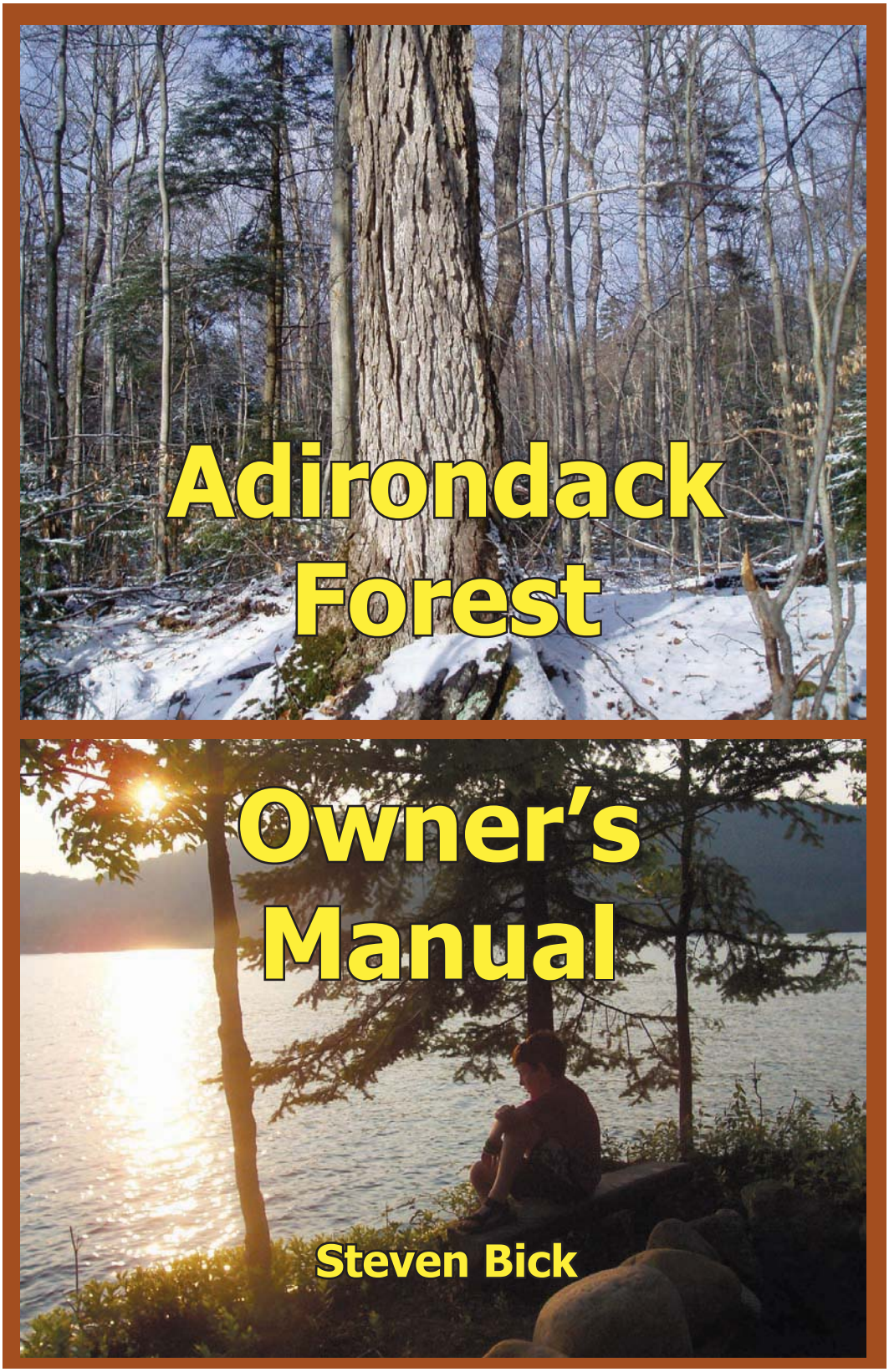
Adirondack Forest
Owner's Manual
Steven Bick

Inside Front Cover

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This book is dedicated to the Piper Girls:
Jennifer Piper Hartsig
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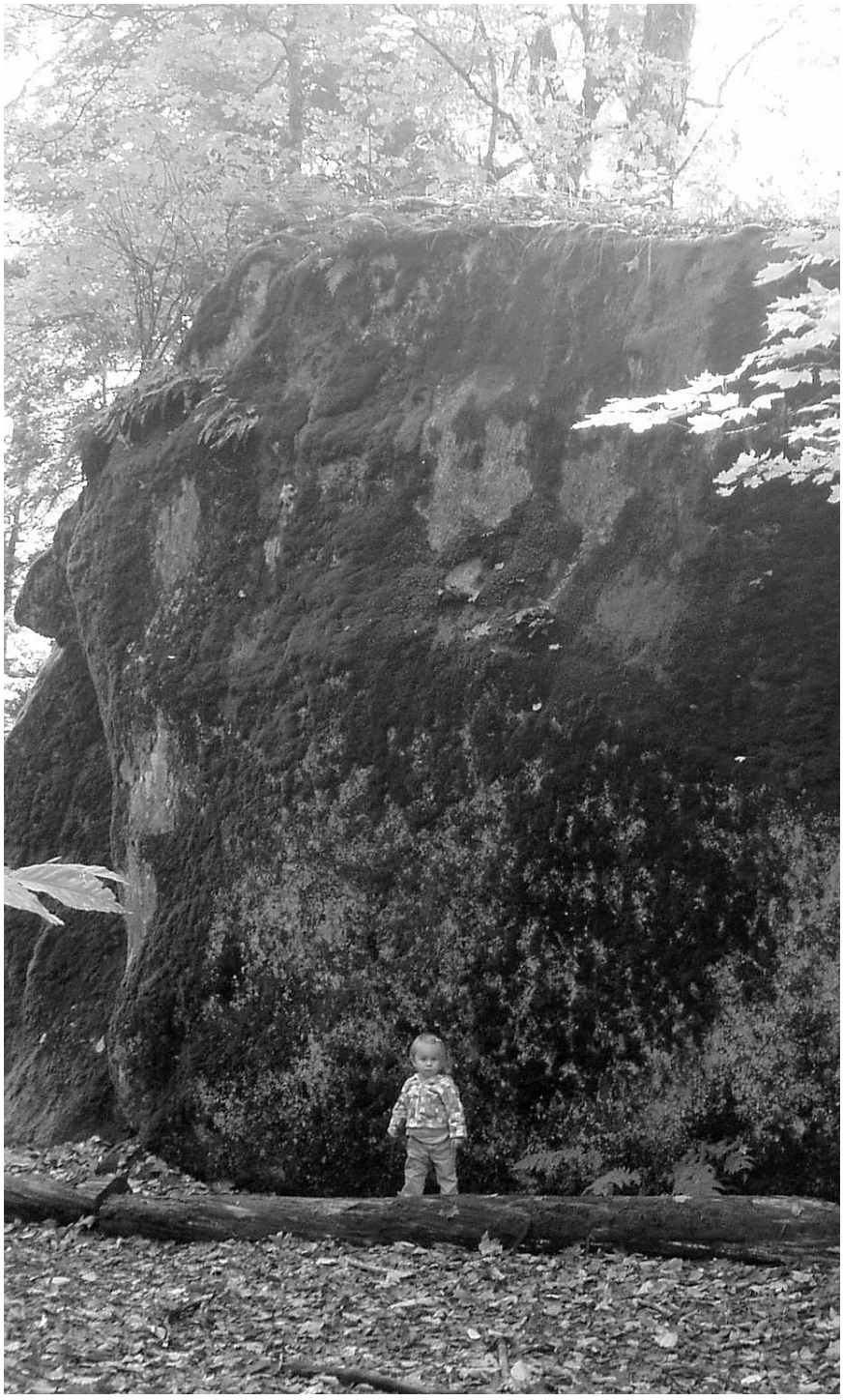

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Jennifer Hartsig, my wife, read through the earliest and roughest versions of every chapter and helped put them into shape for review. Fern Bick, our young daughter, often visited my office to remind me that being a father is much more important than writing anything.

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The information and experiences I needed to write the book were a long time in coming and involved the patient indulgence of quite a few landowners, loggers, caretakers, foresters, and others. Who knew that getting a truck stuck so many times would add up to a wealth of experience?

It is difficult to single out and thank landowners without a tip of the hat to everyone I have been involved with. Peter Bertine, Virginia Brandreth and the rest of the leaders among the Adirondack Landowners Association were supportive and encouraging of my effort to get this book project off the ground. The Stony Brook Club members, lead by club presi-

dent Evan Nahor, were a good source of inspiration for the book. Among the other landowners with a special importance to me are Brandreth Park, Langley Park and Roland Alexander, et al.

I am on similar slippery ground in thanking loggers who have taught me how to get things done in the Adirondacks. My thanks go to all of them, but in particular to Ted and Bruce Koenig, Joe Kriwox, Francis VanAlstine and Frank and Berry Croniser. If you want to learn about people who own land in the Adirondacks, get to know the caretakers and other guardians of the land they employ. Thanks go out to all of them, but in particular to Vern Javes, Jeff Canton, Jamie Roblee, Pete Meneilly, Roger Perkins and the late Clarence Foster.

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I seem to have learned a lot of what I know from foresters who are now retired. Jeff Meuwissen and Gary Miller are a pair of retired DEC foresters who were especially helpful and patient with me when I was first learning about the forest tax law. These guys set a standard in helping the public that all DEC employees should aspire to. The old sagamore himself, Mart Allen, taught me colorful expressions for every possible occasion, in and out of the woods. In a similar fashion, Hungarian patriot and international film star Miklos Gratzer gave me many lessons in telling stories that revolve around forestry.

Steven Bick
Thendara, New York
February 15, 2007

Forward

When you ask individuals about their impressions of—or experiences in—the "Adirondack Park," it brings up as many different images and stories as the people you question. Most often people will tell you about the public lands and their memorable experiences, shared adventures, and favorite mountains, streams, ponds and landscapes. Some tell about the history of the land and people. Others tell about their place or camp in the Park.

What the public knows least about are the private landowners who are the stewards and managers for more than three million acres (52 percent) of the Adirondack Park area. Private landowners include corporations, organizations and individuals with any size parcel from hundreds of thousands of acres to less than one acre in size. These private lands encompass the communities, businesses, camps and cottages, agricultural lands, homes and the commercial and non-commercial private forest lands within the Park. Their success or failure in land ownership and management affect the landscape and communities in the Park just as importantly as do the public lands, but not all have the knowledge and experience that they may need to successfully and appropriately manage their lands.

This book focuses on those stewards of the private non-commercial forest lands within the Adirondack Park and their need to know about forest management. Purchasing or inheriting forest land does not come with an owner's manual or a handy reference and "troubleshooting" guide. Both the enjoyment of and responsibility of owning forest land enkindle and motivate interest in learning more about how to do it and how to do it well. Whether you own forest land for investment, recreation or any other reason, the knowledge you need to manage the forest on your land is introduced in this book.

Future generations of forest landowners depend on what decisions, investments, and actions we make now in forest management. Many of these private lands have been held for generations by clubs, families, and organizations. The Adirondack culture and rich tradition of being a farsighted forest steward is often based on the best available knowledge and science. Steve Bick lays out for you in the chapters of this book what you need to understand to be one of those who can realize some return on your investment in financial terms or continued amenity benefits to yourself, family and friends.

Chad Dawson
February, 2007

Preface

Consulting forestry is an enjoyable and rewarding profession. I'm self employed. Forest owners telephone or write me with questions and other inquiries and I do my best to either help them directly or point them in the right direction. Often, after a year or more of questions, answers and exchanges, firm employment opportunities arise. In the end, I earn a living helping people make and implement land management decisions. Along the way I learn things about the forests and their owners. This knowledge allows me to do a better job helping the next forest owner. After years of this kind of continuing education, I decided I had learned enough to start writing it all down.

In the process, I found that my most common recommendation was that forest owners should hire a consulting forester. This was troubling, both to me and to the non-foresters among my reviewers. The purpose of this book is to help and inform forest owners, not to drum up more work for foresters. To those foresters who will happen across this book, consider my recommendation to seek the services of a qualified consultant as a challenge to you to provide a broad and conscientious range of services to your clients.

On a similar note, none of my suggestions here are meant to undermine the difficult, dangerous (and often only marginally financially rewarding) work of my many friends and acquaintances in the logging community. Not much can happen in forestry without the cooperation of loggers. A profitable environment for the logger is necessary if forest owners want to see the most benefit from their forest management activities.

While this manual may be of some benefit to institutional and industrial owners, it is written primarily for people who own forest land. This includes families, friends, clubs and associations who own the land for personal enjoyment, continuing traditions or for founding new ones. Helping these

people become better stewards and take pleasure in their land is what this manual is all about.

Private forest owners in the Adirondacks include people from a wide range of backgrounds and means. There is a perception among many that people who own land in the Adirondacks must be wealthy, and I suppose that is true of some of them. Adirondack landowners have something valued by all, but it does not automatically follow that their outside wealth is unlimited or even sufficient to allow them to continue to hold on to the land.

I wrote this manual to provide the information forest owners need to manage their land in a way that makes long-term ownership viable. It may be easy for some to envision a future when their personal means will allow them to hang onto their land. The unfortunate irony of this calculation may be that financial pressures in the interim could force them to sell it. "Land rich and cash poor" is a common affliction among all types of landowners.

This manual will show forest owners, working with a qualified forester, how to manage their land in a way that can sustain the enjoyment of its amenities. Hopefully it will also allow them to keep their land, with occasional timber revenue to defray holding costs.

Steve Bick

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Important Topics in this Chapter

- Why is this manual necessary?
- Introduction to the topics covered in each chapter
- Description of forest ownership in the Adirondack Park
- Motivations for private forest ownership in the Adirondacks

Owning a Forest In the Adirondack Park

Introduction

Most forest owners in the Adirondacks are motivated towards forest stewardship by long-term enjoyment, feelings of environmental responsibility and a sense of heritage. Keeping the land in the family or watching a sporting club pass on to a new generation fulfills the fondest hopes of many. Recent increases in land values are terrific if you bought low and plan to sell high, but many owners simply want things to continue the way they are. Escalating property values are accompanied by increasing holding costs, with property taxes representing the most substantial burden. Farsighted forest owners can easily envision a time when the next generation will find that holding costs exceed either

their enjoyment of the land or their means of holding onto it. The idea of selling or developing their ancestors' forests is an understandably repugnant option. The sound management of forest resources, often with the help of a qualified forester, is the best approach to sustaining a family's tenure of ownership across generations.

While timber production provides a source of revenue to defray costs and realize modest returns, it is amenity values that drive most private, non-industrial forest ownerships. Amenity values include the pleasant benefits people experience from the forest, including solitude, scenery, connecting to cultural heritage, aesthetic enjoyment of wildlife and recreational pursuits. Careful management of their timber resource, properly constrained by an emphasis on amenity values, has helped many landowners perpetuate long-term stewardship and continued enjoyment of their land. In contrast, short-term or uninformed harvesting decisions can not only degrade amenity values, but will also set back a forest's ability to produce valuable timber for future generations.

Forestry is the art and science of providing benefits from forest land. The science behind forestry provides the means to guarantee long-term forest health and ensure a continuing source of revenue. The art of practicing forestry lies in making timber production complementary to amenity values. The purpose of this publication is to inform forest owners about forestry and the management and ownership environment in the Adirondack region. Like any owner's manual, this book is meant to familiarize the reader with both operations and features of the forest to enhance its use and enjoyment.

A Manual for Forest Owners

An owner's manual must address a comprehensive set of topics. This introductory chapter offers a basic grounding in the economics of owning forest land in the midst of the surrounding ownership patterns around the Adirondacks. The remainder of this section introduces the topics contained in

this manual and explains why they are important.

Forest owners interact with many people and agencies in the course of managing and enjoying their land. Chapter 2 introduces the various people and entities that make up the forest and natural resources community. It is important to distinguish between the various people and groups and know the types of professional assistance, markets and support that are available to the forest owner.

Good, informed management decisions are achieved through a solid understanding of forest products and the terminology of the forest resource. Chapter 3 defines and explains different types of forest products and measurements. Showing how these quantitative measures translate into value assists forest owners in understanding why their forest might be worth more or less than their neighbor's. A primer on timber harvesting ties measurements, products and utilization together. Forest owners who understand the goods that can be produced by their forest are in a better position to participate in the market for forest products.

Chapters 4, 5 and 6 encompass many of the interwoven activities taking place under the broad umbrella of forest management and ownership. Forest owners who know what they want from their land can express it best through a management plan, and then work with a forester to select silvicultural options that allow them to reach their goals. A written forest management plan binds ownership goals to action. Chapter 4 describes what a good management plan contains, and the process of creating it. Chapter 5 describes silviculture. Silviculture involves the various ways that foresters manipulate forest stands to meet the landowner's objectives, within the context of forest management principles. Management plans define the types of silviculture that will take place on a property, often leading to timber sales. Chapter 6 focuses on various approaches to selling timber and the necessary precautions that must be taken when timber is sold.

Property taxes are an unpopular burden and a financial

challenge. Assessment and taxation facts are detailed in Chapter 7, along with the property tax assessment appeal process. The most tangible relief from property taxes for Adirondack forest owners comes from the New York State Forest Tax Law. This law provides substantial property tax relief for qualifying forest owners who commit their property to long-term timber production. Enrollment in this program has worked well for some, but it is a poor option for others. All of the program's requirements, benefits and drawbacks are presented in this chapter.

Forest land and timber values are the source of much debate and speculation. Chapter 8 discusses the various approaches to the valuation of land and timber and why they are important to forest owners. Land values have a direct impact on the property tax burden through assessments. Timber values are sufficiently complicated that poor decision-making has become the hallmark of the uninformed. Forest owners who know the value of their resources are in a better position to interact with or counteract outside interests.

Conservation easements convey some of the landowner's rights to the state or a private land trust to protect the property against excessive development and ensure that certain land management standards are met. The easement itself is a partial ownership interest in the land. These conservation easements have grown to become a major ownership category in the Adirondack region. Chapter 9 describes conservation easements and how granting them has benefited many forest owners.

Timber thefts are an unfortunate reality wherever valuable timber grows. Chapter 10 describes types of timber thefts, the timber theft law and enforcement strategies. Forest owners should know how to safeguard against timber theft, how to report thefts when they occur, and actions they can take in pursuing compensation when a theft has taken place.

The final chapter of this manual is a list and description

of essential publications and other resources for forest owners. While there is an extensive collection of worthwhile materials to choose from, the focus of this chapter is on describing free publications, many of them easily obtained on the Internet. An extensive bibliography of additional publications is also included.

The various topics covered by this manual provide the answers to questions that landowners have been asking foresters for years. The remainder of this chapter provides a starting point for forest owners to use in recognizing how their goals and ownership fit into the larger scheme of both a working landscape and a public park.

Ownership of the Adirondack Park

An historic line was drawn on a map of New York State in 1892. This "blue line" as it is called, encircled most of the northern region of the state, creating the Adirondack State Park. New York often builds things its own way—it is, after all, the "Empire State." Instead of having a federally-designated National Park in the Adirondacks, comprised entirely of public lands, or a series of smaller state parks on significant sites, New Yorkers designated a state park that includes both public and private land. Today this region encompasses 5.8 million acres, or roughly 9,000 square miles. The Grand Canyon, Glacier, Yellowstone and Yosemite National Parks would all fit neatly together within its perimeter. After crowding these national treasures together, there would still be almost enough room leftover to shoehorn in the great state of Rhode Island.

Slightly more than half of the Adirondack Park is in private ownership, with the remainder owned by the State of New York. Apart from modest state holdings for administrative uses, the state-owned land is part of the State Forest Preserve. Private lands are primarily in forested uses. Private lands are subject to a regional zoning system overseen by the Adirondack Park Agency (APA).

Perpetuating a family heritage and traditional land uses are important goals of many forest owners.

Public Land

The New York State Forest Preserve is protected by the state constitution as "forever wild," meaning that it can never be developed and that timber may not be harvested from it. This restriction was put in place in 1885. The state has found minor exceptions to this constitutional protection—when it is administratively convenient—but Forest Preserve lands are generally considered to be under permanent protection.

The Forest Preserve within the Adirondack Park is divided into management units. Each of these units has a classification that dictates the range of possible uses within the unit. These classifications include wilderness (1,017,217 acres), wild forest (1,288,528 acres), primitive, canoe area, intensive use, and historic. The classifications are well defined in the Adirondack Park State Land Master Plan. In practice, the politics behind the acquisition process has resulted in some less than objective classifications of individual management units.

Owners of state-of-the-art second homes and weathered hunting camps alike share a love for their Adirondack retreats.

Private Land

Adirondack forests are divided among a mixture of ownership types. Many large tracts of private land share a common border with forest preserve acreage. Increasingly mature timber on the forest preserve stands is in direct contrast to the various age classes of timber found on private lands. A mosaic of forest cover and wildlife habitat results from this variation in age classes. This pattern reflects and carries over into the way these forests are used.

The majority of private land (approximately 1.5 million acres) is zoned resource management, the most restrictive category in terms of allowable development. The other zoning categories, in descending order of allowable development include rural use, low intensity, moderate intensity, hamlet, and industrial use. The resource management category accounts for 52 percent of the total private acreage and the rural use category accounts for 34 percent. Each successive category consists of less land. While all of the land zoned as resource management can be considered forest

land, there is a significant amount of forest land in the rural use and low intensity categories as well.

Separating out the more developed portions of the three million acres of private land in the park (as well as the open water), there are approximately 2.5 million acres of private forest land. The State of New York has acquired conservation easements on more than 1.1 million acres of this privately-held property. These easements restrict development and in most cases allow some form of public recreational use. The majority of the acreage encumbered by these conservation easements belongs to institutional investors, such as pension funds. It is very likely that these lands will stay with institutional investors for the foreseeable future.

Of the 1.47 million acres of private lands that are not encumbered by conservation easements held by New York State, one large portfolio of 185,000 acres belongs to the last large industrial owner in the region—a privately-held paper company. It is the management of the remaining 1.28 million acres that this manual addresses. Some of this acreage is encumbered by conservation easements that were donated to private land trusts. These landowners have retained the rights to the land that they need for traditional forested uses of their property.

This breakdown of the acreage within the Adirondack Park demonstrates a significant determining factor in the use and valuation of these properties—scarcity. Private forest lands are very popular. Many different groups and individuals want to buy, own, protect and enjoy the land, or dictate how others should be allowed to do so. Current zoning protection, with half of the private land in the park in the resource management category, means that most of it will always be open space. The nature of this open space could change with parcelization of larger tracts into smaller forest ownerships. If enough larger forest tracts are broken into smaller ones, it would be a significant alteration in the character of the landscape. Financial pressure on forest owners is causing more of this to happen.

Industrial and institutional forest owners are motivated by timber production (above) while most non-industrial private forest owners are inspired by enjoyment of forest amenities (below). Successful forest management can integrate both uses.

Many properties under long-term ownership were acquired generations ago. Often the landowners' ancestors have set a pattern of stewardship into motion and the current generation's role is to perpetuate and enjoy it. Continued uses and adaptations in forest management imply that the current owners prefer conservation of forest values over the options of developing or selling their land.

Motivations of Private Adirondack Forest Owners

The private forest land in the Adirondack Park is owned by people: families, friends, clubs and associations, and by forest products companies and institutional investors. The many uses of forest land are evidence of the varied motivations for owning it. Properly managed forests are capable of providing both timber and amenity values. The manner in which owners go about realizing the benefits from timber growth and amenities demonstrates two general types of motivation for ownership. A discussion of the value of forest land is important in making a distinction between the two general types of owners.

What determines the value of land? Which values for a given parcel of land will prevail? As a general rule, buyers pay no more than the going rate to acquire land, even if they personally place a much higher value on it. The difference between the sales price and their private value is a natural gain from the transaction and a motivation for the acquisition to take place. What if the fair market value of land is higher than the value a prospective buyer places on the intended use? A prospective buyer may still purchase the land if there is a way to capture the difference between the value of the intended use and the sales price.

One buyer, such as a family that wants to spend time together away from the city, might be motivated by a need for quiet enjoyment of the land. This family could capture the difference between the value of its quiet enjoyment and the sales price by periodically selling timber. In this way the forest owner justifies both the original purchase price and

the continued cost of ownership.

Another buyer, such as an investment-driven pension fund, will be motivated by a financial return on its investment through the sale of timber and the eventual gains from the resale of a carefully managed resource. This buyer still had to pay a price that included the value of the land as an amenity resource. The difference in the land's value as an investment in the timber resource and its sales value may be realized by annual hunting leases to clubs and other individuals who want to maintain small hunting camps on the property.

Alternatively, this institutional forest owner might cash in all of the amenity value and limited development value of the property all at once by selling a conservation easement to New York State. This easement conveys most of the amenity rights to the state, for the general public to enjoy.

Institutional forest owners and the few remaining large-scale industrial owners have figured out how to manage their forest resources in a way that provides the things they need. This might be a cash flow that justifies their investment or a supply of wood fiber to feed a mill. Owners like this have their own forestry staff or employ the services of the large forestry consulting firms.

Many of the more stable long-term ownership in the Adirondacks have been by parties motivated primarily by amenity values. These owners recoup their acquisition and holding costs by simply enjoying the property. A wealthy few justify all of the costs in this manner. Most, however, face a financial challenge where these costs are concerned. Outside sales prices and the ever-increasing annual cost of property taxes can tempt owners to part with some of their land for its limited development potential.

There is considerable demand for smaller wooded parcels as second home sites. Many absentee forest owners receive unsolicited "Dear Landowner" letters from the many land speculators active in the region, complete with cash offers. Such companies, even those with a professional forester

Most forest owners value their privacy and cherish their quiet enjoyment of the land.

on their staff, often destroy the long-term timber management potential of land that they purchase, liquidating most of the valuable timber and keeping just enough growing stock in sensitive buffer zones to allow them to resell the land to amenity-driven purchasers from outside the region.

Selling long-term family holdings isn't the fate that traditional forest owners envision for their land, nor the fate that their ancestors had in mind. New owners often purchase forest land with an eye toward the well-being and enjoyment of their descendents.

Important Topics in this Chapter

- Who knew there were this many foresters?
- New York State Department of Environmental Conservation
- Adirondack Park Agency
- Adirondack and other organizations

The Forest and Natural Resources Community

A Community

Adirondack forest owners interact with many people, agencies and organizations in the course of their stewardship and enjoyment of their land. This chapter describes some of these entities and the reasons a forest owner might encounter them. While this is not an exhaustive list, most of the major players are included. People and positions are described, followed by public agencies and then an overview of the many trade and advocacy organizations active in the Adirondacks.

People and Positions

This section will describe the roles of these people and

positions, with a particular emphasis on foresters. There are many fine individuals who comprise an interactive network in the forest economy. Some are self-employed or work for various types of wood products companies, while others work for public agencies.

Foresters of all Types

A *forester* is a scientifically trained professional involved with some aspect of the management of forest land. True foresters have college-level training in their field. New York State does not license foresters and anyone can use the title. Foresters can be either self employed or work for a range of employers, including private landowners, public agencies, universities, forest products companies, land speculators and consulting firms.

Forest owners might approach more than one type of forester for assistance. In general, foresters in the public sector are available to answer specific questions, provide limited general advice and refer people to qualified sources of additional information and services. Foresters who work directly for forest products companies will often provide limited advice and services to forest owners, in connection with their goal of procuring timber for their employers. Consulting foresters are available for hire to provide a full range of forest management services. A description of various types of foresters follows. The many overlaps in designations and qualifications are explained in Table 1.

A *certified forester* has met the requirements of the Society of American Foresters' (SAF) Certified Forester program. Foresters earn the designation "CF" after their names and must meet continuing education requirements to maintain their certification. This designation is independent of the forester's employment status.

Consulting foresters are in the business of offering professional forestry services for hire, most often to private landowners. Once hired, these consultants have a fiduciary responsibility to act in the landowner's best interests. Con-

sulting foresters will often provide free initial consultations with forest owners, including preliminary inspections of their land. Many consultants provide excellent referrals when they are unavailable or unsuited to the type work a forest owner might be inquiring about. With a big market for forestry services in New York State and public agencies and extension services playing only a limited role in meeting their needs, there is considerable demand for the services of qualified consultants. Some forest owners hire consultants to handle every aspect of the management of their land. Others bring them in for limited projects such as timber sales or to solve specific problems.

Cooperating consulting foresters are those who meet the New York State Department of Environmental Conservation's business and educational requirements and choose to be on a reference list maintained for the use of private forest owners.

ACF foresters are those who belong to the Association of Consulting Foresters. This professional organization requires its members to meet strict ethical and educational standards.

NYSICF foresters are consulting foresters who belong to the New York State Institute of Consulting Foresters.

Procurement foresters purchase timber for their employers—usually sawmills, paper companies or log brokers. Procurement foresters have a responsibility to act in their employer's best interest. Often procurement foresters provide useful advice and services to landowners in connection with their efforts to purchase timber. Any forester who claims to be serving both a landowner and a mill at the same time, however, is being disingenuous, at best.

Cooperating industrial foresters, similar to cooperating consulting foresters, are those who meet the New York State Department of Environmental Conservation's requirements and choose to be on a reference list maintained for the use of private forest owners.

Cooperative Extension Foresters are those employed by Cornell University Cooperative Extension. New York State's

extension forestry program is not as robust as those in many other states and there is very little extension forestry presence in the Adirondacks.

NYSDEC foresters are employees of the New York State Department of Environmental Conservation. Their duties include unit management planning for state forest and state forest preserve units, unit management plan implementation, administering state-owned conservation easements, utilization & marketing, and limited private landowner services. *Senior Foresters* within the NYSDEC regional offices oversee the forest tax law program, which brings them into contact with many Adirondack forest owners.

In addition to these various types of foresters, are those who work full time for landowners or other organizations without any procurement duties. Paper company foresters and county foresters are two examples.

Table 1. Types of foresters by employment and professional affiliations.

Forester Employment	Potential Designations and Affiliations
Consulting Forester	SAF Member, Certified Forester, DEC Cooperating Consultant, ACF Forester, NYICF Forester
Procurement Foresters	SAF Member, Certified Forester, DEC Cooperating Industrial Forester
Public Agency Foresters	SAF Member, Certified Forester

Loggers

Loggers are people who produce logs and other roundwood products from timber. They are typically small business people with a small number of employees. Some loggers buy standing timber and try to produce the most valuable raw products from timber. Others are service providers who cut and process timber on a contract basis for landowners or forest products companies. Many loggers do some of both. Further discussion about loggers is included in the chapters on forest products and timber sales.

New York State Certified Loggers are those who meet the educational and business requirements of the New York

Logger Training Program and who choose to be included on this list. The list is maintained by the Empire State Forest Products Association. Certification signals a willingness on the part of the logger to pursue continuing education. Certification serves as a useful distinction, but not a universal one. There are capable and well-qualified loggers who have chosen not to become certified for philosophical reasons.

Public Agencies

Public agencies play a large role, both in the Adirondacks and at the state and federal levels. This section describes the New York State Department of Environmental Conservation, the, the Adirondack Park Agency, the USDA Forest Service, USDA Natural Resource Conservation Service and Cornell Cooperative Extension.

New York State Department of Environmental Conservation

The New York State Department of Environmental Conservation (www.dec.state.ny.us) is the primary public agency involved in the use and management of forest lands in the Adirondacks. In the absence of the type of federal involvement present in other states, and without widespread Cooperative Extension system assistance for forest landowners in the park, this is the primary agency that forest owners interact with.

Administratively, the Adirondack Park falls into two DEC regions: 5 and 6. Region 5 includes Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, and Washington Counties. Region 6 includes Herkimer, Jefferson, Lewis, Oneida and St. Lawrence Counties. Each region includes roughly half of the greater Adirondack area, with a north-south division along the St. Lawrence/Franklin and Herkimer/Hamilton county lines. Both regions include areas outside the Adirondack Park as well.

According to the DEC, the Division of Lands and Forests "cares for public lands in New York State and provides leadership in forestry and forest management." There are several

Lands and Forests offices in each region. Contact information for DEC offices is shown in Figure 1.

Within the Division of Lands and Forests are several bureaus. The Bureau of State Land Management is responsible for State Forests, while the Bureau of Forest Preserve Management administers to the Adirondack and Catskill Forest Preserves. State-owned land with in the Adirondack Park is part of the Forest Preserve. Outside the Adirondack and Catskill Parks, much of the state-owned forest land is in multiple-use State Forests. Planning for various State Forest and Forest Preserve Management Units is an on-going process. Individuals can review and comment on draft unit management plans as a part of this process. Forest owners may find that management activities and use of adjacent state land has a direct impact on their property.

The Bureau of Private Land Services administers the Forest Tax Law (480a) program (detailed in Chapter 8), provides a limited amount of forestry assistance to private forest owners, and provides guidance in the utilization and marketing of forest products. The Albany office publishes a statewide Stumpage Price Report twice each year. Forest owners can contact the DEC to add their name to the mailing list for this publication.

The Division of Lands and Forests maintains a list of Cooperating Foresters that it makes available to the public, both on its website and through the regional offices. This list contains contact information for qualified private sector foresters who act either as consultants to landowners or do procurement work for sawmills, pulp and paper mills, or other forest products based businesses. Earlier versions of this list separated *cooperating consulting foresters* from *cooperating industrial foresters* into two lists, but industrial foresters have made a successful argument to combine them into one. The distinction still remains in each individual listing and it is important that forest owners take note of it when seeking assistance. Consulting foresters have a fiduciary responsibility to whoever hires them; Procurement foresters have a

fiduciary responsibility to the mill that employs them. Both can be good sources of assistance, but the distinction in their allegiance is significant.

In practice, the DEC's Division of Lands and Forests is lightly staffed at the regional levels with very helpful professionals who perform multiple functions. The same forester who checks your property for 480a compliance might also review a Temporary Revocable Permit application, while assisting in the preparation of a unit management plan for forest preserve lands that adjoin yours.

The DEC's activities within the Adirondack Park are subject to the same regulatory procedures under the guidance of the Adirondack Park Agency as private landowners. In recent years the DEC activities in maintaining the forest preserve's infrastructure have come under even greater APA scrutiny. This is due, in part, to the watchful eye of various activist groups. The DEC has the unenviable job of trying to keep diverse user groups and interest groups happy, with limited personnel to get the job done.

The DEC's Division of Forest Protection and Fire Prevention is the home of the *New York State Forest Ranger.* There are more than 60 forest rangers in Regions 5 and 6, including officers. A ranger captain is in charge in each region, with several zones in each region, each under the supervision of a lieutenant. Forest rangers all have a home area within their zone, though emphasis has been shifted in recent years so that rangers perform their duties zone-wide, as needed.

Forest rangers are well-trained professionals with a long history of service in this state. Their emphasis has been on protecting both the forest resource and the people who use and enjoy it. Their job has evolved over the years to include law enforcement, fire control and search and rescue. Their law enforcement duties usually pertain to the use and protection of state lands and of waterways. The forest ranger's long established duties in fire protection include immediate response to wildfires and the supervision of firefighters. Similarly, the forest rangers search and rescue duties involve

New York State Forest Rangers are helpful public servants

coordination of the various agencies and volunteers who participate in the search for people lost in the woods.

Forest owners, foresters and logging contractors often interact with forest rangers in obtaining Article 15 stream crossing permits. If you are installing a culvert, bridge or other crossing (temporary or permanent), it is best to check with the forest ranger in your area to see if a permit is necessary. As one forest ranger likes to put it: "Permits are free, so when in doubt, ask." The forest ranger can usually supply helpful advice on how best to accomplish a stream crossing while protecting the bed and banks of the stream itself. In this role, there is no more helpful, prompt or courteous regulator in state government than the forest ranger. Another permit that landowners occasionally need from forest rangers is for burning brush.

The statewide roster of forest rangers is available on the DEC's website by region, with an email contact and phone number listed for each ranger. Forest rangers maintain a public phone for incoming calls in their homes. In years past, rangers were easy to reach for a routine service requests over a long period of reasonable daytime hours. More recently,

Region 5 - Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington Counties

Ray Brook Headquarters
P.O. Box 296
1115 NYS Route 86
Ray Brook, NY 12977
(518) 897-1200

Northville Office
P.O. Box 1316
701 South Main Street
Northville, NY 12134
(518) 863-4545

Warrensburg Office
P.O. Box 220
232 Golf Course Road
Warrensburg, NY 12885
(518) 623-1200

NYS Forest Ranger Dispatch:
(518) 891-0235

NYS Env. Conservation Officer Dispatch:
(877) 457-5680

Region 6 - Herkimer, Lewis, Jefferson, Oneida and St. Lawrence Counties

Watertown Headquarters
Dulles State Office Building
317 Washington St.
Watertown, NY 13601
(315) 785-2239

Lowville Office
7327 St Rt 812
Lowville, NY 13367
(315) 376-6521

Herkimer Office
225 North Main St.
Herkimer, NY 13350
(315) 866-6330

Potsdam Office
6739 US Highway 11
Potsdam, NY 13676
(315) 265-3090

Utica Office
207 Genesee St.
Utica, NY 13501
(315)793-2554

Figure 1. NYS Department of Environmental Conservation Offices in Regions 5 and 6.

central authority has seeped into their work time routines, resulting in much stricter guidelines that rangers must follow in answering phone calls. For non-emergency requests for information, you can usually leave them a message and expect a call back within a few days. Alternatively, you can contact the forest ranger's central dispatch at 518-897-1300. Because a forest ranger's time is best spent in the field, the best way to reach one in an emergency is to contact the central dispatch phone number (518-891-0235)

The DEC's Division of Law Enforcement is another arm of the department that forest owners sometimes interact with. The division's Environmental Conservation Officers (ECOs) are the uniformed law enforcement representatives of the department. These ECOs are equal in standing to New

York State Troopers and focus primarily on enforcing the New York State Environmental Conservation Laws. Forest owners should know the name and contact information for the ECO nearest them. These are the people to contact if you are having a problem with poaching, trespassing, dumping or timber theft on your land.

The statewide roster of ECOs is available on the DEC's website and is published each year in both the annual state hunting and fishing syllabus. ECOs are often on patrol and can be difficult to contact directly. The best way to reach one in an emergency is through their toll-free central dispatch phone number (1-877-457-5680).

Adirondack Park Agency

The Adirondack Park Agency (APA; www.apa.state.ny.us) is a New York state government entity. It was created in 1971 and given jurisdiction over both public and private land uses within the park. It consists of an 11-member, politically-appointed board, overseeing about 60 professional staff. In its role as a region-wide regulatory body, it has created park-wide land use classifications and cooperated with the DEC in the creation of the Adirondack Park State Land Master Plan. The APA regulates development within the park and enforces a detailed set of rules and regulations.

The APA has jurisdiction over a number of matters that concern forest owners. The most prominent of these are Special Provisions Relating to Wild, Scenic and Recreational Rivers and Jurisdiction and Review of Clearcutting. While these issues may or may not be a concern in your particular forest, it is advisable to familiarize yourself with them.

A detailed description of APA regulations that impact forest owners is included in the following chapter in the discussion of timber harvesting. The APA has produced many useful publications for forest owners and other interested parties. The publications are described in detail in the last chapter of this manual.

USDA Forest Service

There is little or no direct federal involvement with forest owners in the Adirondack Park, but the Forest Service, under the United States Department of Agriculture, is still an important agency. Most people know of the Forest Service's role in managing national forests, but this agency also administers programs to promote sound conservation and utilization practices for private landowners, in cooperation with state agencies like the DEC. Most recently, the Forest Service administered federal funding to state agencies that eventually trickled down to private landowners in the Forest Land Enhancement Program (FLEP). The Forest Service conducts and sponsors research on a wide range of forest management and utilization topics. As a result, this agency makes an abundant supply of useful publications and software programs available. Visit the agency's website at www.fs.fed.us.

One Forest Service effort that is particularly worthy of mention here is the Northeast Decision Model, also known as NED. NED was developed in the Forest Service's Burlington, VT office. NED is a collection of software intended to help resource managers develop goals, assess current and future conditions, and produce sustainable management plans for forest properties. One important piece of software in this collection is *Stewplan.* Stewplan provides a template for assembling all of the information used in creating a forest stewardship plan. Forest stewardship plans are described in greater detail in Chapter Four.

USDA Natural Resource Conservation Service

Another important agency in the U.S. Department of Agriculture is the Natural Resource Conservation Service (previously called the Soil Conservation Service). The NRCS bills itself as "the primary federal agency that works with private landowners to help them conserve, maintain and improve their natural resources." The focus of the NRCS is on voluntary, science-based conservation, technical assistance,

incentive-based programs, and cooperative problem-solving at the community level. The NRCS has many publications available, some of which will be useful to forest owners. There are multiple NRCS service center offices serving Adirondack counties, most on the periphery of the park. Visit the NRCS website at www.nrcs.usda.gov.

Cornell Cooperative Extension

Cornell University Cooperative Extension maintains a "Forest Connect" website through the University's Department of Natural Resources. Its stated mission is to "connect forest users to the knowledge and resources needed to ensure sustainable production and ecological function on private forest lands." The website has resources for forest owners, foresters, loggers, educators and elected officials. Cornell Cooperative Extension is not a familiar entity to most Adirondack forest owners. The extension service itself does not have a large forestry staff like other states, so providing information to owners of small woodlots is an appropriate role.

Organizations

The organizations listed here are active in the Adirondack Park. The descriptions included are intended to be objective and should not be construed as endorsements of their merits or benefits to forest owners. This is not an exhaustive or comprehensive list.

Adirondack Conservation Council

The Adirondack Conservation Council is a collection of sportsmen's clubs, many of them landowners, from throughout NYSDEC Regions 5 and 6. This council is a strong supporter of traditional sporting activities, such as hunting and fishing. As such it seeks to maintain traditional access routes and uses of the Forest Preserve, but generally opposes state acquisition of land.

Adirondack Council

The Adirondack Council was started in 1975 as a not-for-profit, environmental organization working on Adirondack issues. The group monitors use of both public and private lands. With offices in both the Adirondacks and Albany, this group uses advocacy, education and litigation to further its views on land use planning and protection. Visit its website at www.adirondackcouncil.org.

Adirondack Economic Development Corporation

The Adirondack Economic Development Corporation (AEDC) is a private, non-profit organization, based in Saranac Lake. Its mission is to expand employment opportunities in the Adirondack Region by strengthening and diversifying the regional economy. As part of this mission, it provides micro-loans and technical assistance to small businesses. A natural extension of AEDC's goals has been the Adirondack Forest Business Development Program. The AEDC's website (www.aedconline.com) contains a section to help businesses and others find reliable sources of technical information.

Adirondack Landowners Association

The Adirondack Landowners Association is a group of long-term forest owners with a proven track record of stewardship. Many of these landowners were silent stewards of the land for generations before increasing calls for public acquisition forced them to come together and publicize their long history of responsible use of the land. The group works to keep its members informed on property taxes and related issues. "Membership in the Adirondack Landowners Association is open to individuals and organizations owning land in the Adirondacks who support its goals of protecting private property rights and promoting good stewardship."

Adirondack Mountain Club

The Adirondack Mountain Club (www.adk.org) is a well-organized and widely recognized group that is dedi-

cated to recreational uses of the forest preserve and other resources in the Adirondacks. It consists of 27 chapters in New York and other northeastern states. The Adirondack Mountain Club pursues its goals through a mix of education, recreation work and advocacy. Expansion of the public domain in the Adirondacks has been an important focus of its work over its long history.

Adirondack Nature Conservancy

A branch of the nationally-recognized organization, The Nature Conservancy, this group works with its sister organization, the Adirondack Land Trust, to protect open space lands in the Adirondacks. ANC works as a third party to facilitate acquisitions of land and conservation easements by the State of New York, as well as acquiring fee title and conservation easements to sensitive lands that it protects on its own. This organization can be reached through the parent website of The Nature Conservancy (www.nature.org).

Adirondack North Country Association

The Adirondack North Country Association (ANCA) is an economic development organization encompassing the 14 counties of the Adirondack region and beyond. ANCA has a long history of promoting both the natural features and diverse businesses in the region. It bridges the gap between tourism and the forest products industry by embracing everyone. ANCA has a Wood Industry Specialist on its staff, providing technical assistance to many of the businesses that compose the primary and secondary markets for forest owners' timber. ANCA's website can be found at www.adirondack.org.

American Tree Farm System

The American Tree Farm System's mission is "to promote the growing of renewable forest resources on private lands while protecting environmental benefits and increasing public understanding of all benefits of productive forestry." This

system is sponsored by the national, non-profit American Forest Foundation. The organization recognizes that water, wildlife, recreation and wood are essential benefits that private owners and the public derive from forest land.

Tree Farms are the country's oldest form of voluntary third party certification of private forest land. Under the American Tree Farm's third party certification program, private forest owners must develop a management plan that follows strict environmental standards. The plan and property must pass an inspection by an ATFS volunteer forester every five years. Inspection and certification are free. This program is viewed by many to be the most landowner friendly of the three major third party certification programs. Visit the American Tree Farm System website at www.treefarmsystem.org.

Association for the Protection of the Adirondacks

The Association for the Protection of the Adirondacks is the original citizen-based organization formed to protect the Adirondack Region, founded in 1901. This group considers itself the "watchdog of the forest preserve." Through organization, lobbying and advocacy, it has an impressive record of exerting its influence on public policy in the Adirondacks. This group maintains the Center for the Forest Preserve in Niskayuna, NY, including an Adirondack Research Library. Visit the organization's website at www.protectadks.com.

Empire State Forest Products Association

The Empire State Forest Products Association (ESFPA) is the premier lobbying organization for the forest products industry in New York State. Founded in 1906, this group counts paper companies, sawmills, loggers and landowners among its membership. This group keeps a close eye on laws and policies that affect those who make their living in New York's forests. ESFPA is the sponsor of the New York State Logger Training program. Visit the ESFPA website at www.esfpa.org

New York Forest Owners Association

The New York Forest Owners Association (NYFOA) is a not-for-profit group that has promoted the stewardship of private forests since 1963. This association has ten chapters around the state, including two in the Adirondacks. Working in tandem with its sister organization, the New York Woodlands Stewards, NYFOA seeks to educate forest landowners and the general public about sound forest management practices.

Northeastern Loggers' Association

The Northeastern Loggers Association (NELA) is a regional trade group that services loggers, sawmillers and others involved in the forest products business. Among its objectives is promoting sustainable management of the forest resource base while protecting private property rights. NELA publishes the highly regarded The Northern Logger and Timber Processor magazine and hosts an annual trade show at various northeastern locations. This group is the leading provider of continuing education programs for loggers in the Northeast. Headquartered in the Adirondacks at Old Forge, NELA maintains the Forest Industries Exhibit Hall and the 500-acre Flatrock Mountain Demonstration Forest. Visit the NELA website at www.northernlogger.com.

Northern Forest Center

The non-profit Northern Forest Center was established to help build a healthy and productive future for the multistate Northern Forest and its people by strengthening citizen leadership and regional collaboration. The Northern Forest Region includes a large portion of northern New York, including the Adirondacks. This organization administers grants to support its mission and is the source of a number of useful publications. Visit its website at www.northernforest.org.

Rainforest Alliance

The mission of the Rainforest Alliance is to "protect ecosystems and the people and wildlife that depend on them by transforming land-use practices, business practices and consumer behavior." Visit the Rainforest Alliance's website at www.rainforest-alliance.org.

The Rainforest Alliance is the parent organization for the SmartWood third party certification program. This program follows the criteria of the Forest Stewardship Council (FSC) in certifying individual landowners. These standards include the rights of indigenous peoples, workers, and communities, along with a written management plan, maintenance of high forest conservation values and rigorous monitoring and assessment. The SmartWood program is viewed by many in the environmental community as the most desirable of the third party certification programs.

Resource Conservation and Development Councils

Resource Conservation and Development Councils (RC&Ds) were created nationwide by the United States Congress as public/private partnerships for the joint purposes of improving economic activity and enhancing the environment and standard of living in all communities. The United States Department of Agriculture (USDA) designated 375 distinct RC&D areas across the country.

There are two Resource Conservation & Development Councils in the Adirondack region. These councils are comprised of representatives from local planning boards, county boards of supervisors or legislatures, and county soil and water conservation districts. The Greater Adirondack Resource Conservation & Development Council embraces Clinton, Essex, Fulton, Hamilton, Saratoga, Warren and Washington Counties (roughly equivalent to NYSDEC Region 5). The Black River-St. Lawrence Resource Conservation & Development Council embraces much of NYSDEC Region 6. Both are active in sponsoring and promoting educational programs for forest owners and forest products businesses.

Sustainable Forestry Initiative

The Sustainable Forestry Initiative (SFI) is an industry-driven effort to promote "a comprehensive system of principles, objectives and performance measures developed by professional foresters, conservationists and scientists." Under the sponsorship of American Forest & Paper Association, SFI is a voluntary effort by the forest products industry to address environmental concerns and promote responsible behavior. Visit the Sustainable Forestry Initiative's website at www.aboutsfi.org.

SFI third party certification allows landowners to demonstrate to outside parties that they are following sustainable practices on their land. In all, landowners must meet 103 indicators for a successful third party certification. SFI third party certification is viewed by many to be the most industry friendly of the three major third party certification programs.

Important Topics in this Chapter

- Forest products
- Forest Measurements
- Timber Harvesting
- Laws, Regulations and Best Management Practices

Forest Products Measurements and Harvesting

Forest to Market

Forest products are the connection between the forest as a supply of raw materials and the various markets that are a source of revenue for the forest owner. Forest measurements are the means of quantifying timber volume and desirable forest conditions to ensure a sustainable supply of forest products. If forest products can be quantified, they can also be valued. The Forest Valuation Chapter later in this book explains the motivations for estimating the value of timber and timberland using various types of valuation. Processing timber is necessary to realize revenue from the forest. The last section in this chapter describes this process and the regulatory environment in which it takes place.

Forest Products

This section focuses on the wide array of forest products. Recognizing and understanding what the forest produces for the marketplace helps a forest owner understand the demand for timber, and provides a common language for communicating with others in the industry. A brief explanation of the forest products industry in the Northeast is given here to preface descriptions of the many useful, intermediate items produced from timber.

The Forest Products Industry

The forest products industry is broadly defined to include both large corporations and small businesses that handle the primary (timber to logs, pulpwood or other roundwood) and secondary (roundwood to marketable products) processing of wood. The Adirondacks and the surrounding region are the home to many sawmills, ranging from portable bandsaw operations run by sole-proprietors, to slightly larger family-owned sawmills to hardwood and softwood sawmills and furniture manufacturers under corporate ownership.

Smaller operations typically process a mixture of softwoods and hardwoods, while larger mills in the region more commonly process only hardwoods, with one or two large softwood mills as exceptions. Logging contractors produce logs and other roundwood products from timber and deliver them to these mills.

Larger industrial operations, such as paper companies, once had a much larger presence in the region. At present (2007), there is one large land-owning paper company left. All the businesses that utilize the resources provided by forest owners, from the forest to intermediate and consumer products, make up the forest products industry.

Understanding Forests and the Spectrum of Forest Products

The forest owner has land that grows trees. An individual forest can be defined as all the area of forest cover under

Table 1. Important commercial tree species in the Adirondacks.

hardwood trees	softwood trees
American beech	balsam fir
basswood	black spruce
black cherry	Eastern hemlock
red (soft) maple	red pine
red oak	red spruce
sugar (hard) maple	tamarack
white (paper) birch	white cedar
white ash	white pine
yellow birch	

a single ownership. Within the forest will be one or more forest stands. Each stand encompasses all of the contiguous, uniformly accessible area growing the same forest type. Forest types, discussed further in the silviculture chapter, were defined by forest scientists based on the collection of predominant trees species they include, with this information available in reference books. Forest stands are individual units that will undergo a specific timber harvest or improvement operation. For convenience, collections of forest stands with commons access points and of similar age are often lumped together into larger management units. Management objectives for individual stands, discussed elsewhere, may or may not include some aspect of timber production.

There are a number of valuable tree species, both native and planted, found in the Adirondacks. Broad distinctions in these trees are generally divided between hardwood and softwood species, though a more accurate distinction would probably be between deciduous and coniferous trees. A list of important hardwood and softwood tree species found in the Adirondacks is shown in Table 1. Most of the hardwood trees are used to produce lumber that goes into cabinets, furniture, flooring, paneling and other products. Most of the

White wood and small hearts add to the value of hardwood sawlogs.

softwood trees are used to make construction lumber.

Local uses of trees are any purposes for which a consumer might go directly to the mill or to the logger to purchase lumber or poles. Such uses include bridges, railing, camp construction, fences, lean-tos, paneling, specialty items for custom homes and a multitude of other purposes. Both hardwood and softwood products can be purchased locally, directly from mills.

A forest owner's land has trees that are collectively referred to as timber. Timber is an often misunderstood term. Timber denotes standing trees of merchantable quality. Trees are of merchantable quality if someone is willing to pay for the right to cut and remove them. Confusion results when improper terms such as "lumber" are used to refer to timber. This is especially true when the forest owner's point of reference for timber valuation is derived from the products that can be made from timber. Much value is added to finished products during the production process, making it

difficult to infer timber values from the retail values of these products.

When some of this timber is sold, intermediate products are produced from it during the harvesting process. Harvesting involves cutting down the trees and removing either the whole tree or a large portion of it. Several intermediate products are produced during harvesting. The most obvious of these are logs (including both sawlogs and veneer logs). Additional products include roundwood (including both pulpwood and firewood), and wood chips. The entire range of products is not usually produced from every tree or from every forest stand, but potentially may be. The Adirondack region is the source of an incredibly diverse set of products that are eventually made from the material harvested from the forest.

Lumber refers to boards sawn directly from sawlogs. These boards are an intermediate product that is generally part of a longer production process that results in consumer products. Lumber is divided by species and quality into a range of grades, each with specific markets. The hardwood and softwood lumber businesses can be thought of as the process of taking a collection of dissimilar and irregular shapes and sawing and sorting through them until neatly stacked and bundled piles of objects of uniform size and quality are made available to the wide range of people needing them.

In general, the largest portion of the tree's stem that is of the best quality is converted into logs. The process of cutting up tree length stems into logs is known as bucking. Softwood trees are generally cut into logs of uniformly even lengths (8 to 16 feet with several inches of trim), reflecting the commodity products they will yield. Hardwood trees require a greater degree of judgment in the bucking process to produce the highest value logs possible.

Maximizing the volume from the commodity grade-softwood trees is the general rule, because getting the most volume from the tree results in the greatest return. In producing

hardwood logs, maximizing volume will not necessarily result in the greatest return. The focus instead is cutting out the most valuable logs. The larger the diameter of a hardwood log and the fewer defects it contains, the greater the value. For instance, a 12-foot stem might yield a log valued at $100 at the sawmill. But by cutting off a defect, a logger may produce a 10-foot log in a higher grade that is valued at $125. The logger who bucks the logs must have a complete understanding of log grades and markets in order to maximize their value.

The most valuable hardwood logs are used in veneer production, either by a slicing or rotary peeling process. Veneer is very thin sections of wood. It is used to mimic the appearance of solid wood in many types of furniture and other products. Slicing the best looking wood into thin sections results in a greater usable yield than could be obtained from sawing it into lumber. This, in turn, makes the hardwood resource available to a larger number of eventual consumers.

The best sawlogs are the ones that result in the most FAS (first and second grade) lumber. The smaller the log and the more defects it contains, the poorer the lumber that it will eventually yield.

The poorest of the sawlogs are suitable only for the production of lumber used in making shipping pallets. Logs yielding only pallet lumber are often called scragwood or pallet logs. It is not commonly known that the single biggest use of hardwood lumber in the United States is in the production of pallets. This points out how much low quality hardwood lumber there is in relation to the higher grades.

Roundwood is a broad term that includes a range of lower-value intermediate products. Pulpwood, scragwood, bolts or railroad ties and flooring logs are all types of roundwood. Some overlap in the material employed in scragwood, flooring logs and pulpwood occurs. Often an entire tree stem will be of such low quality, including a significant amount of rot, that it is suitable only for pulpwood, as sound wood is needed for the other roundwood products. Upper por-

Hardwood pulpwood is cut into uniform lengths and then loaded on a tractor-trailer for delivery to the pulp & paper mill.

tions of the tree stem are smaller and will have more defects. In poorly formed hardwood trees, all of the logs that can be produced may be suitable only for scragwood. In trees with better form, middle to upper portions of the stem will naturally have more branches and knots, with the resulting logs from these sections being roundwood.

Hardwood pulpwood material is of the same quality as the wood that is commonly used for firewood. In other words, the logger might sell this type of roundwood to either market without a significant difference in value. There is an enormous overlap in the material utilized for the two products. The only firewood material that is unsuitable for pulpwood is bolts that are too short to meet mill specifications for pulpwood or species that are unacceptable to the mill.

After removing logs and pulpwood, all that remains of the tree is the top. Most often this portion of the tree is left in the woods. Some forest owners cut these smaller tops

that are left after a harvest into firewood. In some locations, there are sufficient markets for whole trees chips that it is economically feasible to remove the whole tree at the time of harvesting and convert the tops to chips with a whole-tree chipper. Entire pulpwood-quality trees are sometime used to produce chips.

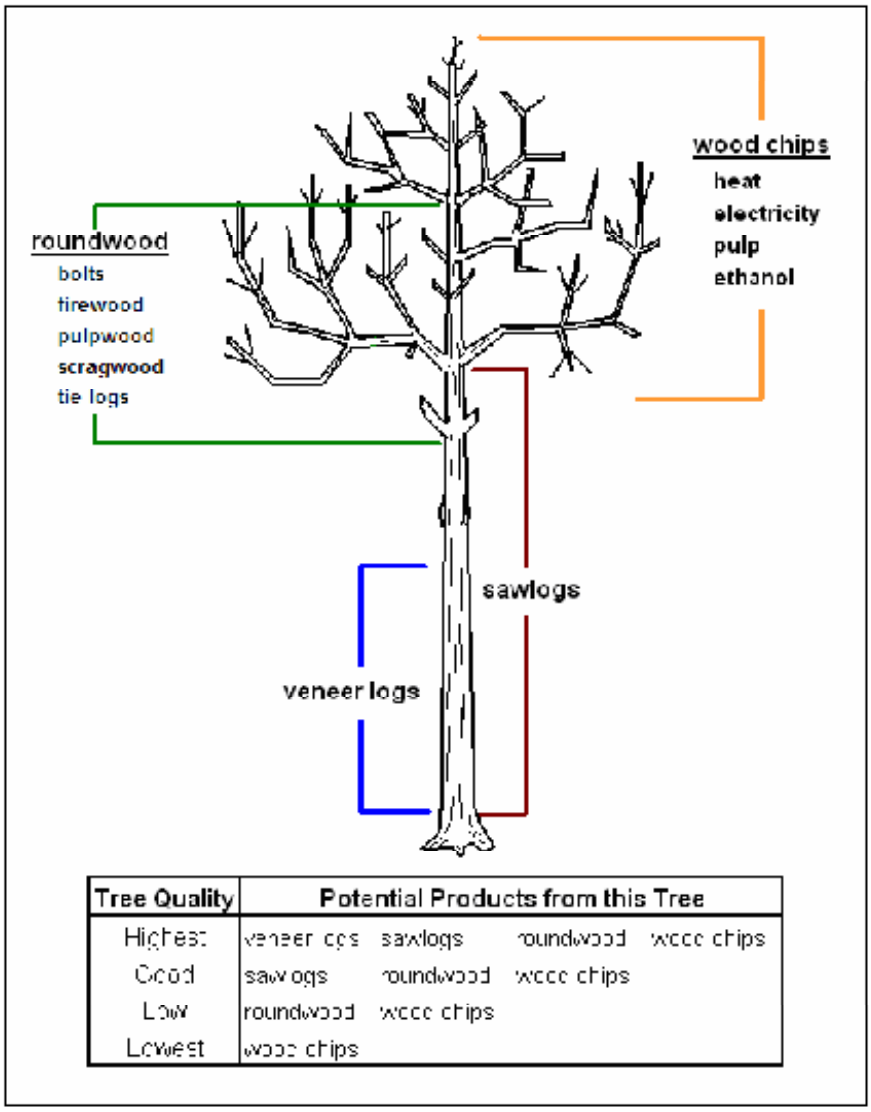
The merchantable value of the tops is very low and the production and delivery cost of the chips is nearly equal to the price paid for them at the mill. Depending on the proximity of a forest to the various markets and the current delivered prices, larger material otherwise suitable for pulpwood and firewood may be converted to chips.

There are essentially two types of whole tree chips. The first is a "clean chip," from which bark and dirt have been removed before chipping, or screened out during the chipping process. Clean chips are used in paper production. Dirty chips are used for large-scale heating plants and for electricity production. New and forthcoming uses for wood chips are energy-based as well. These uses include pellets for heating stoves used in homes, fuel for heating boilers used in mid-sized facilities such as schools and hospitals, and the production of ethanol.

A generalized diagram of the position of various intermediate products within a hardwood tree's stem is shown in Figure 1.

Forest Measurements

In managing a forest, a forester will measure, describe and quantify some of the many elements that comprise it. Forest owners who want to fully understand the management of their property should become familiar with measurements of land area, stand stocking composition and levels, tree volumes, and quantities of forest products. Accurate measurements provide the information needed for good management decisions and form the basis for a management plan that ties actions to goals. These measurements are described in the following sections.



Tree Quality	Potential Products from this Tree			
Highest	veneer logs	sawlogs	roundwood	wood chips
Good	sawlogs	roundwood	wood chips	
Low	roundwood	wood chips		
Lowest	wood chips			

Figure 1. Diagram of product location within a tree (note the overlap caused by varying utilization standards).

Land Measurements and Designations

An individual forest ownership functions as a part of the larger landscape. Manmade boundaries are often arbitrary, though some do take natural features into account. A glance at a map of the ownership patterns in the Adirondacks, fol-

lowed by a look at or recollection of the terrain, will often demonstrate this. The patterns of ownership found today, despite their jumbled appearance on color-coded maps, result from several efforts to divide the land in an orderly way.

A basic measurement of land area is acreage. Each acre is equal to 43,560 square feet of surface area. Ownership of land is often quantified in terms of the number of acres. Original estimates of the acreage of parcels of land in the Adirondacks were often inaccurate and many of them have been corrected by subsequent surveys of individual parcels. The size of larger tracts of land is sometimes expressed in square miles, with each square mile equaling 640 acres.

The first parcel designations date back to the original grants and subdivisions of ownership in the Adirondacks. Nearly every parcel is part of an original "great tract," "purchase" or "patent" or is contained in a named tract, lot or a numbered township. For example, the legal description in a deed might reference Lot 3 in Adgate's Eastern Tract or Lot 68 of the Nobleboro Patent.

Each local taxing authority has mapped all of the parcels in its jurisdiction for property tax purposes. Parcels are assigned original numbers, which do not correspond with the original lot number or those referenced in deeds. The tax map identification number comes in a three-part form: 36.000-1-14, for example. The first part (36.000) is the number of the tax map. The second part (1) is the section on the map in which the parcel is located. The third number (14) is for the lot itself. An individual tax map identification number will be unique to a particular lot within a specific county. While there may be quite a few parcels in the state numbered 5.000-1-2, there can be only one in Hamilton County.

Tax maps are drawn to scale and state an estimate of acreage (based on the local assessor's records). While these maps are an excellent source of information, it is not uncommon to find errors in them. In no case can they be considered to be more reliable than a survey map. Some towns have over-laid the parcel boundaries onto aerial photography,

making them especially useful to the landowner.

Knowing the total acreage of a property is a useful thing, but further delineation is usually required. How much of the total acreage is wetland, or open water? How much is inaccessible for forest management operations? How many contiguous productive acres are there in each timber type? It is in measuring the acreage of these various areas that useful descriptive information about a forest is developed. A forest stand or timber type map of the property (discussed in the Management Plan Chapter) illustrates this information.

A forester may make further descriptive and useful distinctions about the land area at the forest stand level. These are measurements or rankings of the access and operability of the stand for timber harvesting purposes. A simple ranking system of very good, good, fair, poor and very poor might be used to describe each of these.

Access refers to how close a log truck can get to the stand, and under what conditions. A stand might be completely inaccessible in the summer, but very accessible with minimal work needed to freeze a truck road in to it in the winter. The most accessible stands have frontage or close proximity to public roadways. The least accessible stands might require skidding or forwarding logs for more than a mile to reach a site where they can be loaded on a truck. An example of a highly accessible stand is one fronting on a state highway, close to Interstate 87, while a poorly accessible stand is far from a public road and requires an access road to get a log landing within a reasonable distance of it.

Operability refers to the ground conditions on the stand and how well these conditions lend themselves to the operation of logging equipment on the site. Common Adirondack features such as steep slopes, wetlands, multiple stream crossings and large boulders all serve to make a stand less operable. Some stands will be operable only in winter, when the snow serves to offer some protection to the equipment and makes it easier to climb steep slopes. Other sites are simply classified as inoperable, if conditions dictate that both

the soil and the equipment would suffer an unacceptable amount of wear and tear. An example of a highly operable site is one with sandy soils and relatively mild slopes, allowing logging under many different seasonal conditions. Steep slopes with thin soils, rock ledges and many boulders, on the other hand, could only be accessed during winter conditions with adequate snow cover and are thus far less operable.

Forest Stand Composition

After delineating forest stands and measuring their land area, further measurements are needed to describe the timber resource. Stand composition is measured and expressed in terms of the quantity of basal area per acre. Basal area is the surface area of a tree's stem in cross-section, 4.5 feet (breast height) above the ground. The amount of basal area per acre in stand reveals how much of the stand's surface area is covered by tree stems. While crown cover is an important consideration, stem coverage is far easier to quantify and therefore a more useful descriptive measurement for management purposes. For those inclined toward numbers and formulas, the specific measurement of the basal area of a tree is equal to 0.00545 multiplied by the tree's diameter at breast height, squared ($[0.00545 \times DBH]^2$).

Consider that each acre is 43,560 square feet in area. A very well stocked hardwood stand might have 150 square feet of basal area (well-stocked softwood stands have more). While this stocking is only about 0.3 percent of the surface area in the stand, it is visibly more heavily stocked than a recently harvested stand with only half of this stocking. Knowing the basal area per acre in a stand allows a comparison with established stocking tables. In this way it can be determined if the stand is in the under-stocked, well-stocked or over-stocked ranges.

In using basal area to describe a stand, the stocking is further delineated into composition by species. Knowing how much of a stand is comprised of each species allows a determination of forest type it falls into. For example, a stand that

has 25 percent of its basal area in American beech, 32 percent in hard maple and 19 percent in yellow birch (with an assortment of others making up the remaining 24 percent) is in the *sugar maple-beech-yellow birch* type.

Another distinction made in basal area per acre stocking is the percentage of acceptable growing stock (AGS) and unacceptable growing stock (UGS). Each stem falls into one category or the other. The definition of AGS will vary depending on the goals of the forest owner. In general, the definition of acceptable growing stock is tied to the suitability of the stem, now or in the future, for the production of sawtimber. A stem may be merchantable (because it can be sold) and still be considered unacceptable growing stock because it has no long-term potential for improvement. The percentage of a stand that is comprised of AGS will, in part, determine what course of action might be necessary to direct this stand toward the overall goals for the property. This topic is discussed in more detail in Chapter 5.

A further descriptive categorization of the stand has to do with the overall size category the timber falls into. Three general categories are used: seedling-sapling, poletimber, and sawtimber. Forest stands that do not yet have an overhead closed canopy are seedling-sapling stands. Forest stands with closed canopies and average stem diameter of less than ten inches are in the poletimber category. Sawtimber stands are those with an average tree stem DBH (diameter at breast height) of ten inches or greater. Occasional distinctions between light, medium and heavy sawtimber stands are made, based on the amount of sawtimber volume per acre present. Here's an example of the stand level data:

Stand	Area (acres)	Size	Type	BA/AC	Stems/Ac	Vol/Ac (MBF)
1	23	ST	*sugar map*	74	308	1.478
2	19	PT	*beech-sug*	71	451	-
3	45	ST	*red maple*	84	412	2.402
4	12	ST	*sugar map*	91	254	2.845
5	31	PT	*black chen*	70	501	-
6	22	ST	*hemlock-y*	119	412	3.281
7	61	ST	*red spruce*	79	287	2.147

Timber Volume Measurements

Estimates of timber volumes are made by foresters. Knowing the volume of timber on a per-acre basis at the stand level is a great help in making management decisions and valuations. Knowing the volume of a collection of individual trees included in a timber sale can be vitally important in ensuring full value is realized for them.

The volume of timber in an individual tree is difficult to measure with complete accuracy. Trees are irregularly shaped objects and the merchantable portions of the stem can be difficult to determine with absolute certainty without cutting the tree down. For this reason, tree volume is always an estimate, with the true volume only determined by harvesting the tree and bucking the stem into logs for measurement.

With lumber being one of the most important products that eventually comes from trees, it is a common practice to estimate tree volumes in board feet. An actual board foot is a measurement equal to 144 cubic inches. Most often, this is depicted as a piece of a board that is one inch thick, twelve inches long and twelve inches wide. Any square or rectangular wooden object is therefore easy to express in terms of board feet. When discussing a large quantity of board feet, it is more common to refer to it in terms of thousand board feet (abbreviated as MBF). Thus the quantity of 20,000 board feet can be expressed as 20 MBF.

Standing trees and the logs that are cut from them are not square in their dimensions, so a straightforward measurement of the number of board feet they contain cannot be made. However, estimates of the number of board feet in logs can be determined by taking a pair of simple measurements and relating them to an established log rule. Estimating the board foot volume of a tree stem involves making measurements that predict the likely number and size of logs that can be cut from it.

The actual measurement of trees involves several steps. A measurement must be made of the tree's diameter at

breast height (DBH) in inches. A second measurement must be made of a tree's merchantable height in 16-foot logs, down to a one-half log interval. Knowing how high to measure a tree requires experience in judging the quality of the stem and knowledge of the standards of merchantability. In general, merchantable height in a hardwood tree extends to a point in the stem that is a least ten inches in diameter and has two faces (sides of the stem) that are relatively free from defects, such as knots and seams. The merchantable height of softwood species extends to a smaller minimum diameter (five inches for spruce and fir; eight inches for white pine). A further measurement is made of any cull deductions by percent. Cull sections of the tree are any segment of the usable stem that will not be merchantable due to defects.

One further distinction is made in noting the species of the tree. It is always desirable to know the volume of sawtimber in a forest stand by species. Each species of sawtimber has a distinct set of uses and values. When selling logs produced from trees, they are sorted by species and then further sorted into various grades.

All of this information is then used to reference a tree's volume (BF or MBF) from established tables. An example of one is Mesavage and Girard's *Tables for Estimating Board-Foot Volume of Timber* shown in Table 2. This table is primarily used for hardwood trees. A similar table for use with softwood trees is shown in Table 3.

Tree suitable only for pulpwood are measured in the same manner described above, but their volumes are referenced from pulpwood tables. Pulpwood volumes are usually expressed in cords or tons, depending on the market. One cord is equal to the amount of wood that fills 128 cubic feet of space. In terms of solid wood, this may only be about 80 to 90 cubic feet. Weight of pulpwood will vary by species. Numerous conversion factors between tons and green cords exist. The pulpwood in the tops of sawtimber trees is usually estimated by a rule of thumb, based on a factor of approximately 0.5 cords for every MBF of sawtimber.

All of the descriptive measurements and estimates for a forest stand can be summarized in a succinct report. An example stand summary report is shown in Table 4. The formatting of such reports will, of course, vary, but the information they contain should be very informative about the stand itself.

Table 2. A tree volume table commonly used for northern hardwoods.

FORM CLASS 78 International 1/4-inch rule

VOLUME (board feet) BY NUMBER OF USABLE 16-FOOT LOGS

DBH	.5	1	1.5	2	2.5	3	3.5	4	4.5	5
10	20	36	48	59	66	73				
11	25	46	61	76	86	96				
12	31	56	74	92	106	120	128	137		
13	37	67	90	112	130	147	158	168		
14	43	78	105	132	153	174	187	200		
15	51	92	124	156	182	208	225	242		
16	58	106	143	180	210	241	263	285		
17	67	121	164	206	242	278	304	330		
18	75	136	184	233	274	314	344	374		
19	85	154	209	264	311	358	392	427		
20	94	171	234	296	348	401	440	480	511	542
21	105	191	262	332	391	450	496	542	579	616
22	116	211	290	368	434	500	552	603	647	691
23	127	231	318	404	478	552	608	663	714	766
24	138	251	346	441	523	605	664	723	782	840
25	151	275	380	484	574	665	732	800	865	930
26	164	299	414	528	626	725	801	877	949	1021
27	178	323	448	572	680	788	870	952	1032	1111
28	191	347	482	616	733	850	938	1027	1114	1201
29	206	375	521	667	794	920	1016	1112	1210	1308
30	222	403	560	718	854	991	1094	1198	1306	1415

Example

A forester measures a tree that is 22 inches in DBH and two 16-foot logs in height. Looking down the DBH column on the far left to 22 inches and then across the row into the two-log height column reveals that the tree has 368 board feet (0.368 MBF) in it. Source: Mesavage, Clement. and James W. Girard. 1946. Tables for estimating board-foot volume of timber. USDA Forest Service. 94 p.

Table 3. Northern conifer tree volume table.

Northern Conifers - Board Foot Volumes
International rule - Form Class 78

	height in # of 16' logs								
DBH	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**4.5**	**5**
8	20								
9	30	40							
10	36	48	56	63					
11	46	61	72	81					
12	56	74	88	98	109				
13	66	89	106	119	133				
14	75	104	124	140	156	167			
15	91	123	146	166	184	199			
16	106	141	168	192	212	231	247		
17	121	162	193	220	244	266	284		
18	136	182	217	248	276	300	321		
19	154	206	277	281	312	340	364		
20	171	229	337	313	348	379	407	431	
21	191	256	372	350	389	423	455	483	
22	211	282	406	387	430	467	503	535	
23	232	310	443	425	474	515	555	590	
24	252	338	480	463	517	563	606	644	681
25	276	369	480	507	566	618	664	706	748
26	299	400	480	550	614	672	722	768	814
27	323	432	520	596	665	728	783	833	881
28	347	464	560	642	716	783	844	898	948
29	375	502	604	693	773	846	912	972	1026
30	403	540	648	744	830	909	980	1045	1104

Example

A forester measures a red spruce tree that is 12 inches in DBH and three logs in height. Looking down the DBH column on the far left to 12 inches and then across the row into the three-log height column reveals that the tree contains 109 board feet (0.109 MBF). Source: Bickford, C.A. 1951. Form-class Volume Tables for Estimating Board-foot Content of Northern Conifers. USDA Forest Service: Northeastern Forest Experiment. Station. Station Paper No. 38.

Table 4. Example forest stand measurement summary report table.

Stand Name	E4	**Acreage**	44
Basal Area/Acre	67	**Site Class**	2
AGS	57%	**UGS**	43%
Size Class	Sawtimber	**Trees/Acre**	448
Mean Stand Dia.	9		
Forest Type	sugar maple-beech-yellow birch (25)		
Potential Type	same		
Forest Health	fair	**Accessibility**	good
Timber Quality	fair	**Operability**	fair

Species	% of BA	volume per acre	total volume
beech	36%	0	0
black cherry	1%	0	0
hard maple	36%	0.497	21.871
red spruce	1%	0.039	1.719
soft maple	2%	0.026	1.126
white ash	0%	0	0
yellow birch	26%	0.29	12.775
total sawtimber		**0.852**	**37.492**
hardwood pulpwood		2.7 (cords)	119

* all volumes in International 1/4" rule
Date of measurement: April 2006

Note: A summary table of this type would be prepared by the forester for every stand within a forest. This table, coupled with the forester's field experience in the stand and the owner's goals, provides sufficient background for management decisions.

Log and other Roundwood Products Measurements

Timber sales are linked, directly or indirectly, to the products that are produced directly from trees. This section describes the measurement of logs and other roundwood products. Roundwood is a general term used to include low-

grade products such as scragwood, bolts, pulpwood and firewood that are not measured in the same way as veneer and sawlogs. A further product considered here is biomass, which is generally a term for wood-based fuel.

Measurement of logs is known as scaling. Both veneer logs and sawlogs are scaled in the same way. A cross-sectional measurement is made of the diameter in inches on the small end of the log (inside of the bark). This measurement, combined with a measurement of the length of the log, in feet, is used to reference the board foot volume of the log from an established log volume table. Minimum diameters vary by log grade, but in general the minimum diameter is ten inches for hardwood sawlogs, five inches for spruce and fir sawlogs and eight inches for white pine sawlogs. In general, sawlogs must be in lengths of 8, 10, 12, 14 or 16 feet (though the use of odd-length sawlogs is spreading), with several inches of trim over the nominal lengths included to allow for checking (cracking or splitting) in the ends of the log. Veneer logs are sometimes accepted in odd lengths. Deductions from volume are made for defects such as rot and sweep (excessive curvature).

Grading logs involves placing them into various grade categories, thus assigning them different values per MBF. Each species will have its own price schedule for the various grades. In general, the larger a log is in diameter and the fewer defects in contains, the better the grade. A general grading scheme divides the logs into categories such as veneer, prime, #1, #2, and #3.

Earlier paragraphs mentioned referencing established log rule tables to determine log volumes. What are these established log rule tables and where are they found? Observers commonly ask why everyone doesn't simply agree on one of these log rules and stick to it. Each rule evolved in different regions for different purposes and the widespread use of multiple log rules reflects both the many different uses of logs and lumber and the competitive markets for logs as intermediate products.

There are several log rules that are commonly used in the Adirondacks and a large number of misconceptions about them. Again, these rules estimate the number of board feet in a log, rather than make an actual calculation. The log rules state an estimate of the number of board feet in a log falling in each of the diameter/length categories.

The International ¼", Doyle, and Scribner log rules are the ones most commonly used in our region. The Doyle and International ¼" rules are based on formulas that make deductions for the amount of wood lost in sawing off slabs and from the saw's kerf (blade thickness) size. The Scribner rule is based on diagrams of the number and size of boards that could be cut from the log. Each of these log rules arrives at different estimates of volume. The differences between each of these rules is not linear, thus there are no true "rule of thumb" conversion rates from one log rule to the next, despite rumors and practices to the contrary. The International ¼" log rule is shown in Table 5.

In selling logs, the volume of the log is multiplied by the price per MBF to arrive at its value. Thus a switch from one log rule to another necessitates a change in the price to achieve comparable resulting values. Misconceptions and suspicions about the log rules themselves are unfounded. Simple acquaintance with the facts is all that is necessary to make accurate comparisons. Far more mischief has resulted from dishonest scaling (e.g. under-measurement of log diameters) than from factual differences between various log rules.

Roundwood volumes are usually expressed in cords or tons, depending on the market for them. Various roundwood products might require a single, specific length for each stick, or might allow random lengths between stated minimum and maximum lengths (e.g. 6-22 feet).

One cord is equal to the amount of wood that fills 128 cubic feet of space. In terms of solid wood, this may only be about 90 cubic feet or so. Cord volume could be measured on a piece by piece basis, but this is impractical. It is com-

Table 5. International ¼" log rule volumes by log length and diameter.

International 1/4" Log Rule board feet by diameter & length					
Diameter	**8'**	**10'**	**12'**	**14'**	**16'**
6	*10*	*10*	*15*	*15*	*20*
7	*10*	*15*	*20*	*25*	*30*
8	*15*	*20*	*25*	*35*	*40*
9	*20*	*30*	*35*	*45*	*50*
10	*30*	*35*	*45*	*55*	*65*
11	*35*	*45*	*55*	*70*	*80*
12	*45*	*55*	*70*	*85*	*95*
13	*55*	*70*	*85*	*100*	*115*
14	*65*	*80*	*100*	*115*	*135*
15	*75*	*95*	*115*	*135*	*160*
16	*85*	*110*	*130*	*155*	*180*
17	*95*	*125*	*150*	*180*	*205*
18	*110*	*140*	*170*	*200*	*230*
19	*125*	*155*	*190*	*225*	*260*
20	*135*	*175*	*210*	*250*	*290*
21	*155*	*195*	*235*	*280*	*320*
22	*170*	*215*	*260*	*305*	*355*
23	*185*	*235*	*285*	*335*	*390*
24	*205*	*255*	*310*	*370*	*425*
25	*220*	*280*	*340*	*400*	*460*
26	*240*	*305*	*370*	*435*	*500*
27	*260*	*330*	*400*	*470*	*540*
28	*280*	*355*	*430*	*510*	*585*
29	*305*	*385*	*465*	*545*	*630*
30	*325*	*410*	*495*	*585*	*675*

Example

A scaler measures the diameter of 17 inches on the small end of the log and then finds that the log is 16 feet long. Looking down the diameter column on the far left to 17 inches and then across to the 16-foot column, reveals that the log contains 205 board feet (0.205 MBF).

mon instead to measure the height, width and length of a pile (as it sits loaded on a truck), calculate the number of cubic feet of space the load occupies and divide this by 128 to arrive at an estimate of cord volume.

Weight is viewed as the most objective way of measuring roundwood volume and has become the most common method of doing so. Truckloads of roundwood are weighed loaded and unloaded, with the difference being the weight of the wood.

Firewood volumes are measured and expressed in cords, but consumers of this product should have a careful understanding of how this is applied. A full cord, as with pulpwood, is all of the wood that will fill 128 cubic feet of space, based on wood stacked eight feet wide, four feet high and four feet deep. In some Adirondack localities, selling firewood by the full cord (whether in log length, blocks, or split) is the norm. The best way to measure such cords is to know the cubic foot volume of the truck bed or trailer that delivers them and determine what portion of this area is fully loaded.

In other areas, firewood is commonly measured and sold by the face cord. A face cord is all the wood that fills an area eight feet wide and four feet high, but it is only as deep as the length of the blocks or pieces of wood. In theory, a full cord of split wood contains three 4x8-foot stacks of 16-inch lengths. A face cord is then just one of these stacks of 16-inch wood. Face cords of longer or shorter lengths have more volume and thus are worth more or less than 16-inch wood.

Whole trees of low quality and the tops other trees are used for certain purposes in their entirety. Biomass volumes are expressed in tons. Biomass is generally processed into wood chips. These volumes are expressed in green tons, as weighed at their destination. Biomass volumes are seldom estimated in standing trees. The expected growth in the use of wood as an energy source means that the volumes of low quality stems will probably be expressed in tons on a more regular basis.

Hardwood sawlogs laid out for scaling.

Timber Harvesting

Logging involves harvesting the timber from a property, removing it from the woods and processing in into intermediate products. The following sections outline the harvesting process and explain the equipment mixes that are used in accomplishing this. Timber harvesting takes place within a legal and regulatory environment. The laws and regulations pertaining to timber harvesting in the Adirondacks, along with voluntary best management practices for water quality, are described as well.

The Logging Process

Timber harvesting is done by loggers. Loggers are small business owners who make a living cutting down and converting timber into salable products, such as logs and pulpwood. A logger might purchase timber in order to make a profit from the logs and roundwood he produces from it. Alternatively, the logger might be hired by a sawmill or other

timber buyer and paid a set rate per MBF to produce logs. Loggers are sometimes hired directly by landowners. This is most often done on a large scale by industrial or institutional forest owners, but occasionally smaller forest owners use this approach to harvesting timber. While both the small business owner and his employees are loggers, the term will be used here to describe the owner of the business.

Timber harvesting—or logging—is the process of felling trees, removing them from the woods, and then bucking them into products such as logs and pulpwood. The products are sorted on a log landing or header, and then loaded on trucks that take them to the buyer, such as a sawmill or pulpmill.

A log landing is an area that is accessible to a log truck. Ideally it will be as close to the timber being harvested as possible, in order to minimize harvesting costs. Locating a log landing involves several limitations. One of these is the physical constraints of where it is possible to turn a large truck around. Other limitations in establishing a log landing include aesthetic considerations in placing it where it will not conflict with other uses of the forest, as well as keeping a safe distance away from water courses. If a log landing from past operations isn't available, opening a new one may involve clearing trees and possibly hauling gravel to ensure that the ground is stable enough to support a truck.

Trees that are being harvested must be felled, either by hand with a chainsaw or mechanically, using a large machine. Once felled, they are typically brought to the log landing for further processing and loading. In general, it is desirable to harvest the tree furthest from the landing area first. This allows the use of trees that will eventually be harvested as bumpers for equipment and the tree-length logs that pass by them. This serves to minimize the damage to the residual trees. There are a several types of equipment used in various combinations for logging in the Adirondacks. As one logger put it "there's no single best way of doing things here, so we try a little bit of everything."

Logging Equipment

The Northeast region is the home to an interesting mix of timber harvesting systems. With a diverse resource base and a wide array of landowner goals, demands and sensitivities, there is no single perfect mix of equipment for harvesting timber. Most logging contractors have arrived at the configuration they use through trial and error. This evolution in equipment mixes is a response to the work that is available to them, coupled with shifts in the labor supply. A forester can work with the owner to ensure that a logger with an equipment spread and techniques suitable for each situation is used for the timber harvest.

Several generic equipment configurations are discussed here in turn. Loggers who are inclined to do good work that protects both water quality and the residual stand are able to do so regardless of the equipment array they choose. With that said, some equipment mixes are better suited to specific work situations than others.

A log loader is used to load logs and roundwood on a truck. Loaders are often mounted on an old truck chassis and used as a stand-alone piece of equipment on the landing, both for loading and for sorting logs. Some log trucks have a loader mounted on them. This has an advantage in portability, but increases the amount of weight being carried by the truck, decreasing the size of the load it can carry.

Often the loader is connected to a slasher or mechanical sawbuck. A slasher is a large round circular saw used to cut tree stems to a specified length. A mechanical sawbuck accomplishes the same purpose using a hydraulic chainsaw. The slasher increases production and is very well suited to low value roundwood products. Valuable hardwood logs can be bucked with a slasher, though this requires more skill and experienced judgment by the operator.

Delimbers are used on log landings to remove the limbs from trees, if they are brought out in tree length. The most productive (as well as most expensive) of these is the stroke delimber. This machine lifts the stem and makes a single

pass along its length, severing the branches. A less productive alternative to this machine is a pull-through delimber. This machine is mounted to the side of the log loader. The loader pulls the stem through it, severing the branches. These pull-through delimbers work well for spruce and fir logs, but are less efficient in delimbing hardwoods and softwoods with wider and fuller branches.

The whole-tree chipper, as its name implies, turns an entire tree stem and top into wood chips using a series of blades (also known as "knives"), blowing them into the back of an enclosed van trailer. Whole tree stems of small or inferior quality are processed through the whole tree chipper, as well as the top portions of better quality stems. The flail-delimber uses a series of short lengths of chain to remove all of the mud and bark from a tree stem before chipping, in order to produce a clean chip for paper production. Occasionally a tub-grinder is combined in an operation with a flail-chipper to grind portions flail debris and other portions of the tree unsuitable for clean chips into dirty chips that can be burned for heating or energy production.

Triaxle log trucks with loaders mounted on them often have shorter "pup" trailers that can be pulled behind them. These vehicles can be driven on slightly more winding roads and steeper slopes than tractor trailers. Tractor-trailer trucks can carry slightly more volume than triaxle-pup combinations and are more economical for trucking over longer distances.

Perhaps the most conventional or traditional piece of equipment is the cable skidder. Cable skidders come in a range of sizes. They have four rubber tires and the machine articulates (hinges) in the middle. A long cable extends from a winch and up through a roller. Choker chains are cinched around the large end of felled trees and then hooked to the skidder's cable. This machine is most often used in combination with trees that are felled by hand with a chainsaw. A small-scale logging contractor can get by using only a chainsaw and a cable skidder. In the not so distant past, prior to

A log loader is often combined with a slasher for cutting tree-length stems into logs and pulpwood and then sorting and stacking them.

A cable skidder (top), forwarder (center) and grapple skidder (bottom) are all machines used to bring tree stems from the woods to the log landing.

the adoption of more mechanized harvesting equipment, the only difference between a large logging firm and a small one was the number of cable skidders used and how many workers were employed.

A grapple skidder is very similar to a cable skidder, except that the logs are hooked to the machine with a large grapple that grasps them. This machine is well suited to pulling a large number of small stems that have been bunched together. It is less well suited to gathering scattered individual stems.

A forwarder is a six- to eight-wheeled or wheel-tracked machine used to bring bucked logs from the woods to the landing. This machine has a hydraulic loader for picking the logs up and then placing them in a "bunk" on the back of the machine. The logs aren't skidded on the ground, but instead hauled out of the woods. This machine does less damage to trails and causes fewer and shallower wheel ruts. It can move a greater volume of logs to the landing at one time than a skidder. A somewhat similar machine is a clam-bunk skidder. This machine is intended more for removing whole trees from the woods. The butt end of the tree is placed in the bunk, where it is grasped with a grapple or "clam." The tree tops trail along behind, sticking out from the end of the bunk and dragging on the ground.

A feller-buncher is a machine used for cutting down trees and then bunching them together. These machines may be mounted on tracks or rubber tires. Tracked machines are able to operate on steeper and wetter terrain. A long arm, or "boom," is mounted on the machine with a cutting head on the end of it. The cutting head may have a hot saw (a disc that is always running) or an intermittent (run on command) saw. Intermittent saws may be a large round disc or chain-saw bar and chain. The arm is extended out and the tree is grasped and then severed. The smaller trees can be picked right up and moved around. Larger trees cannot be picked up standing, but can be steered to the ground carefully. Skilled feller-buncher operators are able to cut down the

A feller-buncher is used to harvest trees and pile them for removal by a skidder or forwarder. This machine is equipped with an intermittent disc saw.

trees in a timber sale without imposing significant damage to the valuable residual trees.

A more complicated attachment for a feller-buncher (and sometimes for a forwarder) is known as a cut-to-length (CTL) processing head. This processing head allows the operator to make all of the bucking decisions and cuts as soon as the tree has been severed. This is an efficient and labor-saving piece of equipment. Adoption of CTL systems has been slow in the Northeast due to their high cost.

For Adirondack logging, a bulldozer is generally conceded to be an important part of the mix. Roadwork and the preparation and repair of landings and trails are readily accomplished with a bulldozer. While every logging contractor does not have a bulldozer, this is a machine that is useful in combination with any other mix of equipment.

Some small loggers operate with the combination of a cable skidder and a loader. This results in relatively low production. The labor force behind it will be one or two people. More cable skidders can be added to this mix to increase production. Each additional skidder, of course, will require another employee to operate it. This equipment configuration is most cost-effective when there is a high return to the logger per unit of production, such as when he has purchased valuable timber for a relatively low price.

The feller-buncher works well in combination with a grapple skidder. The feller-buncher can pile multiple stems in one location. In this way, most of the skidder's time is spent pulling stems out of the woods, rather than assembling them together before taking them to the landing. Depending on the spacing of the timber and the terrain and the distance to the landing, a feller-buncher can sometimes supply enough tree stems for two or more grapple skidders. One potential drawback in this system is that it is difficult for the feller-buncher to top off and limb the tree. As a result, whole trees are brought the landing where they are delimbed. The grapple skidder then carries tops back into the woods, using them to fill in low or wet spots on the skid trail. Alternatively, the tree tops can be run through a whole tree chipper on the log landing, if a market exists for the chips.

The feller-buncher also works well in combination with a forwarder. This type of operation is much the same as the preceding one, except that the tree tops must be cut off and limbed in the woods. Long stems may have to be cut to size in the woods as well. A couple of alternatives exist. When a whole tree chipper is included in the mix, a clam-bunk skidder can be substituted for the forwarder. Alternatively, the feller-buncher can be mounted with a cut-to-length processing head, so that all of the processing is completed in the woods, before the logs are loaded on the forwarder. Forwarders make it possible to build smaller landings, because there is no need to delimb or buck on the landing, and the loaded forwarder is more maneuverable than a cable or

A whole tree chipper blows wood chips into a van so they can be trucked to an end user.

grapple skidder pulling logs.

Other equipment combinations exist, though the ones described here are the general models that are followed. Many loggers have a variety of older equipment available to them. Forest terrain and stocking varies. Older equipment can easily be added to the mix on a case-by-case basis, as individual jobs require. For example, when the logs must be moved a great distance to a landing, a two-stage process might be used in which they are bunched in the woods with cable or grapple skidders and then moved with a forwarder to the log landing some distance away.

Laws, Regulations and Best Management Practices

There are relatively few laws and regulations in the Adirondack Park that pertain directly to logging. The regulations that are in place, however, must be observed. Reputable loggers will be knowledgeable about the regulatory climate and how to comply with it. Several sections of the New York State Environmental Conservation Law that are

related to logging are explained here. The Adirondack Park Agency has regulations about the location and intensity of logging that are applicable to certain situations. Best management practices (BMPs) for water quality are voluntary, but provide useful guidelines that forest owners will want followed when timber harvesting occurs on their land.

NYS Environmental Conservation Law Compliance

Environmental Conservation Law (ECL) Article 9 pertains to lopping the tops of softwood trees species when they are harvested as a measure to prevent forest fires. Softwood tops, when dry, are much more easily burned than those of hardwood trees. The law requires that tops be lopped down to the point where the stem is no more than three inches in diameter. Lopping the tops puts them in contact with the ground, hastening their decay and preventing them from becoming dried out and thus more flammable.

This tree top lopping requirement is in effect in each of the designated fire towns, encompassing all of the Adirondack Park. A list of fire towns in the Adirondack region, by county, is shown in Table 6.

ECL Article 15 pertains to the protection of streams and the disturbance of streambeds. When harvesting timber, it is often necessary to cross streams with logging equipment. Any classified stream is protected, as well as any stream that is a tributary of a classified stream. This effectively means that crossing any stream in the Adirondack Park with logging equipment or trucks will require a permit.

In the Adirondacks, a stream crossing permit is issued by a New York State Forest Ranger. The ranger will inspect the site, discuss the requirements for crossing the stream in a manner that protects the bed and banks and prevents erosion, and then will issue the permit. Permits are free at this time and the forest rangers are very reasonable people who are willing to work with and advise both foresters and loggers to ensure that good stream crossing techniques are used.

Table 6. A list of the fire towns by county where top lopping of softwood trees is required in the Adirondacks.

County	Fire Towns
Clinton	Altona, Ausable, Black Brook, Dannemora, Ellenburg, Saranac
Essex	all towns
Franklin	Belmont, Brighton, Duane, Franklin, Harrietstown, Santa Clara, Tupper Lake, Waverly
Fulton	Bleecker, Caroga, Mayfield, Northampton, Stratford
Hamilton	all towns
Herkimer	Ohio, Russia, Salisbury, Webb
Lewis	Croghan, Diana, Greig, Lyonsdale, Watson
Oneida	Forestport, Remsen
St. Lawrence	Clare, Clifton, Colton, Fine, Hopkinton, Parishville, Piercefield, Pitcairn
Warren	Bolton, Chester, Hague, Horicon, Johnsburgh, Lake George, Luzerne, Queensbury, Stoney Creek, Thurman, Warrensburg
Washington	Dresden, Fort Ann, Putnam

In the past, failure to obtain a permit was a common practice. Unless someone calls to inquire, the forest ranger might be unaware that a crossing is taking place. Failure to obtain a permit, however, can result in a $10,000 fine for each incident. Forest owners should require that all necessary permits be obtained by the timber harvester. This provides an added layer of oversight to ensure protection of both land and water.

Adirondack Park Agency Regulations

Within the APA rules and regulations pertaining to Special Provisions Relating to Wild, Scenic and Recreational River are some clauses directly related to timber harvesting and forest management. Most of the significant rivers and

Temporary stream crossing for logging may require a portable skidder bridge and a permit from a New York State Forest Ranger.

streams in the Adirondacks fall into one of the three classifications. The classification of a particular stream can be found in the State Land Master Plan or from the APA's Adirondack Park Land Use & Development Map (available on the APA's website: www.apa.state.ny.us). Regardless of which of the three classifications a stream falls into, the same timber harvesting guidelines are in force, as long as it is outside a hamlet or moderate intensity use area.

Harvesting or removal of trees or other vegetation within 100 feet of the high water mark (as measured horizontally) is classified as a rivers project. As such, a permit from the APA is required. This is clearly stated within one section of the APA Rules and Regulations. A second restriction, a few pages later, states that any such removal of trees or other vegetation shall not exceed "five percent of the total basal area of timber or other vegetation per acre over any ten-year period."

This ambiguity over the necessity of a permit has, in part, led to selective enforcement of these regulations for different landowners. In connection with clearing a small riverbank area for a temporary timber bridge used for timber harvesting, one landowner may be subject to significant and potentially costly conditions in order to obtain a permit, while another may be summarily deemed "non-jurisdictional." When dealing with the APA, it is best to comply with all regulations and not use slipshod enforcement or political favoritism towards others as an excuse for non-compliance.

No new log landing areas may be established within 200 feet of the mean high water mark of the river. Similarly, no new sand and gravel excavation sites used in connection with forest management are allowed within this 200-foot zone. Logging equipment may not be stored within 100 feet of the river.

A second set of harvesting standards applies to the area between the closest 100 feet of land to the river and a one-quarter mile wide corridor on each side of it. The regulations state that "Forest management shall conform to recognized silvicultural systems as defined in Terminology of Forest Science, Technology, Practices and Products appropriate to the site." The regulation further states that *Timber Harvesting Guidelines for New York State* be followed. In practice, Timber Harvesting Guidelines for New York State have been supplanted by *New York State Forestry Best Management Practices for Water Quality BMP Field Guide* (discussed in the following section).

If an even-age stand falls within this quarter-mile zone, one cutting to remove the main canopy of up to one-third of the area is allowed within a ten-year period, provided that the intention of the harvesting is to stimulate regeneration. This general guideline is subject to the provision that it would result in no more than 15 contiguous acres being clearcut, nor more than 50 percent of the basal area of 30 contiguous acres being removed.

APA regulations require a permit from the agency for

Use of tire mats is a sound best management practice for crossing wet spots.

any clearcut that exceeds 25 acres (an even stricter standard of 15 acres is applied within classified river corridors). The APA's definition of a clearcut is different than the commonly accepted silvicultural definition. Note that under some circumstances, a shelterwood harvest (removal of all but a protective portion of the overstory) falls under the APA's definition of a clearcut. Specifically, according to APA regulations:

> "clearcutting means any cutting of trees over six inches in diameter at breast height over any 10-year cutting cycle where the average residual basal area is less than 30 square feet per acre, measured within the harvested area."

Separate clearcuts of eight acres or more must be separated by at least 300 feet of uncut timber, or these areas will be aggregated and might potentially comprise more than 25

acres, triggering the permit requirement.

Additionally, the APA regulates the construction of woods roads across wetlands for timber harvesting activities. If the construction of the road requires placing fill or a material disturbance of a wetland, a permit from the APA is required.

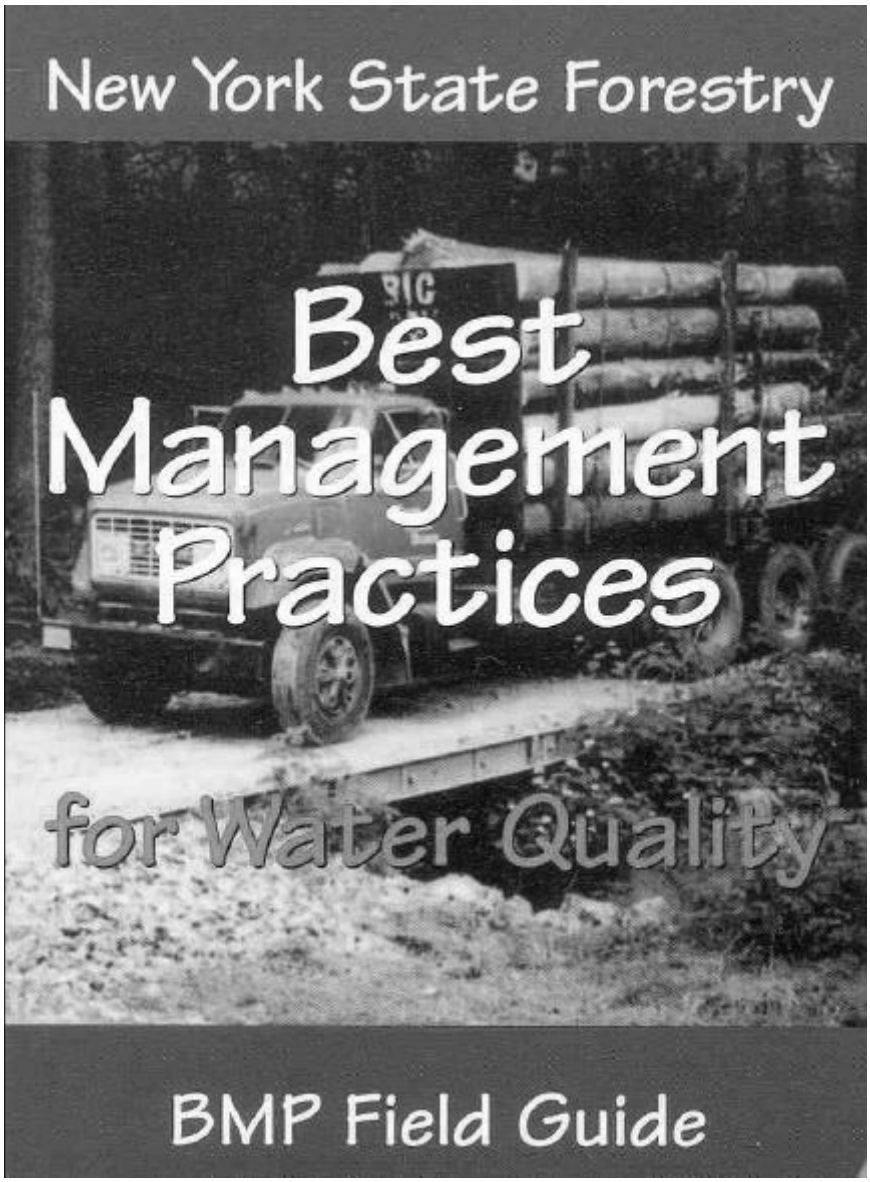
Best Management Practices for Water Quality

The Adirondacks is a wet region. Ample snow in winter and rain the rest of the year means that a great deal of water must flow through and across the land. All watercourses are connected and adhere to the law of gravity. When timber harvesting or road construction takes place, there is the potential to alter stable runoff and flow patterns and to disturb soil that might be eroded away. Some movement of soil on a site is acceptable, as long as the land can be returned to its previous condition after harvesting. Precautionary and remedial actions and installations can ensure that water quality isn't harmed when logging or other mechanized activities take place in the forest.

Best management practices, or BMPs, for water quality are a voluntary approach to protecting water resources and downstream ecology. Forest owners do not own the water that flows across their property. Therefore they do not have the right to pollute it or put sediment in it that would impact those downstream. New York State was slow to adopt the best management practices approach, but when the DEC finally did so, it produced an excellent pocket-sized manual on them. Borrowing from many sources, the *New York State Forestry Best Management Practices for Water Quality BMP Field Guide* is a full color publication that illustrates and describes various means of protecting water quality.

Most BMPs pertain to how to cross streams with logging equipment, the proper construction of roadways and the installation of culverts, and post-harvest precautions that will prevent erosion of soil into water courses. A few of the items in the New York BMPs pertain to visual buffers and

things not directly related to water quality. Individual forest owners can judge how these recommendations apply to their land.



Following New York State's voluntary Best Management Practices provides important safeguards to water quality.

Important Topics in this Chapter

- Planning as a process
- Management objectives
- Policies for careful management
- State management plan requirements for 480a enrollment
- Federal stewardship plan requirements

Forest Management Plans

Planning for Long-Term Management

Management of a forest requires planning. A management plan is a document that combines intentions with actions over time. The plan describes the forest resource, states the management objectives, outlines the activities that must take place to reach these desired objectives, and asserts policies that ensure sustainable management of natural resources in a manner that is compatible with amenity values. A detailed map of the property and long-range work schedule should be included in the plan.

Plans change over time out of necessity; it is impossible to foresee every challenge, opportunity or obstacle that may occur. Having a formal document, however, serves to remind all parties of the original objectives and it reserves

a structured point of reference to ensure that a process is followed, if changing the plan should become necessary. On properties with multiple owners, someone is bound to ask "why are we doing this?" about any given management action. A written plan that has been approved by all of the owners provides a reference point for answering such questions.

The planning process and the contents of a management plan are described in this chapter. The planning process varies depending on the complexity of both the land and its owners. The level of detail in the plan, beyond certain minimums, is a reflection of the preferences and level of involvement of its owners. Different people are comfortable with their own distinct levels of detail.

A forest management plan is compiled and written by a forester with the proper qualifications and credentials. The forester is hired to work on the owner's behalf, either as a consultant or an employee. A fiduciary relationship between the forester and the owner must exist. Forestry advice provided by those who want to influence harvesting decisions and purchase timber is less than objective and should not be relied on as a source of advice. The forest owner's needs are best met with professional assistance from someone whose compensation isn't coming from another master.

The Planning Process

Creating a forest management plan is a process that requires technical information as well as considerations of the needs and opinions of the forest owners. An inventory of the forest resource provides factual information that can be used in describing the range of management possibilities. A clear statement of management objectives should arise from thoughtful discussion. Lands with multiple owners might require give and take on everyone's part, as well as some pointed questions from the forester writing the plan. The forester should compare the objectives with the current state of the resource and then present a full range of options to

the owner or owners on how to achieve desired conditions. Once the owners have decided the benefits from the forest they want to enhance and protect, the forester can create a work plan to accomplish these goals.

Management Objectives

Management objectives for a forest are determined by its owners. These objectives are defined and selected from a broad range of possibilities. Some forest owners place a strong emphasis on enjoyment of aesthetic benefits or on maximizing or minimizing timber income. Owners of some large holdings might wish to promote stability in the surrounding community, supplying timber to ensure primary and secondary jobs. Others wish to realize occasional timber revenue for stewardship projects or other improvements. Promoting bio-diversity and forest health to enhance habitat for desired species are important objectives for others.

There is a small set of management objectives that are common to many forest owners in the Adirondacks. Often, new owners wish to realize some timber income in the short term to offset a portion of their acquisition costs. Such owners are often farsighted people who wish to couple short-term revenue with the enhancement of existing forest stands so that they will supply timber revenue at some future time, perhaps to coincide with retirement or children going to college.

Long-term owners often wish to offset property taxes and enhance the stocking of existing stands in order to leave the property in good condition as a sustainable resource for future generations. This may involve continuing a pattern of past management or taking a different management direction to help the forest recover from the cumulative effects of past harvesting practices.

Some forest owners want to modify the forest cover to enhance it as habitat for wildlife. This management goal sometimes takes the form of a new emphasis on diversity in the forest cover. Occasionally this approach arises from a

Forest owners should communicate their management goals to their forester and make field visits a part of the planning process.

nostalgic desire to return the forest to a condition that coincided with healthy game populations or favorite memories.

Quite often a management plan targets multiple goals. Clear goals are a prerequisite to successful management activities. Forest owners who don't make distinct statements of what they want to accomplish may muddle along from one idea to the next over a period of years, only to find they have squandered opportunities and undermined the potential of their forest. Timber growth is slow in the Adirondacks and an entire generation of landowners may have to bear the costs of poor decisions.

The planning process requires understanding not only what the desired forest conditions are now and in the future, but knowing the available resources to work with in achieving these goals. While the owners are the best and ultimate source of management objectives, they sometimes find it difficult to express them in a manner that can be practically applied. One approach is to have all of the decision-makers

among the ownership write down their individual forest management goals and then gather to discuss and clarify them.

Another approach is meeting with a forester who will discuss goals with the owners. The forester should then summarize everything he or she has heard in a brief report and return it to the owners as a means of facilitating discussion and decision-making. This practice makes a good first meeting between an owner and a forester and is a means of determining if this consultant is well suited to working with a particular group of people.

Inventory of Resources

Concurrent to the process of defining and clarifying management objectives is the need to generate a description, inventory and map of the land. The property's boundaries must be mapped in relation to important nearby features. Access points must be shown. The use of a topographic map or aerial photograph as a base map is advisable because of the additional information these resources can convey.

The land area is divided into individual forest stands. Forest stands are contiguous areas of the same forest type and age class of trees that share common access points. Occasionally multiple stands are grouped together into larger management areas, especially when access or operational considerations advise against treatment of very small stands.

Within each stand it is helpful to know the current stocking of basal area by species. Knowing the species composition by percent enables determination of the forest type. *Forest Cover Types of the United States and Canada* is a publication that serves as an excellent reference in determining forest types. A further distinction in basal area measurements is made between acceptable and unacceptable growing stock (discussed in the silviculture chapter), expressed as a percentage of total growing stock. Basal area, in combination with the number of stems per acre allows comparison of the current stocking in a stand with established stocking charts

from the commonly accepted silvicultural guidelines for various timber types.

The size class of the stand (sawtimber, poletimber or seedling-sapling) is inferred by the average tree diameter. Average tree diameters of ten inches and greater classify the stand in the sawtimber size class. Average tree diameters between four and ten inches classify the stand in the poletimber size class. Average tree diameters of less than four inches classify the stand in the seedling-sapling size class.

In New York, we divide site classes rather coarsely into the three categories, with 1 being the best, 2 being of moderate quality and 3 being the poorest and least productive. Tree heights from the stand are the key determinate of site class.

Information on timber volume is desirable for all sawtimber stands and to a lesser extent poletimber stands. While it is not absolutely crucial to know timber volumes by species and product, this information allows for a more informed consideration of harvesting decisions.

In addition to the quantitative measures of individual forest stands, somewhat more subjective notes are important as well. The relative accessibility of each stand should be noted, as well as some mention of the potential operability in each. Access refers to how close a logging truck can get to the stand and operability refers to the difficulty of moving and handling logging equipment in the stand.

Discussion and Decision-Making

With an inventory of the property complete an interim report containing the stand-level data, a detailed map can be compiled. A formal presentation by the forester may be necessary for a property with a large ownership group, while simple correspondence and phone discussions may work well for an individual owner. If a formal set of management objectives has been worked out at this point, the forester may be able to make specific recommendations on a course of action for each stand. If not, a range of options should

be presented. These possibilities will be constrained by the potential of the forest resource, as discovered in the inventory process. Whether the presentation occurs in person or an on-going dialogue via correspondence ensues, a series of questions and answers should result from a discussion of the property inventory.

Amenity-driven owners may want to designate primary and secondary uses for various stands. For example, timber production might be the primary use of a stand in the back of the property that is far removed from highly used or highly visible areas. Recreation might be a secondary use of this stand. A highly visible stand within a quarter mile of a lakeshore and containing a popular foot trail might be designated for recreational and aesthetic uses, with timber production deemed a secondary use or ruled out entirely.

Taking all of the resources the forest owner has to work with and all of the possibilities into account, the management objectives must be finalized. With the objectives set, all actions undertaken under the guise of this plan should make some contribution toward achieving management objectives. After discussing all of the options with the landowners, the forester will work with them to create a plan of action, including a specific work schedule. It can be difficult to assign activities to individual years, as outside forces often shift scheduling around. Ideally, planned forest operations are placed into five-year windows for the work to be done.

With a clear understanding of the landowner's goals and the potential of the land, a forester can develop a recommended plan of action. The level of information described earlier allows a forester to prescribe any silvicultural treatments necessary to contribute to the overall goals for the property. Individual management units may or many not require some level of harvesting or other treatment over the planning horizon (generally 15 to 20 years).

Plan Amendment and Updates

The best of plans can be rendered obsolete by events

outside the forest owner's control. Wind and ice storms, tree diseases, mill openings and closings, changes in oil prices and similar events can all have an impact on forest management opportunities. Operational constraints caused by such events can usually be solved over time. In general, they do not call for amending management objectives, but rather re-scheduling treatments and possibly altering or adding to policies.

Updates to forest management plans should occur every five years or so. On small properties, updating the plan may be uneventful. Larger properties that have undergone active timber management are more prone to needing significant fieldwork and discussions in updating the plan. For properties with multiple owners, a formal update to the management plan can serve to keep all parties informed and engaged about management activities. This is especially true after periods of inactivity.

The update process provides an opportunity to review the work schedule to see if everything on it has been accomplished and, if so, if these operations have had the desired impact. Looking forward, every action scheduled into the future can be examined and reconsidered, if necessary. For example, suppose that timber stand improvements done over the previous five years have not resulted in the type of regeneration of desirable species that was intended. If similar treatments are planned for the next five years, it probably makes sense to find a more effective means of accomplishing them. If a timber harvest is scheduled in the next year or two that will be comprised primarily of a species with low current market values, it might make sense to defer these harvests on the upcoming schedule or make them contingent on market conditions.

Unless drastic changes to a plan are in order, the updated plan will be a similar document to the original one, with an updated work schedule. Slight changes in policies might result from discussion with the forester about past successes and failures. Changes in management objectives usually

arise only at the direction of the forest owner or the ownership group or committee.

Policies

When a set of written policies is included in a plan, it means that the owners have considered certain possibilities or eventualities in relation to their ownership goals into account and wish to formally document that certain practices must be followed. Even individuals or immediate family ownerships may find it necessary to document such policies to provide a consistent source of direction for their property over time.

Family ownerships that are transitioning into a third or fourth generation tend to become partnership groups of relatives with diverging circumstances. Similarly, forests with ownership by multiple parties, such as associations and clubs, may find that their connection to the land is the only thing they have in common. In such cases it is beneficial to consider an array of policies, to make certain determinations and then document them in the management plan. Similar to the management objectives, this provides a benchmark reference when an issue arises and there is disagreement among the owners over how it should be handled. It is probably impossible to foresee every issue that might arise or to know ahead of time how they should be addressed, but many items can be effectively dealt with up front.

The following policies are intended as both examples and suggestions. Forest owners will find that they can select among these and customize them to suit their needs. They may also find that some of them are not be applicable to their property or objectives.

Best Management Practices for Water Quality (BMPs)

All harvesting activities, as well as road and trail construction must comply with New York State Forestry Best Management Practices for Water Quality (available from the NYS Department of Environmental Conservation). This BMP

requirement applies to the activities undertaken by the owners themselves or by any outside contractors. Timber sale contracts should specify this requirement.

Updates and the Planning Process

This management plan should undergo a formal review and update every five years. The work schedule in this plan is divided into five-year blocks to provide windows of opportunity to achieve periodic goals. Annual work plans may be drawn up each year, as operational plans become clearer.

Regular updates to the management plan provide a formal opportunity to review the work that has been done, examine any changes in policies that might be needed to ensure progress is directed to meeting management objectives, and to take advantage of emerging opportunities in education, markets and management.

Unscheduled Opportunities

Unplanned activities should be allowed, if already within the parameters of the work schedule (e.g. a treatment planned for Year 7 becomes cost effective in Year 4) or they otherwise contribute to the overriding management objectives. Some of the silvicultural treatments desirable to improve certain stands will be difficult to accomplish because the proceeds from the timber harvested will be less than the costs involved. If labor, equipment or cost-share funding becomes available that would make these treatments easier to accomplish, it may be desirable to take advantage of the opportunity, even if a treatment can be only partially completed.

Certified Logger Training

Loggers who work on this property should have achieved Trained Logger Certification in New York State. Proof of such certification can be found on the New York logger training website (www.nyloggertraining.org). Certification gives the forest owner a certain level of assurance

about the abilities of the logger. This policy can be a strict requirement or it can be a suggestion.

Safety Plans

Every harvesting site requires a safety plan and all those involved with operations should have a copy of it. Prior to beginning harvesting operations, the safety plan should be reviewed by all parties involved. The safety plan should contain, at a minimum, the contact phone numbers for the local fire department, the state police, the nearest forest ranger, the forest ranger dispatch number in Ray Brook, the logging contractor, any foresters involved and the landowner. Additionally, it should contain the coordinates (Latitude/Longitude & Universal Transverse Mercator systems) of the nearest potential helicopter landing site and concise, accurate directions on how to access the property and the job site. All workers on the site should have instructions to flag a trail to the injured person and to unlock any gates and meet and lead the emergency personnel to the accident.

Forestry Advice & Harvesting Supervision

Timber harvesting activities and management planning should take place under the supervision of a forester who is working for the landowner. The forester should have minimum qualifications of several years experience working in the Northeast, listed in good standing on the NYSDEC list of cooperating consulting foresters and be a Society of American Foresters Certified Forester.

Timber Sale Contracts

All timber sales and timber stand improvement operations shall be subject to a written contract. This contract should spell out the obligations of both parties along with the time frame for the contracted activity. The contract should provide a description of the area involved and specify stumpage payment rates or amounts, as well as a payment schedule. The purchaser and any contractors or

subcontractors will be required to supply proof of adequate liability and workmen's compensation insurance. A performance bond to be held by a third party may be required. The bond will come into play if there is significant damage to the land or roadways and the timber purchaser does not take corrective or remedial action in a timely manner. See Chapter 5 for more details on timber sale contracts.

Formal Notice

Each year a formal reminder will be posted and mailed to all of the owners, detailing any forest management activities scheduled to take place in that year. Some clubs and associations maintain a secure website or email listserv for this purpose. Note that this policy is most appropriate to large clubs and associations or other properties with many owners.

State and Federal Requirements

In addition to the core elements of any effective forest management plan are state and federal requirements applicable in certain situations. Land enrolled under the New York State Forest Tax Law must have a forest management plan that meets the guidelines of this program. The U.S. Forest Service has specifications for forest stewardship plans. Stewardship plans meeting federal requirements qualify a property for some cost-share funds, when they are available.

State and federal guidelines for management plans are similar, with many overlapping requirements, but there are also items unique to each. With minor modifications it is possible to create a plan meeting both state and federal requirements. Even when participation in either program is not a current consideration, it is wise to create a plan that complies with each in case it becomes advantageous to participate in these programs at a future date. Outlines of the state and federal requirements are included here. A sample forest management plan that meets both state and federal standards is included at the end of this chapter.

New York State Forest Tax Law (480a)

Table 1. Outline of required federal stewardship plan impact information.

1	**Names**
	a. Landowner identification
	b. Property address
	c. Plan author identification
	d. Date plan prepared
	e. Summary of landowner's available Time, Interest, Money, and Energy (TIME)
2	**Directions/Access**
	a. Directions to property or legal description
	b. Property code
	c. Management access
	d.Map info
3	**Property Description**
	a. Property description
	b. Ecoregion/USFS Subsection
	c. Total acres
4	**Site Information**
	a. Soil description/characteristics
	b. Interaction with surrounding properties
	c. Threatened/endangered species
	d. Cultural importance
5	**Goals**
	a. General resource goal or goals for the property (Visual, Timber Production, Wildlife etc.)
	b. Specific goal description
	c. Additional comments on the goal or goals
6	**Stand Descriptions by Name, Acres, Forest Type, and Size Class**
	a. Identification - name, acres, existing & potential forest type, size class, and successional trends
	b. Site - stand history & health, site quality, and timber quality
	c. Statistics - stocking, trees/ac, dia, basal area, acceptable basal area, volume, site index
	d. Potential uses - timber production, recreation, habitat and wildlife, other
	e. Features & Issues - important natural features, water quality issues
	f. Objectives - landowner's overall objective for the stand, recommended silvicultural prescription
	g. Prescription - description of silvicultural prescription

Management Plan Requirements

New York State Forest Tax Law (480a) forest management plan requirements are focused on timber production. Each plan must contain the application number provided by the Department of Environmental Conservation, the name and contact information of the landowner(s) and identification of the tract by tax map and deed numbers. The enrolled land area must be divided into individual stands or broader management units. Required information about each forest

stand includes acreage, forest type, size class (seedling-sapling, poletimber or sawtimber), site class, species composition, and basal area per acre. A map that shows the location of each stand and summarizes all of the stand information must be included in the plan and drawn to a scale deemed acceptable by the regional DEC office. The narrative section must detail the types of forest crops to be continually produced from each stand and list any threatened or endangered species known to be present on the property. A 15-year work schedule included at the end of the plan must list, by year, each of the harvesting activities or other treatments to be undertaken, including any boundary maintenance. All enrolled land must be managed for timber production, though this does not preclude other uses.

Note that there is no formal statement of the forest owner's objectives in these state requirements, as this type of plan is narrowly focused on timber production. Long-term timber production is the implied management objective. Many management objectives are both possible and allowed, but there is no requirement that they be formally stated within this type of management plan. Forest owners can work with their forester to incorporate a broader range of goals, while still meeting all of the 480a requirements. Using the federal forestry stewardship plan format is a very good way to do this.

Federal Stewardship Plan Requirements

Federal stewardship plan requirements encompass a wider range of management goals and are more specific in their nature. The Forest Service's Stewplan is a free software package that allows convenient input of all of the required information and produces a compliant plan document in html or text file format (available at www.fs.fed.us). The Stewplan software provides an excellent means of assembling all of the relevant information in one document. An outline of all of the information that must be gathered in preparing the plan is shown in Table 1. While the plan gen-

erated by the software meets all of the stewardship requirements, it is often necessary to add further information and narrative to such a plan to fully customize it. Since most forest owners enrolling under the New York State Forest Tax Law have ownership goals in addition to timber management, creating a stewardship plan that is further customized to meet 480a requirements is an effective planning strategy.

An example of a plan meeting all of these requirements is shown on the following pages.

FOREST STEWARDSHIP PLAN

This is a forest management plan developed under current Federal and State forest stewardship guidelines and in fulfillment of requirement of enrollment under the New York State Forest Tax Law, designed to meet the needs of the Otter Creek Club.

Date Prepared:	October 2006
Plan Time Frame:	2005-202
Property Owner(s):	Otter Creek Club
Address:	P.O. Box 200 Adirondack, NY
Telephone:	5188-555-0000
Email:	Otter@ottercreekclub2.com
Property Address: (if applicable)	Iron Lake Road, Adirondack, NY, 15545, Hamilton County
Legal description or directions to site:	From the intersection of Limekiln Lake Road and Iron Lake Road near the turn onto Iron Lake and follow it around the lake for 8.4 miles until it ends at a locked gate. The gate is the entrance to the property.
Prepared By:	Rusty Woods, CF
Company:	Fernwood Forestry
Address:	P.O. Box 100, Adirondack, NY, 15545
Telephone:	518-555-1212
Email:	Info@fernwoodforestry.com
Approvals:	
Landowner:	_____ **Date:** _____
Prepared by:	**Rusty Woods** **Date:** 30 October 2006
Approving Agency:	**NYSDEC** **Date:** 16 November 2006

Chapter Four

GENERAL INFORMATION

The Otter Creek Club is has been owned by the Smith and Adams families for several generations. These families share a common bond in the ownership and care of this land. The camp compound area includes a main lodge and several smaller outbuildings. Both families are frequent visitors to the camp for weekends, summers and hunting seasons. They are strongly motivated to protect and enjoy this land.

The property itself is a nearly 450 acres in size, all of it draining into Otter Creek as it passes through the property. This northern hardwood forest is typical of the region, with past cutting practices contributing to its currently less than desirable stocking. The purpose of this plan is to begin a formal pattern of management to be replicated and carried forward by successive generations. This property will be enrolled under Section 480a of the New York State Real Property Law.

Landowner Assessment

Description of resources and level of interest from the landowner:	The owners have a lodge and hunting cabins on the property. They enjoy visiting the land and pursuing outdoor activities in all seasons.
Management Objectives	• Generate periodic income from timber production, with sawtimber being the primary goal and pulpwood being a byproduct of management toward this goal. • Develop multipurpose trails • Establish/maintain a tall continuous canopy • Minimize disturbance • Leave many big trees • Promote vegetation that displays colorful foliage in Autumn

General Property Information

Total land area:	449.9 Acres
Total number of stands/mgmt units:	4
General property description:	This 449.9-acre property encompasses tax map parcels 127.000-1-51 and 127.000-1-52. It is a large, uniform tract, with nearly identical timber types throughout. The bulk of the acreage is in slopes facing southeast. Otter Creek and two of its major tributaries are found on of the property. A roadway entrance leading into the property is graveled for a short distance, leading to a log landing. A network of winter logging roads and skid trails provide access to the property from this point.
Description of surrounding properties:	This property is bordered on three sides by New York State Forest Preserve. The recent timber harvesting here provides diversity in the wildlife habitat, offering a contrast to the older growth forest preserve. Several small parcels with seasonal homes adjoin the property, between the boundary and the road front.
Soils information:	Generally this property has coarse textured soils with a mor humus on the surface. The soils on the steeper slopes are thinnest. Unfortunately, there is no soil survey data for Hamilton County.
Management access:	The entrance to the property is graveled for a short distance, leading to a landing area. A winter road from this landing leads to a series of other landings further into the property.
Presence of threatened and endangered species:	None that we are aware of.
Cultural importance:	This property exemplifies the Adirondack tradition of family lands that are interspersed with forest preserve. As a working forest, it is important to the landscape of the Adirondack Park.

Certification of Eligible Acreage:

I certify that all of the land shown as eligible in this plan is legally eligible for enrollment under Section 480a of the New York State Real Property Tax Law.

Rusty Woods

Signature of Forester

STAND 1 DESCRIPTION

Land area:	Land area: 74 Acres	
Land use history:	This stand had a small number of stems removed in the recent (3+ years ago) selection harvest of the adjoining stands.	
Forest Type:		
- Existing	beech-sugar maple (60)	
- Potential	sugar maple-beech-yellow birch (25)	
Successional trend:	This forest type is the climax for the site. There is a significant amount of yellow birch present and the removal of beech stems could alter the composition into the sugar maple-beech-yellow birch type.	
Forest health:	Good	
Site quality:	Site index is 2 for sugar maple. Good - soils are somewhat thin but the southeast aspect of the slope makes up for this somewhat.	
Approximate age:	85	**Size class:** sawtimber
Trees per acre:	271	**Mean Stand Diameter:** 12.3 in.
Basal Area (BA):	72	**Acceptable BA:** 64 percent
Growth Rate:	2 percent	**Timber Quality:** medium
Stocking:	sugar maple (51 percent), beech (31 percent), yellow birch (12 percent) others (6 percent)	
Stand Volume:	3.474 MBF (Int.)	
Habitat and wildlife use:	Provides a portion of the habitat necessary for many native game species.	
Recreational opportunities:	Hiking & hunting.	
Potential for timber production:	Best of the four stands on the property.	
Water quality issues:	This stand has steep slopes that drain into Otter Creek. Any harvesting must adhere to Water Quality BMPs to ensure the protection of water courses.	
Important natural features:	Steep slopes.	

Stand 1 Plans

Landowner's objectives for this stand: Produce sawtimber and develop trails through the stand.

Silvicultural Prescription

Recommended silvicultural system:	Uneven-aged management, favoring sugar maple and yellow birch. Target maximum diameter is 20 inches. The desired cutting cycle is 25 years.
Details of the silvicultural prescription:	Selection harvest to remove mature sawtimber and undesirable growing stock.

Planned Activities Selection harvest in 2011-2012

STAND 2 DESCRIPTION

Land area:	Land area: 110 Acres	
Land use history:	This stand underwent a selection harvest 3-5 years ago.	
Forest Type:		
- Existing	sugar maple-beech-yellow birch (25)	
- Potential	same	
Successional trend:	This current forest type is the climax for this site. Steps will be necessary to prevent beech composition from growing.	
Forest health:	Fair - some signs of beech scale disease.	
Site quality:	Site index is 2 for sugar maple. Good	
Approximate age:	60	**Size class:** sawtimber
Trees per acre:	281	**Mean Stand Diameter:** 11.2 in.
Basal Area (BA):	66.3	**Acceptable BA:** 58 percent
Growth Rate:	1.5 percent	**Timber Quality:** Fair
Stocking:	beech (35 percent), sugar maple (22 percent), yellow birch (16 percent), soft maple (13 percent), hemlock (10 percent), others (4 percent).	
Stand Volume:	2.120 MBF (Int.)	
Habitat and wildlife use:	Provides a portion of the habitat necessary for many native game species.	
Recreational opportunities:	Hiking, hunting, enjoyment of adjoining Warner Lake.	
Potential for timber production:	Fair - limited access reduces management options.	
Water quality issues:	Much of this stand drains into Otter Creek. All harvesting must follow Water Quality BMPs.	
Important natural features:	Steep slopes	

Stand 2 Plans

Landowner's objectives for this stand:	Produce sawtimber and enhance wildlife habitat.

Silvicultural Prescription

Recommended silvicultural system:	Uneven-aged management, favoring sugar maple and yellow birch. Target maximum diameter is 20 inches. The desired cutting cycle is 25 years.
Details of the silvicultural prescription:	Eventual removal of undesirable growing stock.

Planned Activities None in current planning horizon

STAND 3 DESCRIPTION

Land area:	Land area: 169 Acres	
Land use history:	This stand had a selection harvest in the past 3-5 years.	
Forest Type:		
- Existing	sugar maple-beech-yellow birch (25)	
- Potential	same	
Successional trend:	This is the climax type for this site. Steps will be necessary to prevent beech composition from growing.	
Forest health:	Fair - high composition of beech showing signs of beech scale disease.	
Site quality:	Site index is 2 for sugar maple. Good	
Approximate age:	70-100	**Size class:** sawtimber
Trees per acre:	344	**Mean Stand Diameter:** 10.5 in.
Basal Area (BA):	71.3	**Acceptable BA:** 38 percent
Growth Rate:	2 percent	**Timber Quality:** medium
Stocking:		
Stand Volume:	1.611 MBF (Int.)	
Habitat and wildlife use:	This stand provides a portion of the habitat necessary for many native game species.	
Recreational opportunities:	Hiking, hunting & enjoyment of adjoining Warner Lake.	
Potential for timber production:	Fair – limited access reduces management options.	
Water quality issues:	Most of the stand drains into Otter Creek. All harvesting must follow Water Quality BMP's to protect them.	
Important natural features:	One arm of Fawn Mountain extends into this stand.	

Stand 3 Plans

Landowner's objectives for this stand: Produce sawtimber and enhance wildlife habitat.

Silvicultural Prescription

Recommended silvicultural system:	Uneven-aged management, favoring sugar maple and yellow birch. Target maximum diameter is 20 inches. The desired cutting cycle is 25 years.
Details of the silvicultural prescription:	Area wide thinning to removal of undesirable growing stock (mostly beech) and to promote regeneration of favored species.

Planned Activities Area-wide thinning in 2011-2012.

STAND 4 DESCRIPTION

Land area:	Land area: 75 Acres		
Land use history:	This stand underwent a selection harvest in the past 3-5 years		
Forest Type:			
- Existing	sugar maple-beech-yellow birch (25)		
- Potential	same		
Successional trend:	This is the climax type for this site.		
Forest health:	Fair		
Site quality:	Site index is 2 for sugar maple. good		
Approximate age:	75-125	**Size class:** sawtimber	
Trees per acre:	324	**Mean Stand Diameter:** 10.2 in.	
Basal Area (BA):	66.4	**Acceptable BA:** 58 percent	
Growth Rate:	2 percent	**Timber Quality:** medium	
Stocking:	beech (39 percent), sugar maple (21 percent), yellow birch (20 percent), red spruce (8 percent), soft maple (7 percent), others (5 percent)		
Stand Volume:	1.944 MBF (Int.)		
Habitat and wildlife use:	This stand has a portion of the habitat necessary for many game species		
Recreational opportunities:	Hiking & Hunting		
Potential for timber production:	Good - southeast facing slope and more accessible than Stands 2&3.		
Water quality issues:	Some of this stand drains directly into Otter Creek. All harvesting here must follow Water Quality BMP's.		
Important natural features:	Steep slopes.		

Stand 4 Plans

Landowner's objectives for this stand:	Produce sawtimber and enhance scenic value.

Silvicultural Prescription

Recommended silvicultural system:	Uneven-aged management, favoring sugar maple and yellow birch. Target maximum diameter is 20 inches. The desired cutting cycle is 25 years.
Details of the silvicultural prescription:	Eventual removal of undesirable growing stock.

Planned Activities None in current planning horizon

SUMMARY TABLES

Comparison of management units on the Otter Creek Club property

Unit	Acres	Cover Type	Stand Diameter	Basal Area	Silvicultural System
Stand 1	74	beech-sugar maple (60)	12.3 in.	72	Uneven-aged management. Maximum diameter 20 inches. Cutting cycle of 25 years.
Stand 2	110	sugar maple-beech-yellow birch (25)	11.2 in.	66.3	Uneven-aged management. Maximum diameter 20 inches. Cutting cycle of 25 years.
Stand 3	169	sugar maple-beech-yellow birch (25)	10.5 in.	71.3	Uneven-aged management. Maximum diameter 20 inches. Cutting cycle of 25 years.
Stand 4	75	sugar maple-beech-yellow birch (25)	10.2 in.	66.4	Uneven-aged management. Maximum diameter 20 inches. Cutting cycle of 25 years.

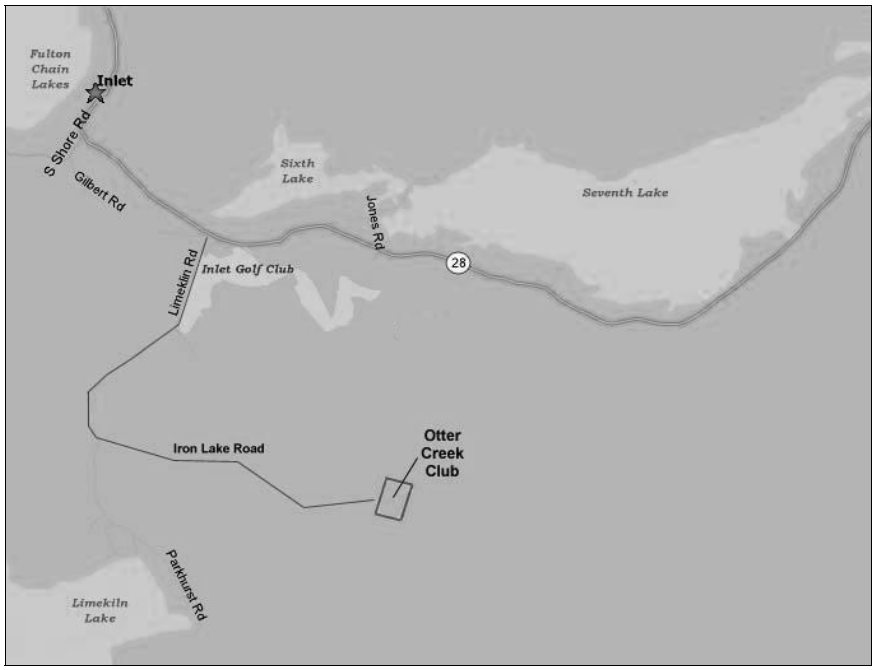
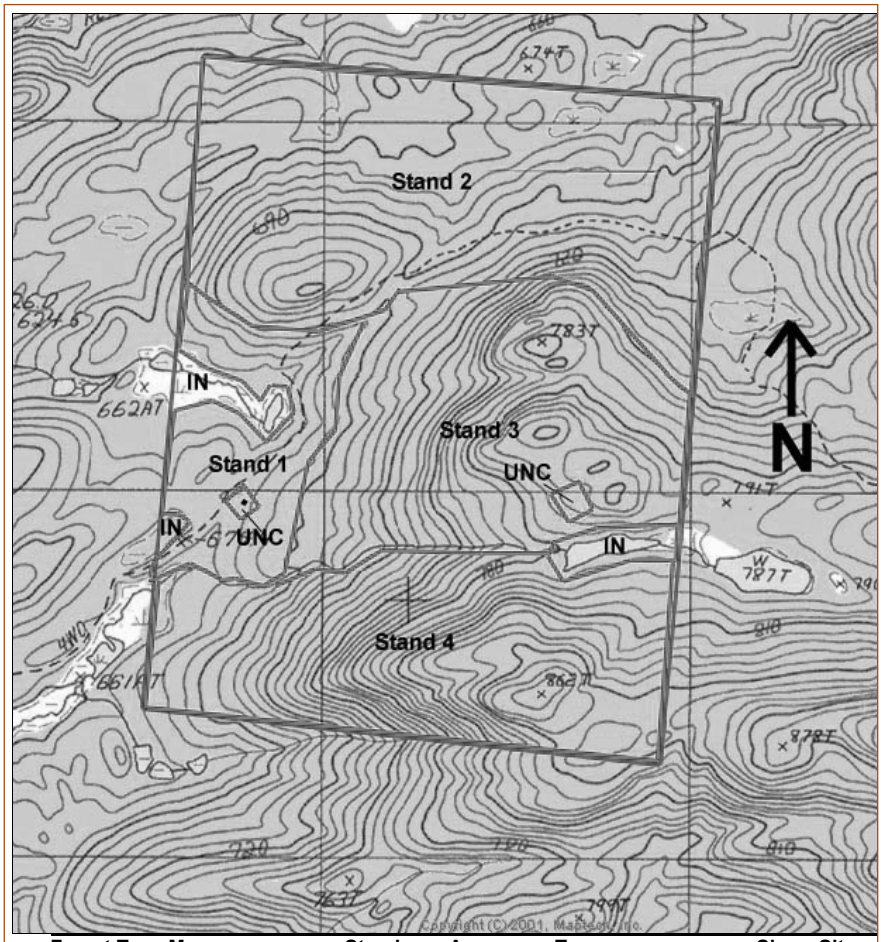


Figure 1. Location map for Otter Creek Club Property, Iron Lake Road, Town of Adirondack, Hamilton County, New York.



Forest Type Map	Stand	Acreage	Type	Size	Site
for	1	74	be-sm (60)	ST	2
Otter Creek Club	2	110	sm-be-yb (25)	ST	2
P.O. Box 1000	3	168	sm-be-yb (25)	ST	2
Rosebud, NY 15547	4	75	sm-be-yb (25)	ST	2
Application # 20-87	Ineligible	20.9			
Town of Adirondack	UNC	2			
Hamilton County, NY	Total	**449.9**			

Figure 2. Forest type map for Otter Creek Club Property.

Forest Management Policies

The following policies shall be strictly observed in the management of this property:

Best Management Practices - All harvesting activities, as well as road and trail construction must comply with *New York State Forestry Best Management Practices for Water Quality BMP Field Guide.*

Certified Loggers – To the extent possible, loggers who work on this property should have achieved Trained Logger Certification in New York State.

Consulting Forester – A qualified consulting forester will be engaged to design and supervise all timber harvesting and other forest management activities.

Enrollment Requirements – All of the requirements for enrollment of this property under the New York State Forest Tax Law will be met. Required notices, management plan updates and annual commitment forms will be submitted in a timely fashion to both the New York State Department of Environmental Conservation and to the local assessor.

Management Plan Updates – This plan will be updated every five years. Occasionally amendments may take place as well, in response to natural disasters or other unforeseen outside events. Slight alterations to the work schedule may occasionally be made in response to emerging opportunities.

Safety Plans – All harvesting operations on this property will have a safety plan containing contact information for emergency personnel, directions to the work site and general advice on how to respond to an accident. All those involved in the harvesting operations, including the owners, loggers, foresters, state forest ranger and others will be given a copy of this information prior to the start of the work.

Timber Sale Contracts - All timber harvesting operations will require a written contract specifying the obligations of both parties. All contractors will be required to supply proof of adequate liability and workmen's compensation insurance. A performance bond to be held by a third party will be required, if potential damage to the land or roadways is significant.

Holiday Week – Under no circumstances will timber harvesting be allowed in Stand 1 or 2 (those closest to the camp compound) between the dates December 24 and January 2 of each year.

Fifteen-year work schedule for Otter Creek Club property.

Otter Creek Club Forest Management Schedule			
1-Mar		**28-Feb**	
2007	to	2008	Layout trail network
2008	to	2009	Build trails
2009	to	2010	
2010	to	2011	Inspect & Maintain Boundary Lines
2011	to	2012	Update Management Plan
2012	to	2013	Select harvest of Stand 1 Area-wide harvest of Stand 3
2013	to	2014	Maintain hiking trails
2014	to	2015	
2015	to	2016	Inspect & Maintain Boundary Lines
2016	to	2017	Update Management Plan
2017	to	2018	
2018	to	2019	
2019	to	2020	
2020	to	2021	Inspect & Maintain Boundary Lines
2021	to	2022	Update Management Plan

Important Topics in this Chapter

- Classification of trees within a forest stand
- Forest stand terminology and stand types
- Silvicultural prescriptions for forest stands
- Even-aged silviculture
- Uneven-aged silviculture
- Crop tree silviculture

Silviculture and its Role In Forest Management

Silviculture

Silviculture is the treatment of forest stands to enhance the supply of benefits from a forest. The composition of individual forest stands and the goals of the forest owner will dictate what type of silviculture is appropriate. The proper application of silviculture is the difference between long-term stewardship of a resource and simple short-term liquidation of valuable timber. It is important to understand the range of silvicultural options and how a forester implements them in the pursuit of a forest owner's goals.

Baskerville (1977) states that "we do not conduct silviculture for silviculture's sake, we also do not conduct silviculture without considering the financial ramifications."

Expanding on Baskerville's theme, silviculture should be used to provide or enhance the products, revenue and other benefits a forest provides for its owners. Silviculture is a scientific approach to the manipulation of forest stands. An important part of forest management is the application of silviculture.

Nyland (2002) provides a thoughtful description of the things that silviculture can do within the context of managing a forest. From an economic perspective, these things include:

- shortening the time needed to realize benefits from forest management;
- increasing the options or values available to the forest owner (in contrast to an unmanaged forest);
- improving the qualify of benefits from the forest for its owner; and
- providing the full range of desired forest values to the owners at the least cost.

This chapter is a rudimentary overview of a complicated topic. For this reason, it will be prefaced with a discussion of terms and concepts, followed by descriptions different types of silviculture and a discussion of the merits and disadvantages that forest owners realize in their practice.

Terms and Concepts

The terminology of silviculture has enough complicated jargon to confuse even foresters who practice it daily. This section will introduce and define several important terms. Some of the distinctions made in silviculture apply to individual trees, while others are made at the forest stand level. Understanding these terms allows a forest owner to better explain management objectives to the forester.

Trees

Forest stands are comprised of trees. Individual trees vary by species, size, form, health, vigor and position in the stand,

Advanced regeneration of desirable species is released to allow the growth and development of a new sawtimber stand.

current and potential value, and suitability for user-defined purposes. Trees progress in their initial growth from seedlings to saplings. The presence of a distinct group of saplings within the understory of a stand is referred to as advanced regeneration. Saplings become poles when they are about six inches in DBH. Poles advance the sawtimber size class when they reach ten inches in DBH (eight inches in DBH for some softwood species).

Woody plants that normally do not exceed 20 feet in height are considered shrubs. Common Adirondack shrubs include striped maple, mountain maple and witch hobble. Occasionally species such as Eastern hophornbeam and witch hazel are found. Some of these shrubs obstruct the understory growth of valuable commercial tree species.

Trees can be classified as dominant, codominant, intermediate or suppressed. The classifications pertain to the tree's position within the forest canopy. Dominant trees receive full sunlight from above and from the sides. Codomi-

nant trees are part of the main canopy, receiving full sunlight from above, but are not as tall as the dominant trees. Intermediate trees may receive some overhead sunlight, but are in competition with the dominant and codominant trees for sunlight from the sides. Suppressed trees are those that are below the main canopy and receive little or no direct sunlight and so are typically slow growing.

Within each of these categories are trees that may have long-term potential for value growth, as well as trees that are taking up space in the stand but will not continue to grow in value. In the case of codominant, intermediate and suppressed trees, it may be necessary to open the canopy for them to reach their full potential.

It is clear that trees will occupy different positions within the stand structure according to their size. Some trees can survive suppression better or longer than others, eventually responding to openings that give them greater sunlight. The ability of a tree to withstand shade is known as its tolerance. Tree species are generally classified as tolerant, intermediate or intolerant. A list of important species by shade tolerance is given in Table 1. Note that superior soil and site conditions tend to increase the shade tolerance of various species.

As it happens, many of the more valuable trees species fall into the intermediate or intolerant categories. This means that regeneration of these species tends to require more sunlight and thus more openings in the forest canopy.

An important classification of the trees within a stand is the division between acceptable growing stock (AGS) and unacceptable growing stock (UGS). Acceptable growing stock can be defined in any way that is compatible with specific management objectives for a property. When revenue from timber sales is the primary management goal for a stand, a tree will usually be considered acceptable growing stock if it has the potential to be of sawtimber quality at the time of the next scheduled harvest. Any tree stems that do not meet the definition of AGS are considered unacceptable growing stock.

Table 1. Shade tolerance of important Adirondack tree species.

Tolerant	**Intermediate**	**Intolerant**
American beech	black ash	bigtooth aspen
basswood	black oak	black cherry
black spruce	red oak	paper birch
Eastern hemlock	white ash	quaking aspen
Northern white cedar	white oak	tamarack
red (soft) maple	white pine	
red spruce	yellow birch	
sugar (hard) maple		

Forest Stands and Stand Types

Silviculture is practiced at the forest stand level. Forest stands have been defined previously in this manual as all of the contiguous, accessible area under the same ownership having the same forest type. Each forest stand can be analyzed and described individually. With a full knowledge of the composition and potential of each forest stand, the forest owner and forester make decisions about the timing and actions necessary to realize the desired benefits from the forest.

Each forest stand is of a particular type, determined by the species composition it contains. Forest types are named based on the tree species that dominate them. A list of common forest types found in the Adirondacks is shown in Table 2. At least 23 naturally occurring forest types are present, but a smaller number of spruce-fir, pine and hemlock and northern hardwood types predominate. Red spruce-balsam fir, red spruce-yellow birch, Eastern white pine, hemlock-yellow birch, sugar maple-beech-yellow birch, beech sugar maple and red maple are the most frequently occurring forest types. In some stands there is the potential to change from one forest type to a more desirable one with the right silvicultural treatments. For example, it may be possible and desirable to convert a beech-sugar maple stand that is dominated by low quality beech stems to a sugar maple-beech-

Table 2. Forest stand timber types found in the Adirondacks.

boreal conifer types	**pine and hemlock types**
balsam fir	red pine
black spruce-tamarack	Eastern white pine
tamarack	white pine-hemlock
	Eastern hemlock
boreal hardwoods	white pine-northern red oak-red maple
paper birch	hemlock-yellow birch
spruce-fir types	**northern hardwood types**
red spruce	sugar maple
red spruce-balsam fir	sugar maple-beech-yellow birch
red spruce-yellow birch	sugar maple-basswood
res spruce-sugar maple-beech	black cherry-maple
paper birch-red spruce-balsam fir	beech-sugar maple
northern white cedar	red maple
	northern red oak

yellow birch stand over time.

Daniel, et al, (1979) distinguish between stand density and stand stocking as important descriptive terms. Stand density is a quantitative measure of the amount and frequency of tree stems. Stand density is commonly expressed in terms of basal area per acre and the number of stems per acre. Stand stocking is a more subjective term that relates to the suitability of the stand density in relation to the management objectives for the stand. Stands are often categorized as understocked, fully stocked or overstocked. Established stocking charts that show ideal ranges for various forest stand types are used in making this determination.

Forest stands are usually described as being in one of three size classes. Seedling-sapling stands, as the name implies, are comprised of trees in the smallest size class. Poletimber stands have a closed canopy, but have not yet reached sawtimber size. Sawtimber stands will have an average DBH of ten inches or greater.

The concept of defining primary and secondary uses for each stand was introduced in Chapter Four's discussion of

forest management plans. Specifically, a forest owner might work with a forester to classify each stand in terms of how it will contribute to overall forest management objectives. For example, Stand 3 might not contain any important recreational or aesthetic resources, so this stand could be given a primary use classification of timber production. Stand 4 might be in close proximity to camp buildings, highly visible and often used. In this case it would be given a primary classification of recreation and amenity uses, with any focus on timber production being secondary to these activities. Such classifications are even more important than the physical characteristics of the stand in determining the type of silviculture that is most appropriate.

Silvicultural Prescriptions

Silvicultural work can be categorized in its simplest form as performing two essential functions: regeneration of new trees and tending existing trees. With these functions in mind, a silvicultural prescription can be thought of as a work order for what should be done in a stand to focus its growth and development in the desired direction. Beyond simply stating actions to be taken, a prescription should state the rationale for these actions and the desired outcomes.

In general, each silvicultural operation should address each of the following intentions:

- promoting regeneration of desirable species;
- enhancing the growth of acceptable growing stock;
- removal of unacceptable growing stock; and
- generating benefits (aesthetics, wildlife habitat, revenue, etc.) from trees over their life cycle.

The emphasis on these goals will vary in each operation. For example, a commercial thinning designed to remove unacceptable growing stock will not directly generate revenue from financially mature trees, but will contribute toward the growth in value of the acceptable growing stock over time.

Some stands simply need to develop before an eventual

reassessment of their condition at a future date. In such cases, no prescription and no action will be necessary. The option of waiting or doing nothing should not be overlooked. Patience and restraint on the part of both the forester and forest owner is necessary in recognizing when the best current course of action may be simply to do nothing.

Even-aged vs. Uneven-aged Silviculture

Two broad management approaches are even-aged and uneven-aged silviculture. Even-aged management implies that a stand will have trees of the same age and size class. Even-aged stands have a target or ideal rotation age at which they are harvested. The eventual result of this approach is harvesting of most or all of the entire stand and regeneration of a new crop of trees. This approach is most commonly employed with softwood plantations, but is entirely appropriate for natural hardwood stands as well.

Uneven-aged management implies that forest stands will contain more than one age class of trees. The multiple age classes of trees in the stand maintain the forest cover over the longest time period, but require more frequent harvests. The frequency of the harvesting operations is known as the cutting cycle.

Simplified diagrams of even-aged and uneven-aged stands are shown in Figure 1. A more thorough description of these two approaches to silviculture is given in the following sections.

Even-Aged Silviculture

Even-aged silviculture is used to perpetuate a forest stand with a single age class of trees. After quantifying the forest stand's density in terms of basal area per acre, number of stems per acre and average stand diameter, an established stocking chart is referenced to determine if the stand is understocked, fully stocked or overstocked. There are very few overstocked stands in the Adirondacks, except those on New York State Forest Preserve land. Fully stocked stands

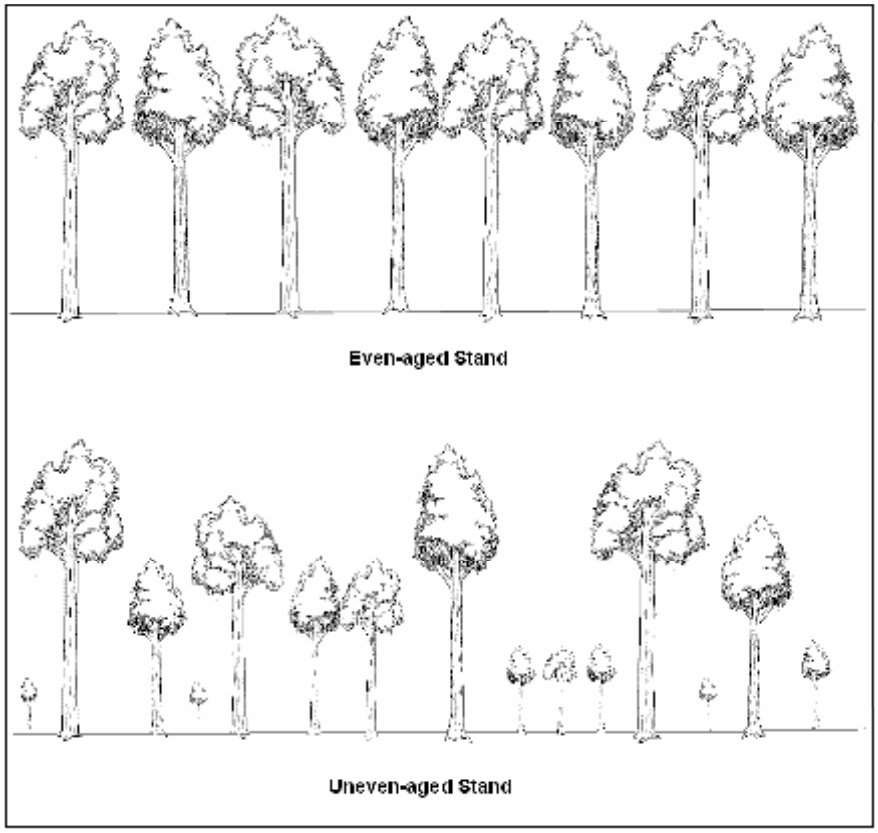
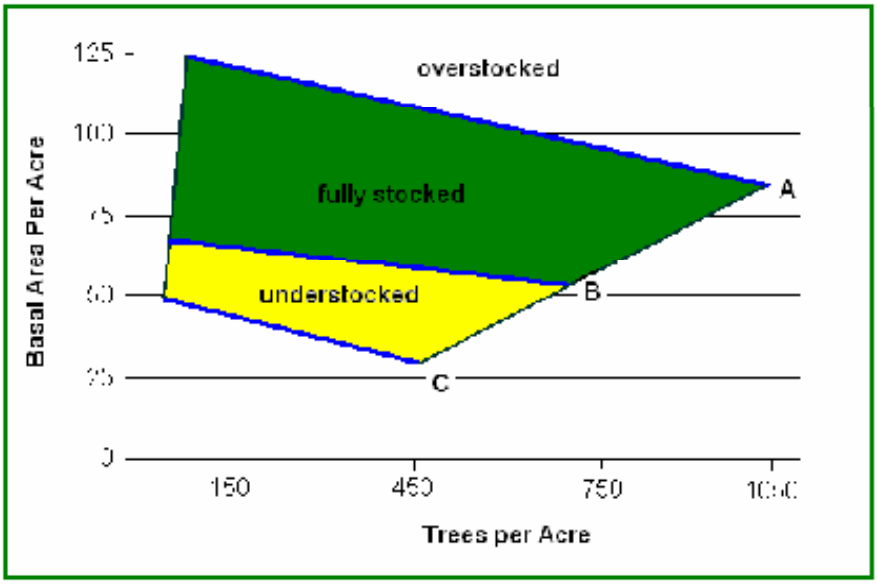


Figure 1. Simplified diagram of even-aged and uneven-aged forest stand composition.

are those with a collection of trees that, based on their diameters and basal area, fully occupy a site (Nowak, 2002). Understocked stands are those that are less than fully occupied and usually need time to grow into the fully stocked category. An example stocking chart for even-aged northern hardwood stands is shown in Figure 2.

Even-aged stands have a rotation length at the end of which they reach financial maturity. Intermediate treatments midway through these rotations might be necessary to concentrate growth in acceptable growing stock. These stands will eventually require a clearcutting (with seed trees left intact) or shelterwood approach.

Clearcutting, as the name implies, involves the removal



Northern Hardwoods Even-Aged Stocking Guide

adapted from Leak, W. B., Solomon, Dale S. and Paul S. DeHayes. 1988. *Silvicultural Guide for Northern Hardwood Types in the Northeast (revised)*. Broomhall, PA. USDA Forest Service Research Paper NE-603. 36 p.

- Example 1: A northern hardwood stand with 50 square feet of basal area and 200 trees per acre is considered understocked.
- Example 2: A northern hardwood stand with 80 square feet of basal area and 300 trees per acre is considered fully stocked.
- Example 3: A northern hardwood stand with 125 square feet of basal area and 600 trees per acre is considered overstocked.

Figure 2. An example stocking table for even-aged northern hardwood

of all stems in stand. Clearcut areas in the Northeast are usually quick to regenerate new forest cover, though it may or may not include desirable species. A common misconception among some Adirondack landowners is that a clearcut is equivalent to deforestation. While this perception is wrong, there is no arguing that some people find clearcuts unsightly and that some non-timber forest benefits are foregone or postponed by clearcuts. Additionally, if a clearcut is not properly laid out, scheduled and conducted, there is the potential for erosion and warming of water temperatures in stream corridors.

Shelterwood systems usually employ two harvests at different times. The first harvest creates space and light for the regeneration of a new crop of trees, while leaving some crown cover as a seed source and to protect the understory. Once this new crop becomes established, a second harvest removes the remainder of the overstory. In either case, intermediate thinnings might be needed to remove unacceptable growing stock and enhance the growth of the stand.

Two-aged silviculture resembles even-aged silviculture in many ways. The primary difference is that two distinct age classes of trees are the desirable condition in the stand. Conversion to a two-aged stand might involve a thinning to provide for sunlight and room for the establishment of a second age class of trees. Subsequent harvests are focused on maintaining two distinct age classes of trees.

Regulations on Even-aged Silviculture

Adirondack Park Agency regulations require a permit from the agency for any clearcut exceeding 25 acres. The APA's definition of a clearcut is different than the commonly accepted silvicultural definition. Specifically, according to APA regulations:

> *"clearcutting means any cutting of trees over six inches in diameter at breast height over any 10-year cutting cycle where the average residual basal area is less than 30 square feet per acre, measured within the harvested area."*

Note that under some circumstances, a shelterwood harvest falls under the APA's definition of a clearcut. If the stand is less than 25 acres in size, a permit is not required. Some forest owners have divided larger stands into smaller areas of less than 25 acres. In this way it is possible to use even-aged silviculture on the smaller stands at different times and avoid involving the APA and permitting process, as long as areas of eight acres or more are separated by uncut areas of at least 300 feet. In general, smaller clearcuts are more appealing aesthetically than larger ones.

Even-aged Silviculture and Ownership Goals

Many forest owners are reluctant to use even-aged silviculture because they prefer a closed canopy in a stand to having a seedling-sapling stand that will take years to mature. In some cases, forest owners have made a conscious decision to forego optimal timber production for this reason. Other owners may have a shorter time frame for decision making. When a forest owner has a time frame of 20 years or less for timber value appreciation and other forest benefits required in the interim, it is difficult to embrace even-aged silviculture.

Owners of small properties are particularly reluctant to follow this route, because any single stand might dominate the appearance of the property. On larger properties, a collection of even-aged stands in various stages of development provides a diversity of both wildlife habitat and scenery.

Some forest stands in the Adirondacks have continually had the best growing stock removed in past harvests, to the point where unacceptable growing stock dominates the stocking. In these cases, removing all of the unacceptable growing stock in an effort to establish an even-aged stand may be the best option from a timber management standpoint.

Uneven-Aged Silviculture

Uneven-aged forest stands have three or more age classes of trees present in them. Such stands tend to be caused by man-made or natural disturbances that create openings in the canopy, allowing new age classes of trees to develop. Uneven-aged silviculture requires a cutting cycle of periodic harvests that should improve the composition of the stand and enhance regeneration of new trees.

Unlike the established stocking charts developed for even-aged silviculture, uneven-aged stands have minimum stand structure goals used to ensure that all of the age classes are adequately represented. A desirable residual amount of basal area is identified, along with a targeted distribution of this basal area among different DBH ranges.

Uneven-aged silviculture requires either a single tree selection system for harvesting or a group selection. Under single tree selection, individual trees are selected and marked for harvesting, again with the four overriding purposes of regeneration, enhancement, cull removal and financial return in mind. With the current high value potential of individual stems, making decisions on each stem on an individual basis is a prudent approach. One 14-inch DBH tree might just be beginning a period of accelerated value growth that could culminate at the time of the next schedule harvest, while another may be a suppressed tree that will not make any further growth in value.

Alternatively, uneven aged management may be pursued using group selection. Group selection implies harvesting all of the trees in an entire area of two acres or less. This option is more appropriate than single tree selection when there is a high composition of undesirable stems and aesthetics or other reasons rule out even-aged treatments. Group selection is also a good compromise between single tree selection and clearcutting as a means to enhance whitetail deer habitat.

The uneven-aged approach has proven quite compatible with the desire of many Adirondack landowners to maintain a wooded backdrop to enhance enjoyment of amenities. The

periodic cash flow from the cutting cycles of an uneven-aged stand helps ensure that gaps between management activities do not skip generations. On smaller properties, long intervals between management activities can mean original management intentions are forgotten or overlooked, with each new generation of ownership reinventing the wheel or negotiating through a redundant set of management decisions.

Crop Tree Silviculture

A silvicultural alternative to the even-aged/uneven-aged way of examining and treating forest stands is known as crop tree silviculture. Crop tree management has similarities to both of these other approaches. This type of silviculture is seen by many as forest owner friendly. A forester can explain crop tree silviculture to a forest owner while they walk through a stand together, while the other types of silviculture are a bit more difficult to explain and visualize.

In this approach, crop trees are identified using predetermined criteria. These criteria are directly related to the management objectives. Management of the forest stand then focuses on enhancing the growth of these trees. Individual trees will fall into one of three criteria in the crop tree approach: crop trees themselves, trees interfering with the growth of crop trees that should be removed, and other trees that are considered surplus. A simplified illustration of crop tree management classification is shown in Figure 3.

The disposition of the surplus trees (retention or removal) will be determined by the overall goals from the stand. If large numbers of these surplus trees are eventually removed, crop tree management will tend to resemble even-aged silviculture. Conversely, when these surplus trees are largely retained to keep appearance of the forest more or less intact, the stand will tend to develop in more of an uneven-aged fashion.

Perkey and Wilkins (1993) give general descriptions of the characteristics of crop trees when the goals for the stand

A thinning is used to remove trees interfering with the growth of crop trees.

are timber production, enhancing wildlife habitat, or aesthetics. In general, dominant and codominant stems are good candidates for crop trees. Other crop tree characteristics will vary with the stand goals.

If the primary goal for a stand is to manage it for timber production, crop trees will be healthy stems with the ability to grow in value over the next 20 years or more. In lower valued species, value growth will be best in stems of the highest quality, meaning those that are free of disease and have few defects. Soft maple is a good example of such a species. In higher value species, lower quality stems may have considerable potential for value growth. Hard maple

is a good example of a high value species that continues to grow in value even when the individual stems have obvious defects.

If wildlife habitat is the primary goal for the stand, species that produce mast crops that provide food, such as beech, black cherry and red oak are good crop trees. These should be healthy trees that can be expected to live at least another 20 years. Additionally, trees of any species and size that provide nesting cavities are retained and do not need to be released by removing trees around them. Such trees are usually of low quality and low vigor, but they do not have to be living to benefit wildlife.

If aesthetics is the primary goal for the stand, crop trees should be attractive in form—though beauty is in the eye of the beholder. Common tree defects from a timber quality standpoint often become character marks when visual criteria are used. This may mean that many more defects are acceptable in aesthetic crop trees than in those managed for timber production. Species that provide attractive foliage are often favored. High visibility stems, such as those along roadways and fence lines are important crop trees. Unique trees of any species or quality are usually retained. For example, many stands in the Adirondacks have very old and large yellow birch trees that are hollow and have often been cut into as a check of their quality in past logging operations. These trees cling to life and are often substantially larger than the other trees in the stand. Such trees are often retained to remind the forest owner of what once dominated the stand.

Crop tree management tends to be very similar to uneven-aged management using a single tree selection system. Openings created to favor crop trees also provide room for the establishment of a new age class of trees in the understory. Conversely, if relatively few crop trees are identified in a stand, and much of the other growing stock is removed, this approach will tend to resemble even-aged management using a shelterwood or seed tree system.

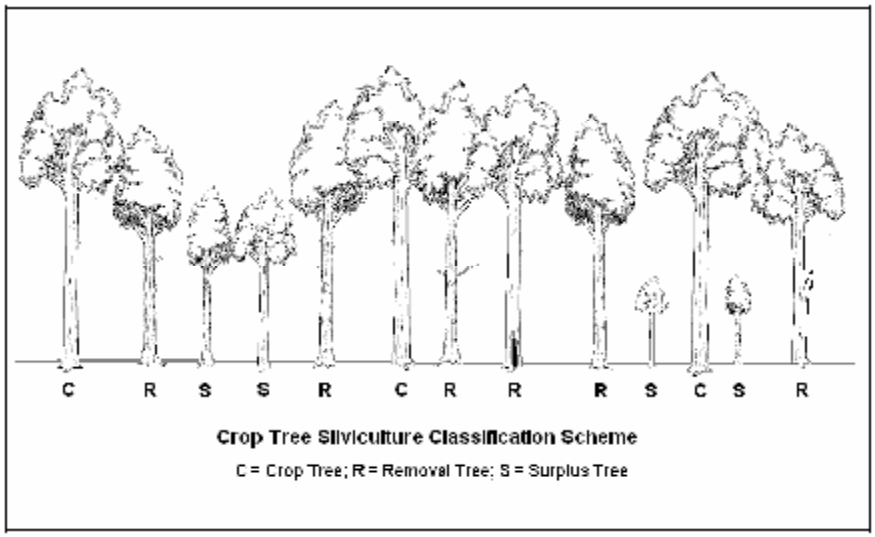


Figure 3. Illustration of tree designations for crop tree silviculture.

In the Adirondacks it is often possible to combine timber, wildlife and aesthetic goals by enhancing the growth of crop trees for each purpose within a single stand. Even when timber production is a primary stand goal, retaining trees that do not conflict with crop trees usually means that the canopy of most of the stand will remain closed. This is an important aesthetic consideration for many forest owners. Similarly, trees that provide nesting cavities for wildlife are often retained, even though they tend to be trees without any potential for value growth. Traditional silviculture was often critical of any decision to retain low value trees. Such efforts were labeled "high-grading" because high value stems were removed and the long-term financial potential of the stand was reduced. The crop tree approach recognizes that forest owners can make a conscious decision to forego some of the long-term timber income potential in a stand in exchange for the other important benefits the stand can provide.

Different Approaches for Different Stands

In reading the previous description of various silvicultural approaches, it is important to remember that silviculture

is applied at the stand level. Choosing a particular silvicultural approach for one stand does not dictate that the same approach must be used on the other stands in the forest. If timber production is the primary goal of ownership, the forest owner will choose to employ the full range of silvicultural options, as appropriate. In general, on larger properties there is more opportunity to embrace a wider range of silvicultural practices.

In practice, most forest owners find costs to be a factor in limiting the intensity of the silviculture they choose to practice. This is especially true on the many remote properties in the Adirondacks. Many forest owners are simply unable to pursue silvicultural practices that cost more than the revenue they generate. One approach that some forest owners have used is taking a portion of the income from some stands to subsidize improvement work on others. In other cases, forest owners make informed decisions to pursue less than optimal management practices because of the costs involved. This is no different than the choices people make in many other aspects of life.

On properties where amenity values drive ownership goals, there has been a tendency to embrace uneven-aged silviculture and crop tree management as the systems that are most compatible with maintaining the forested character of the land. In this case, landowners have made an informed decision to forego some of the potential revenue from timber production both now and in the future. This trade-off becomes a burden for future generations when landowners decide to retain a large concentration of undesirable growing stock, delaying the establishment of new stands. Fortunately, the continuing trend of innovation in wood products technology keeps shifting the demand to create markets for lower quality stems. A forester with a good understanding of the owner's goals, the market for forest products and the full range of silvicultural possibilities is an important asset in ensuring that the direction in all of the stands contributes to the flow of benefits from the forest.

Shade tolerant species like red spruce (above) can dominate the understory of forest stands.

Important Topics in this Chapter

- Defining what is for sale
- Types of timber buyers
- The Role of competition in timber sales
- Methods and procedures for selling timber
- Timber Sale Contracts
- Sample Timber Sale Prospectus

Timber Sales

Timber Sales

After adopting a forest management plan, putting it into practice eventually leads to timber harvesting. In treating various forest stands, trees will inevitably need to be harvested, either because they have reached financial maturity or because their removal would assist in the further growth and development of the stand. Ownership goals and the silvicultural approach to managing a stand combine to dictate that a certain percentage of trees is ultimately removed.

Previous chapters on management plans and silviculture discussed the background behind these harvesting decisions. This chapter will concentrate on the various methods of selling timber, presenting the applicability, advantages and disadvantages of each. A discussion of timber buyers and prices precedes the description of the methods of selling timber.

Which Trees Are For Sale?

There must be some designation or description of the trees that are being sold and harvested. A forester might mark each of the trees with paint to designate them for harvesting and removal. The base of each tree is marked as well, so that stumps can be examined during the harvest to ensure that no unmarked trees were cut and removed. In some situations, trees are not painted to designate them for removal, such as when large numbers of low value stems are being removed. In other cases, such as shelterwood harvests, the relatively small number of trees that are meant to remain are painted and all of the unmarked stems are removed.

Another means of designating the trees included in a sale is to state a minimum DBH, with all trees above the minimum intended for harvesting. This is not considered an acceptable approach from a silvicultural standpoint, however, as it will often result in the premature harvest of some stems and the imprudent retention of others. A similar approach is to designate trees by a stating a minimum stump diameter, though few reputable buyers would suggest using this as a sales criteria. Another means of describing the trees included in a sale is to designate all of the trees of a particular species for removal. This species level designation is only advisable in a few situations. The least desirable approach is to leave it up to the purchaser to select the trees for harvest.

Growth in Timber Sale Prices

Timber sale prices have increased considerably in recent decades. Stumpage prices that experienced little or no growth for an extended period of time began to grow considerably starting in the late 1980s. This upward trend continues to this day, with normal seasonal variations and occasional setbacks.

Consider the stumpage value growth trend in two important hardwood species: soft maple and hard maple. A review of the New York State Department of Environmental Conservation's Stumpage Price Report reveals that the most

common stumpage price for soft maple in Herkimer County in 1974 was $40 per MBF (Doyle rule). By 1984 this price had risen to $60 per MBF, a respectable increase of 50 percent. By 1994, the most common price for soft maple was up to $125 per MBF for a remarkable ten-year increase of 125 percent. The trend of price increases continues to this day (2006), as soft maple stumpage prices in this region have risen to $175 per MBF. This $50 rise in the price represents a 40 percent increase over the past ten years. Note that these are nominal prices that do not account for inflation.

Soft maple is considered a lower value species that is abundant and easy to regenerate. In examining the far more desirable species of hard maple, the increases are more dramatic. The most common stumpage price for hard maple in Herkimer County in 1974 was $53 per MBF. By 1984 this price had risen to $75 per MBF, a respectable increase of 42 percent. By 1994, the most common price for hard maple was up to $300 per MBF for an astounding ten-year increase of 300 percent. The trend of increases continues, as hard maple stumpage prices in this region rose to $700 per MBF in 2004. This $400 rise in the price represents a 133 percent increase over the past ten years. Note that this discussion involved the most common prices published in the Stumpage Price Report. Actual prices can vary considerably in either direction, depending on location, quality, stand access and stand operability. Prices on the other important hardwood species in the Adirondacks (black cherry, hard maple, paper birch, red oak, soft maple and yellow birch) have seen similar increases over time.

Competition for Timber and Logs

A surprising number of Adirondack landowners are uninformed about the competitive markets that exist for valuable timber. Undervalued timber, coupled with outdated sales techniques, can result in disappointing returns. In what ways can forest owners realize the highest values when they sell timber? It is important to qualify this ques-

tion by first stating that the type and volume of timber to be sold is first determined by the goals and operational strategies discussed in previous chapters, and are further subject to constraints designed to protect water quality and amenity values. For any given set of trees to be harvested, how is the greatest return realized? The answer lies in taking advantage of the competitive markets for hardwood timber and logs. A secondary consideration in terms of return—but an important operational consideration—is how to realize reasonable values for commodity grades of timber such as pulpwood, scrag (pallet) wood, softwood and firewood.

A hardwood sawmill in Boonville, NY recently determined that, within a 50-mile radius of its mill, there were 32 places to sell logs. This high number of potential markets reflects the competitive nature of the hardwood lumber and veneer business. The ten largest hardwood lumber companies in the country control less than ten percent of overall production. In contrast, the ten largest paper companies in the country control a much higher portion of total production.

The wide range of species, grades, and dimensions of hardwood lumber, along with its many diverse uses, creates intense competition for hardwood timber and logs. Informed landowners will take advantage of the competitive nature of these markets by selling their timber through competitive lump sum, sealed bid sales. Similarly, in situations where a lump sum sale of timber might not be desirable, hardwood logs can be sold through competitive bidding.

Timber Buyers

In the past, logging contractors were the primary purchasers of timber. While loggers still purchase timber, the logging business has been altered considerably by stumpage price increases. In many cases, loggers must now compete with sawmills and log brokers to purchase timber. As a result, many loggers have been forced to shift their businesses to some combination of harvesting for hire and purchasing

lower quality timber that yields large volumes of commodity grade products such as pulpwood and wood chips.

When a timber sale involves a large quantity of accessible hardwood timber, sawmills are often the buyers capable of paying the highest prices. Sawmills will pay a premium to ensure a supply of wood to the mill and have the financial capacity to tie up operating funds in timber for an extended period of time. Another occasional buyer of timber who is often willing to pay competitive prices is the log broker. These brokers are in a position to buy timber from multiple sources and then assemble and merchandise out larger quantities of different species and grades of logs. Log brokers sometimes finance timber purchasers for loggers who supply them.

Informed landowners are less willing to finance the purchase of their timber (or accept the risk) by allowing logs to be sold before they receive payment. More commonly, they receive a lump sum payment before the timber is harvested. The purchaser hires the logging contractor to harvest the timber and, in some cases, deliver it to the mill.

A timber buyer cannot be faulted for purchasing timber at any rate the landowner is willing to accept, and it is unreasonable not to recognize the legitimate motive of making a profit. On the other hand, informed forest owners cannot be faulted for abandoning superannuated price schedules and realizing a greater return for their timber. The following sections take some of the mystery out of the timber sale process.

Timber Sales Procedures

There are several acceptable approaches to selling timber. For any given situation, the most suitable approach should be employed to achieve both optimal returns and protect the land. The pay-as-cut method, in which timber is paid for based on set rates for the intermediate products produced from it by the logger, was the predominant approach to selling timber in the past. Competitive bid timber sales are

generally seen to be the best way for forest owners to realize the highest returns for their timber. Negotiated lump sum sales involve an up front payment for the timber. Competitive bid log sales often provide strong returns, but require careful sorting during the harvesting process. The production and merchandising method of selling timber involves hiring contractors to harvest the timber and then controlling the marketing of the products that result. Each of these timber sale methods is explained here in turn. The advantages of each are summarized in Table 1.

Pay-as-Cut Timber Sales

In the pay-as-cut approach to selling timber, the purchaser pays set rates for different products produced from the timber, with payment made as these products are sold. A price schedule is agreed upon in advance, with different rates for each product. As a general rule the more valuable the product, the higher the rate. Rates are expressed per unit of product (e.g. $ per MBF for sawlogs; $ per ton for pulpwood). When using this approach it is important to have a consulting forester or similar representative negotiate or approve of the rates that are offered. There are no universal rates that are fair for every site, other than for the very lowest valued products. As discussed in a previous chapter, timber quality, access and operability all shape the fair market value of timber on a given site.

Any rates that are based on a fixed dollar amount per MBF should specify what log rule is used for scaling. If multiple log rules are a possibility (i.e. different rules from different markets for various species), different rates must be specified for each log rule. A rate of $100 per MBF will result in much lower payment for logs scaled with the Doyle rule than it will for logs scaled with the International log rule. A higher price per MBF is clearly required for the Doyle rule in order to achieve equivalent payments.

When payment is tied to the sale of products to various buyers, the seller must require strict accounting of ev-

erything that has been sold. This accounting will take the form of copies of all mill sales slips, provided at regular intervals (once or twice a month or on the completion of smaller sales). A payment schedule must be specified. There is some difficulty in monitoring the sale of loads of logs and pulpwood. In the end, the only true guarantee the seller has comes from the honesty and reputation of the purchaser. Accepting slightly lower rates from a reputable purchaser is far better than higher rates from someone who doesn't pay for everything that is harvested.

A potential disadvantage that must be addressed is failure to complete the work. Because the purchaser has not tied up any advance payment in the timber, there is no guarantee that all of the timber included in the sale will be harvested. This is especially true of lower value trees and pockets of timber that are difficult to get to. With this possibility in mind, contract terms should state that the purchaser agrees to harvest all of the timber marked or designated for harvesting. As part of the sale agreement, a cash performance bond should be held by the seller or seller's representative. This bond ensures compliance with this and other requirements.

When timber is sold to a logging contractor using the pay-as-cut method with fixed payment rates, all of the marketing decisions are usually left to the logger. In theory, it should not matter to the forest owner where the products are sold if the payment rates are constant. In practice, the landowner benefits when the products are sold to whoever accepts the most (and often the poorest) logs, because the more volume that is sold, the more money the forest owner receives.

If timber is sold directly to a mill or log broker by the pay-as-cut method, the forest owner is at the mercy of the mill's scaler in determining sawlog volumes. This does not mean that all or even most mills are dishonest, just that there is the potential for mischief and under-scaling that would result in underpayment in some cases. Note that the same potential exists when timber is sold to a logger who must,

in turn, sell to the mill. In this case, however, the logger can pressure the sawmill to give a fair accounting for the logs, because the sawmill's buyer knows that the logger has the option of selling the logs to another sawmill.

A variation of the pay-as-cut method of selling timber bases the rates that are paid on a percentage of whatever is paid for the products the logger produces from the timber. In this way, both the timber seller and the timber buyer share in the returns from effective marketing of the logs. Often rates for higher valued species and products, such as hardwood sawlogs and veneer, are specified as a percentage of their sale price, while lower value species and products are paid for at a set rate. This modified approach is advantageous when a sale contains a large volume of low value timber, coupled with a small volume of high value timber. Such high volume-low value sales are common to timber stand improvement work in the Adirondacks.

The pay-as-cut method, using fixed rates per unit of production, is well suited to commodity grade products such as softwood logs, pulpwood, firewood, and wood chips. The timber purchaser has the lowest margins on these products and the prices he is willing to pay for them are usually calculated by subtracting production costs from product sales prices. In most cases, there is not much left over after production costs are met. Harvesting situations that result in large volumes of commodity grade products are well suited to the pay-as-cut approach. Timber stand improvement and salvage work are, along with second part shelterwood and clearcuts, good examples of this situation.

In general, the pay-as-cut method is an outdated approach to selling valuable and readily accessible hardwood sawtimber, though timber continues to be sold using this method. Occasionally this approach is a sound method of selling timber that can produce high-quality sawlogs, when the harvesting costs of such timber are difficult to predict due to access or operability problems and when all parties are comfortable with the choice of log buyers.

Trees marked with a double line of paint indicate that the property boundary is nearby.

Competitive Bid Timber Sales

In the competitive, lump sum bid method of selling timber, an estimate of the volume of each tree included in the sale is made and then summarized by species and product. A detailed prospectus, including volume estimates, contractual requirements (discussed later in this chapter), and time frames is sent to prospective purchasers. A formal showing is usually held, but interested parties are given the opportunity to inspect and cruise the timber on their own. With carefully delineated sale guidelines and requirements, prospective purchasers are bidding on more than just quantities of timber. They are bidding on the right to harvest this timber under terms acceptable to the seller.

Prospective purchasers submit sealed lump sum bids for the timber by a specified date and time. The high bidder is awarded the sale and the timber is usually paid for before it is harvested. The landowner will reserve the right to refuse any and all bids, in case the bids are too low or a disrepu-

table party submits the high bid. Adhering to the highest ethical standards in handling bid sales and carefully restricting who the prospectus is sent to will weed out disreputable bidders. It is important to keep the entire bidding process transparent, with all bidders welcome to attend the bid opening and witness the results.

Generally speaking, the lump sum bid process works well for single tree and group selection treatment and any time there is a significant volume of valuable hardwoods. In using this method it is common to see a wide range of prices in the bids. Each bidder has slightly different utilization standards, harvesting costs and inventory. In the end, the bid tells the seller who wants the timber the most.

A sample sales prospectus for a lump sum competitive bid timber sale in included at the end of this chapter.

Negotiated Lump Sum Sales

The negotiated lump sum sale method involves bargaining, in advance, for the sale price of a specified set of trees to be harvested. This method is advantageous in a limited set of situations. Under no circumstances should this method be used unless the seller has a reliable estimate of the timber volumes and values by species. Lump sum payments for all trees larger than a minimum diameter at breast height or stump diameter are a bad idea on several levels. It is difficult to ensure that smaller trees are not removed or that low value trees are not left behind. In most of these diameter limit purchases, the buyer has made an estimate of the timber volume, but the seller has not.

Some unscrupulous buyers have used the lump sum negotiated sale approach because it has an initial positive appeal. Uninformed forest owners are approached with cash offers for their timber that may seem appealing because the true value is unknown to them. Some such offers may be earnest approaches from honest buyers, but sellers in this situation are still at a disadvantage in not knowing the true value of their timber or their leverage in dictating the terms

of the sale.

Many forest owners begin down the road to selling timber after first being approached with a cash offer from someone who has trespassed on the land to cruise the timber. Prudent people, when faced with this situation, look into the background of the prospective purchaser and research alternative methods of selling their timber. Often enough this leads them to a reputable consulting forester, a carefully planned sale and a more lucrative return.

Negotiated lump sum sales work well when the seller has a small quantity of valuable timber and wishes to dictate careful or unusual terms of the sale. For example, specifying that the timber can only be harvested in the month of September when the owners are present, or improvements must be made to a bridge or road as a part of the sale. Other circumstances where this method can be used to the seller's advantage include selling a very small volume to a reputable buyer working on a neighboring property or adding a small quantity to a previously completed lump sum competitive bid sale.

Competitive Bid Log Sales

In the competitive bid log sale approach, the hardwood logs produced from a timber harvest are sorted and laid out in an accessible location. Potential bidders are invited to inspect, scale and grade the logs and submit bids on each set of logs by a specified time. Sealed bids can be required if a formal process is necessary to reassure all potential buyers that a fair process in being followed, or bids may be submitted over phone by a specified date and time, if a less formal process is acceptable. There are many advantages to this approach to selling timber, including the ability to combine it with other methods.

Sorting logs allows concurrent multiple sales to take place, ensuring that competitive forces determine the value of each set of logs. In general, veneer logs are separated from sawlogs. Sawlogs are separated by species. Occasionally the

lower value species are lumped together. The greater the volume to be sold, the more feasible it is to make multiple sorts of the logs. In this way, separate bids are solicited for each species and for veneer. Potential buyers have different species needs and inventories at any given point in time, so it is quite common to receive high bids from different bidders for different species. For small volume sales of a single log trailer load or less, species are often combined.

The high bidder for each set is awarded the sale and then pays for the logs before trucking them away. While log bid sales are generally less formal than sealed bid timber sales, ethical standards must be followed, or the next time a bid log sale is held no one will be interested. For example, one underhanded practice that has been employed in the past is to have everyone submit their bids and then inform a favored buyer of the highest one, offering the opportunity to beat or match it. This is not only unfair, but it is a completely inconsiderate waste of the other bidders' valuable time.

The competitive bid log sale approach is flexible enough to combine with other methods. For example, all of the hardwood stems in a sale can be sold in this manner under a pay-as-cut contract, with the timber buyer and seller each receiving a percentage of the log sale price. Commodity grade products such as softwood logs and pulpwood are sold as before by the timber buyer, with a set rate paid to the forest owner. Alternatively, the seller can use the production and merchandising approach described next to hire a logger to produce the logs and then sell them in a competitive bid sale.

Production & Merchandising Method

The production and merchandising method of selling timber is employed by owners of large properties and administered by consulting foresters or foresters directly employed by the owner. In this approach, the seller hires one or more logging contractor to harvest timber and produce logs and pulpwood. The contractors are paid set rates for produc-

tion, with different rates for different products. These rates are negotiated in advance and will usually reflect prices paid by other parties in similar situations. Veneer and sawlogs are sorted by species and sometimes by grade and then are sold to sawmills or log brokers.

By controlling large volumes of different products, the seller can realize optimal returns. Some logs can be sold through competitive bid sales while others are sold directly to mills according to a previously negotiated price schedule. Sellers may use a concentration yard in a convenient location. This allows them to bring products from multiple jobs into a common location and provides an opportunity for sorting and stockpiling larger volumes of logs. There is an advantage in having all of the scaling and grading done by the log buyer under the watchful eyes of the seller before the logs reach their end destination.

Historically, most sawlogs went directly to the mills as "gatewood." Gatewood includes logs or roundwood delivered directly to the mill before payment for it has been made. This process effectively removed the pressures of competition from the scaling and grading process. The seller was at the mercy of the purchaser. This has changed to the point where most hardwood logs are purchased and scaled off-site before they are delivered to the mill.

Some forest owners are concerned about the prospect of having the logging contractors deemed as employees (and the resulting liability thereof) if they are given too much direction in the harvesting process. One way to prevent this is to enter into a contract that makes the contractor the purchaser of the timber. The payment schedule specifies that the seller will receive the proceeds from the sale of the products, less specific rates per unit of production in each case.

The production and merchandising method has the advantage of economies of scale in the sale process. Large suppliers usually get higher prices and are in a better position to dictate the terms of payment and delivery. Pension funds, paper companies and a few very large non-industrial forest

Table1. Summary of timber sale methods.

Timber Sale Method	When Used
Pay-as-Cut	low-value harvests timber stand improvement harvesting uncertainty
Lump-sum Competitive Timber Bid	high & intermediate value harvests
Negotiated Lump-sum sale	low volumes of high & intermediate value timber special circumstances
Lump-sum Competitive log bid	high & intermediate value harvests can combine with pay-as-cut method
Production & Merchandising	very large supply to sell combine with other methods

owners have used this approach.

The drawback to this method is that it is difficult to arrive at a payment schedule for the logging contractor that ensures optimal utilization of the resource. Logging contractors who can make a viable living under low, fixed rates are almost always production oriented. When loggers are paid a set rate per unit of production, it is logical for them to maximize volume, rather than focusing on producing the most valuable logs. Optimal value bucking patterns for hardwood logs often result in less volume, with defective sections of the logs cut out and discarded or used for firewood.

Another potential utilization problem comes when lower-value roundwood logs are not carefully sorted or cut out and are instead employed as pulpwood or even made into wood chips. Highly mechanized contractors try to maintain a production schedule to meet quotas and keep trucks moving. As a result, trees are sometimes employed in lower end

Trees included in a timber sale have paint marks on their stumps so foresters can inspect the site during harvesting to ensure that no unmarked trees are taken.

products when careful (and more time-consuming) production would have made them into logs. When this happens, the forest owner ends up receiving less money for the timber.

One potential solution to this problem is to have the loggers deliver the most valuable stems to a concentration yard in tree lengths and then pay them based on weight. Optimal bucking can then be completed in the yard. This approach is usually feasible only for very large operations, because of the labor and equipments costs of handling the material multiple times.

Timber Sale Contracts

When timber is sold, a contract between the purchaser and seller should be used to bind both parties to the agreement. These contracts should be reviewed, amended as necessary and approved by the seller's lawyer. The contract

may also require significant input from a forester to protect the land and address all of the seller's concerns.

Timber sale contracts contain some general information, listing the names of the purchaser and seller and the location of the property, along with contact information and the time period the contract will be in force. Payment terms should be specified, with amounts or payment rates and dates all clearly stated. For pay-as-cut contracts, the purchaser must be required to supply the seller all of the forest products sales records in a timely manner.

The timber that is being sold must be identified. For example, the contract might reference all of the timber marked with blue paint in an area bordered by the public road on the south and the property's boundaries on the north, east and west. Reference might also be made to the timber described in the sale prospectus, if there was one.

It is a common practice for the seller to guarantee the boundary lines. Properly identified and maintained boundaries will give the seller the ability to do so. The seller should make no guarantee of the volume or quality of the timber and a statement to this effect should be included in the contract.

Any of the forest management policies in the management plan that pertain to harvesting should be addressed, as necessary, in the timber sale contract. Such items usually include the purchaser's compliance with applicable laws and regulations, the necessity of obtaining permits and following best management practices for the protection of water quality.

Requirements for contractors and subcontractors must be addressed. When a logger is not the actual purchaser, all logging contractors and sub-contractors should meet with the approval of the consulting forester or seller to ensure that well-qualified and competent people are used.

The layout and construction of roads, trails and log landings should be made subject to the approval of the seller or the forester. Purchasers will usually have the most practical

ideas about where these things should go, but will not necessarily take the same considerations into account as the seller. Some give and take is necessary in this process, but the seller's ultimate approval is necessary to ensure satisfactory results.

Further contractual requirements will place as much of the liability as possible on the timber purchaser and specify requirements for liability insurance. Current limits of liability specified in many contracts call for between $1,000,000 and $5,000,000 in insurance coverage, with the landowner being named as an additional insured. Some larger forest owners should undergo a risk assessment to determine an adequate level of liability insurance protection.

Similar to liability protection, another requirement calls for the loggers to be covered with workers' compensation insurance by the purchaser. Certificates proving that liability insurance and workers' compensation insurance policies are in effect should be provided to the landowner before any harvesting takes place.

The contract should require a cash performance bond in a fixed amount, specify who will hold it (usually the consulting forester), and when it will be returned. Such bonds are commonly held in interest-bearing accounts, with the interest and principal eventually returned to the purchaser. The bond is intended to ensure compliance with the contract.

If unmarked or undesignated timber is intentionally harvested, a stiff penalty should be named in the contract—usually two or three times the value of the timber. Some trees will be accidentally knocked down in any harvest. These trees should be brought to the seller's or forester's attention and be paid for at fair market rates, as required in the contract.

The contract should specify a cash penalty for littering or polluting the harvesting site. Requirements for post-harvest remedial work, such as bulldozing of ruts or seeding of landing sites should be spelled out in detail. For example, all ruts in skid trails and roads must be removed at the completion

Timber sale contracts specify that necessary remedial work, such as the repairing roads and filling in ruts, will be taken care of by the purchaser upon completion of the harvesting.

of the timber harvesting work or as soon after as is practical.

The consequences for breach of contract must be specified. It is common practice to require written notice of a breach of contract. If the breach is not corrected within a specified number of days, the harvesting operations are suspended. Ultimately the purchaser could surrender rights to the timber if breaches are persistent or uncorrected.

Timber sale contracts specify that necessary remedial work, such as the repairing roads and filling in ruts, will be taken care of by the purchaser upon completion of the harvesting.

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Timber Sale - Request for Bids

Beaverhead Park
Town of Adirondack
Hamilton County, NY

Location

This 128-acre sale area is located on Sabattis Road in the Town of Adirondack, Hamilton County, NY. A location map of the property is shown in Figure 1. If northbound on State Route 7, make a left onto Paradox Road just past the Newton Corners Convenience Store. Follow this road for 1.1 miles, watching for the entrance (#187) to the property on your right, directly across from the Ragged Knoll Fish & Game Club.

Owner

The timber and property are owned by Clarence and Clare Meagher of 44 Piper Drive, Fairport, NY, 14450.

Volumes

The sale contains approximately 107 MBF (International rule) of hardwood sawtimber, including over 79 MBF of hard maple and over 23 MBF of soft maple. A breakdown of volume by species is shown in Table 1. A complete tree tally for all sawtimber is shown in Table 2.

All trees included in the sale are marked with blue paint. Double-lined trees indicate the boundary of the cutting area and are included in the sale. Trees tallied as hardwood pulpwood are marked with a stripe *and* dot of paint.

The volume of each tree was estimated on an individual basis, with appropriate cull deductions. All trees were marked and estimated by the Fernwood Forestry staff. Sawtimber volume estimates are based on Mesavage and Girard's *Tables for Estimating Board-Foot Volume of Timber*, using the average form class in the northeast region for each species.

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Site Conditions
A site map of the timber sale area is attached (Figure 2). The sale area encompasses approximately 128 acres of this 320-acre property. The terrain has mild to moderate slopes and scattered boulders throughout. The property boundary lines are clearly marked. Trees along the edge of the boundary are marked with a double paint line.

There is one significant stream crossing necessary to access the timber. A bridge will be required for this crossing and a permit from the State Forest Ranger may be necessary.

Terms of the Sale
The timber is for sale on a lump sum, competitive sealed bid basis. Bids will be opened on Friday, December 3rd at 1 PM at the Meagher camp at the entrance to the property. Bidders are welcome to attend the bid opening and hand-deliver their bids at that time. Please use the attached Bid Form and write "bid enclosed" on the outside of the envelope. The timber will be sold to the highest bidder, but the landowner reserves the right to refuse any and all bids.

The landowner requires that equal payments of one half the purchase price be made in December 2006 and January 2007. The contract will be signed at the mutual convenience of the purchaser and the landowner, but no later than December 23, 2006. The payment check must be made out to Clarence and Clare Meagher. Fernwood Forestry does not accept funds on behalf of clients. A sample contract is available upon request.

Harvesting will take place only under winter conditions in months of December through March. Suitable weather conditions are to be determined by the landowner's forester. The purchaser will have two full winter seasons to harvest the timber. If the timber has not been cut by the end of March 2008, title to it will revert to the landowner. An extension of this time period will be given for reasonable, weather-related causes, if necessary.

Prior to starting the harvest, the purchaser must supply the landowner with certificates proving $1,000,000 insurance coverage for liability and adequate workmen's compensation insurance. Clarence and Clare Meagher should be named as an additional insured on the liability certificate.

A performance bond in the amount of $5,000 must be posted with Fernwood Forestry before the harvesting begins. This bond will be released upon satisfactory completion of the harvest, including any clean up or road repairs required in the contract. The cost of repairing any remaining damages to the property or instituting any BMP measures will be deducted from the performance bond. Additionally, $20 will be deducted from the bond for each minor item of garbage (oil jugs, boxes, pop cans, etc.) left on the site.

Other Considerations
All marked trees in the sale area must be cut down, though individual trees deemed hazardous by the cutters may be left for safety purposes. Trees marked with an "X" are not included in the tally and may be harvested

Figure 1. Beaverhead Park timber sale location, Town of Adirondack, Hamilton County, NY.

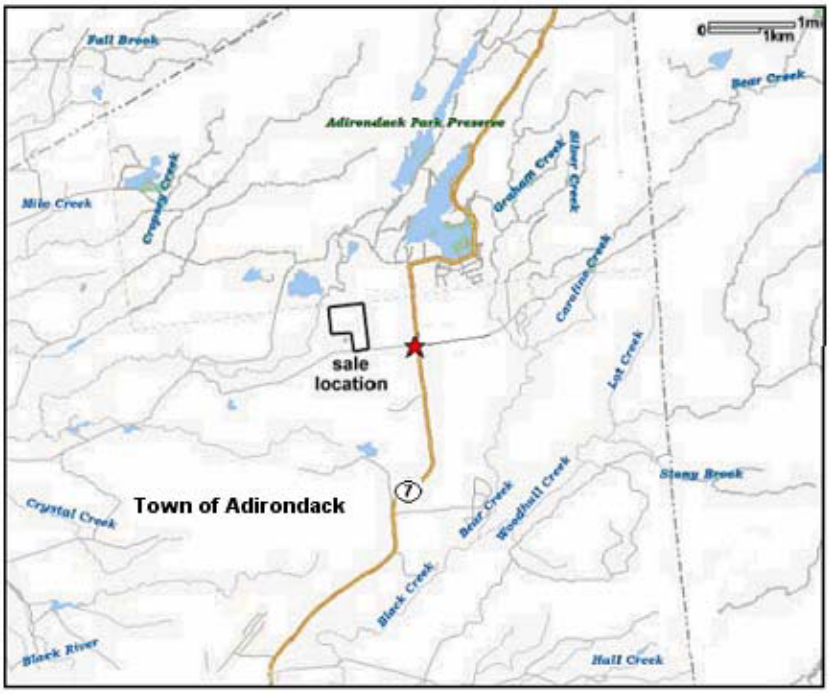


Table 1. Beaverhead Park timber sale volume summary.

Summary

	Volumes (MBF)			
species/product	**Doyle**	**Scribner**	**International**	**# of trees**
beech	0.696	0.897	1.000	6
black cherry	1.582	1.978	2.193	18
hard maple	59.339	72.227	79.404	369
soft maple	17.445	21.172	23.285	138
yellow birch	0.588	0.746	0.829	6
sawtimber totals	**79.65**	**97.02**	**106.711**	**537**

	Maine	**International**	
spruce-fir sawtimber	9.569	8.914	72
hardwood pulpwood	cords	tons	
trees	102	234	325
tops	49	111	
total	**151**	**345**	
total # of trees	**934**		

Table 2. Beaverhead Park property species tally summary.

hard maple

DBH	HGT 0.5	1	1.5	2	2.5	3	DBH	Dist.
14	22	16					14	38
15	2	9	1				15	12
16	12	22	12	5			16	51
17	2	9	14	14	4		17	43
18	2	13	27	27	6	2	18	77
19		6	21	20	6	1	19	54
20	1	5	9	14	12	1	20	42
21		1	7	14	4	2	21	28
22			4	6	2	1	22	13
23				4	3		23	7
24			2		1		24	3
25							25	0
26			1				26	1
	0.5	1	1.5	2	2.5	3		
Dist.	41	81	98	104	38	7		

spruce-fir

DBH	HGT 1	1.5	2	2.5	3	3.5	DBH	Dist.
10	3		7				10	10
11			7				11	7
12	1		10	5			12	16
13			3	6			13	9
14			1	9			14	10
15				7			15	7
16				3			16	3
17				3	1		17	4
18				1			18	1
19				2			19	2
20				2			20	2
21							21	0
22							22	0
Dist.	1	1.5	2	2.5	3	3.5		
	4	0	28	38	1	0		

cherry

DBH	HGT 0.5	1	1.5	2	2.5	3	DBH	Dist.
14	2	1					14	3
15		2					15	2
16	2	3	1				16	6
17	1	1	1				17	3
18	1						18	1
19		1					19	1
20							20	0
21			1				21	1
22				1			22	1
23							23	0
24							24	0
25							25	0
26							26	0
	0.5	1	1.5	2	2.5	3		
Dist.	6	8	3	1	0	0		

soft maple

DBH	HGT 0.5	1	1.5	2	2.5	3	DBH	Dist.
14	3	6	1				14	10
15	1		1				15	2
16	6	14	11				16	31
17		9	11	6			17	26
18	2	8	11				18	21
19		2	5	3			19	10
20	4	11	4	1			20	20
21		2	2				21	4
22	1			1			22	2
23		2	3				23	5
24		2	1				24	3
25			1				25	1
26			1				26	1
27			1				27	1
	0.5	1	1.5	2	2.5	3		
Dist.	17	56	52	11	0	0		

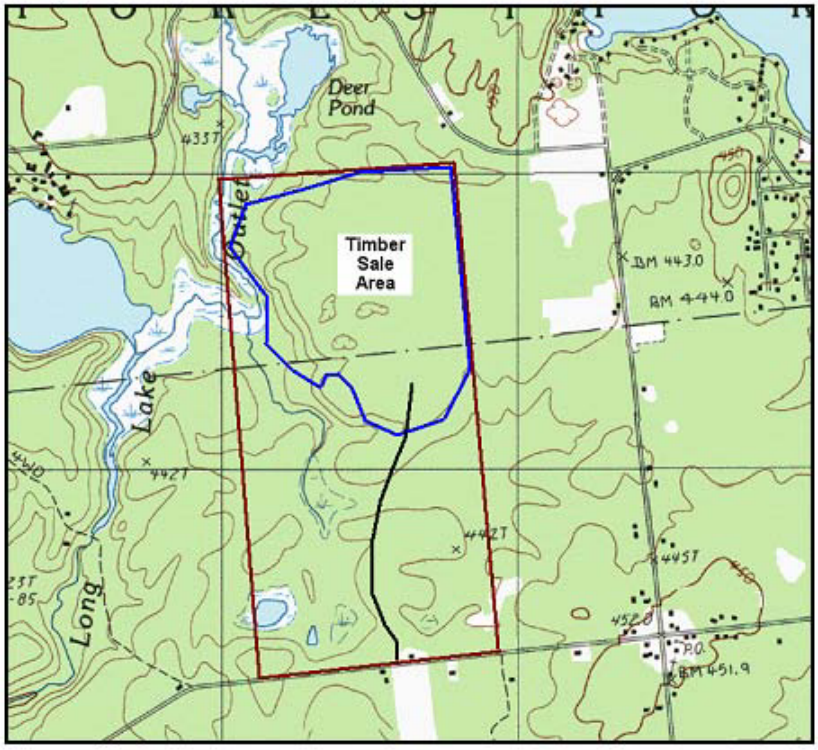
y. birch

DBH	HGT 0.5	1	1.5	2	2.5	3	DBH	Dist.
14							14	0
15							15	0
16		2	1				16	3
17							17	0
18		1	1				18	2
19		1					19	1
	0.5	1	1.5	2	2.5	3		
Dist.	0	4	2	0	0	0		

beech

DBH	HGT 0.5	1	1.5	2	2.5	3	DBH	Dist.
14							14	0
15			1				15	1
16		1	1	1			16	3
17		1					17	1
18							18	0
19							19	0
	0.5	1	1.5	2	2.5	3		
Dist.	0	2	2	1	0	0		

Figure 2. Beaverhead Park timber sale site map, Town of Adirondack, Hamilton County, NY.



Fernwood Forestry
P.O. Box 100, Adirondack, NY 15545 ♦ Ph. 518-354-0001♦ Fax 518-354-0002 ♦ Info@fernwoodforestry.com

Bid Form

Beaverhead Park Property Timber Sale

Sale Date: on Friday, December 3rd, 2006, promptly at 1 PM.
NAME: _____

ADDRESS: _____
_____
_____

PHONE: (_____) _____

BID AMOUNT: _____
I have looked at and/or I am familiar with the quality and quantity of the timber I am bidding on, the conditions of the sale, and the provisions of the timber sale contract.

SIGNED BY: _____

Instructions
Please mail this bid to Fernwood Forestry, P.O. Box 100, Adirondack, NY, 15545 so that is received by the morning of December 3, or hand-deliver it by noon at the bid opening at the Beaverhead Park camp (187 Sabattis Road, Adirondack, NY 15545). Whether the bid is mailed or hand-delivered, please place it in a sealed envelope clearly marked "timber bid enclosed."

Important Topics in this Chapter

- New York State timber theft law
- Types of timber theft
- Timber theft prevention
- Enforcement process

Timber Theft

Timber Theft and Thieves

Timber theft is a recurring problem in New York State, though greater efforts at prevention and enforcement have been made in recent years. Timber values have risen to the point where forest owners, lawmakers and law enforcement have all paid much more attention when timber is stolen. These same high values make stealing timber more lucrative to a thief. A trailer load of hardwood logs can be cut and stolen in a single day, with proceeds in the thousands of dollars.

Timber theft takes several forms. Outright theft involves parties unknown to the landowners entering their property without permission and cutting down and removing trees. A few thefts have involved parties who made seemingly le-

Timber thieves often cause substantial damage to the land.

gitimate pay-as-cut timber sale agreements, but used a false name and then failed to make any payments. Occasionally a thief will even misrepresent himself as the owner of someone else's property in selling the timber to genuine buyers who are acting in good faith. Some thefts occur within the context of a formal timber sale—with the purchaser flagrantly violating the contract in the hopes of removing additional timber without paying for it.

Timber thieves are referred to throughout this chapter as just that—thieves. Honest loggers and others who purchase timber in an above board fashion should not lumped in with thieves by according them the title of loggers. All of the honest players in the forest economy deplore timber theft and are quick to cooperate in exposing thieves and bringing them to justice.

Timber Theft Law

Theft has always been against the law, but in the case of timber, additional efforts have been required to ensure that the gravity of the crime is properly recognized in the law enforcement community, with appropriate penalties assigned to it. In 2004, an amendment was passed to the New York State Environmental Conservation Law (ECL). Specifically, Article 9 was amended to make the removal or destruction of timber without the owner's consent against the law and assign stiff penalties for this crime. The law now states that the thief will be liable for triple the stumpage value or $250 per tree, or both.

There are several justifications for triple damages and the possibility of a minimum value or additional value of $250 per tree. This strict penalty, if it is eagerly applied and publicized, should discourage timber theft. The forest owner should be entitled to more than just the fair market value of the timber on the date of the theft. In most cases, potential value growth was destroyed. The land is often left damaged and rutted, with expensive remediation activities needed to repair it. Thieves almost always remove the best trees, which tends to limit the owner's forest management options for the foreseeable future.

There is a provision in the amended law to give some protection to those who inadvertently harvested timber when they believed they had a lawful right to do so. In such cases, the party who harvested the timber is liable for the stumpage value or $250 per tree or both, rather than triple damages.

Situations like this occur when boundary lines are improperly marked or dishonest parties misrepresent themselves as having the authority to sell timber that they do not actually own. In such cases the person harvesting the timber bears some responsibility for carelessness or lack of due diligence, but criminal intent is proven to be lacking.

The full text of the relevant sections of New York State ECL Article 9 is presented in Table 1.

Table 1. The New York State Environmental Conservation Law as it pertains to timber theft.

New York State Environmental Conservation Law Pertaining to Timber Thefts

1. If any person, without the consent of the owner thereof, cuts, removes, injures or destroys, or causes to be cut, removed, injured or destroyed, any underwood, tree or timber on the land of another or on the common or other land of a city, village, town or county, or damages the land in the course thereof, an action may be maintained against such person for treble the stumpage value of the tree or timber or two hundred fifty dollars per tree, or both and for any permanent and substantial damage caused to the land or the improvements thereon as a result of such violation. Such reparations shall be of such kind, nature and extent as will reasonably restore the lands affected by the violation to their condition immediately before the violation and may be made by physical restoration of such lands and/or by the assessment of monetary payment to make such restoration.

2. In any action brought pursuant to subdivision one of this section, if the defendant establishes by clear and convincing evidence, that when the defendant committed the violation, he or she had cause to believe the land was his or her own, or that he or she had an easement or right of way across such land which permitted such action, or he or she had a legal right to harvest such land, then he or she shall be liable for the stumpage value or two hundred fifty dollars per tree, or both and reasonable costs associated with maintaining an action pursuant to this section. In such case, the defendant shall also be liable for any permanent and substantial damage caused to the land or the improvements thereon as a result of such violation. Such reparations shall be of such kind, nature and extent as will reasonably restore the lands affected by the violation to their condition immediately before the violation and may be made by physical restoration of such lands and/or by the assessment of monetary payment to make such restoration.

Timber thefts are often discovered months after they happen when forest owners find the stumps of valuable trees like the black cherry above.

Outright Theft

The outright theft of timber is conducted by parties with a criminal intent to enter onto another person's land and remove timber. One general pattern for such thefts is for the thief to gain entry through a neighboring property, often through a timber sale agreement with this neighbor. The thief then crosses the boundary line to access the timber on one or more neighbor's property. Even when the thief has a log landing area in plain site from a public roadway, there is no obvious way of knowing that the timber is being stolen.

Timber thieves generally target the most valuable trees. Typically, these will be mature hardwoods such as hard maple, black cherry, yellow birch, white ash and red oak. Harvesting only the best trees limits the thief's exposure on the property and maximizes the return. Thieves make no effort to repair damage to the property. An ideal situation for them is to prey on absentee landowners who have no idea how much their timber is worth, have not maintained or

posted their boundaries and are not present when the theft takes place. In such cases is it is often months or years before the theft is discovered.

An even more devious type of timber theft occurs when the thief misrepresents himself as the owner of the timber to an honest buyer or to a logging contractor who is paid to cut the timber. In this case there may be as many as three victims—the timber owner, the purchaser and the logger. The timber owner is still the primary victim, as the purchaser and logger are responsible for their own due diligence in ascertaining if the seller truly owns the timber. This situation is a far less common type of theft, but it does happen. Word of mouth within the forestry community serves to prevent this type of theft. Fraudulent operators become readily known anytime thefts like this happen.

Theft Within Timber Sales

A more subtle form of timber theft occurs within the context of an agreement between the forest owner and a timber purchaser. One example would be if the purchaser harvests trees that were not designated by the agreement, or harvests the correct trees but does not pay for them. Theft can occur in a pay-as-cut timber sale when the purchaser under reports the volume of wood harvested.

There is a significant amount of gray area when it comes to determining if a theft has occurred when there is an agreement of some sort in place. Suppose a timber buyer offers a lump-sum price for a forest owner's timber and it is accepted. After the harvesting has started or is complete, the forest owners learn that the timber had a fair market value of roughly twice what they were paid. In this case, a theft probably hasn't taken place.

How about if a purchaser tells a forest owner that harvesting the timber should probably result in $20,000 when the logs are sold, but then only ends up paying $10,000? If the purchaser made a written guarantee of the $20,000, then a theft may have taken place. If the $20,000 was just a fast

talking enticement that didn't end up in a contract, the forest owner is mostly a victim of poor judgment. In some cases, forest owners must simply accept that they have made a poor business deal, but no real theft has occurred.

The best way to prevent timber thefts of this type is to arrange for representation by a consulting forester. Follow the timber sale practices outlined in Chapter 6 of this book and rigidly enforce the contract. Strict contracts and reputable representation tend to discourage the type of purchasers who are willing to enter into an agreement and then fail to abide by it.

In most cases when an agreement (written or spoken) is entered into, thefts of this type become a civil matter and must be pursued in this way. Forest owners who are victims of theft through contract violations or the failure to live up to a spoken agreement should contact an attorney familiar with timber sales and the forest products industry for advice on how best to pursue legal remedies. Lawyers who are not familiar with timber sales will go through a learning curve at the forest owner's expense to try to correct the situation. Timber sale prices and values can be established with the help of a consulting forester.

Timber is occasionally purchased through fraudulent means. Suppose a timber buyer walks through a forest stand with its owner and marks each of the trees to be purchased with paint. An agreement is made to sell these marked trees for a lump sum. After the fact, this purchaser comes back and marks many more trees. The agreement simply states that the trees conveyed are marked with paint. The additional trees were obtained through fraudulent means. Though this may sound far-fetched, it has happened before and will probably happen again.

Each of these examples of poor or fraudulent deals has a common theme. Forest owners are taken advantage of because they are uninformed. The best way to avoid having this happen to you is to do some research on your own and question the various foresters who help forest owners.

Thefts Due to Mistakes

In some cases, outright mistakes have been made in marking and harvesting trees. These mistakes have every appearance of a theft when they are discovered by the owner. Such mistakes originate from a variety of sources: errors by the forester marking the timber, neglected boundary lines, miscommunication with logging crews, general carelessness, or deception by a neighboring landowner. Honest people are swift and agreeable in correcting their mistakes. Occasionally the timber harvester is left looking like the bad guy when boundaries are misrepresented or the wrong trees are marked for harvesting.

Theft Prevention

Forest owners can do a number of things to minimize the risk of timber theft. Boundary lines should be adequately maintained, painted and posted against trespass. Those who do not want to discourage neighbors from walking on their land by posting it can post signs warning against timber trespass. Regular inspections of their land is an option for some owners, while others live too far away. Absentee owners may want to give a neighbor or trusted local friend permission to hunt or hike on the property, with the knowledge that they will be quick to report any unusual activity. When timber harvesting activity occurs nearby, a polite visit with the other forest owner or with the logger is appropriate to ensure that everyone is aware of the location of the boundary lines. Forest owners who work with consulting foresters can ask them to look into nearby logging situations or inquire if the parties involved are reputable.

Enforcement

Forest owners who discover a theft on their property should report it to a New York State Environmental Conservation Officer. As a violation of state law, it can be reported to any police agency with jurisdiction in the location, but ultimately these cases are referred to the DEC. Most thefts

Posted and well-maintained boundary lines, along with frequent inspections, can help discourage timber theft.

are discovered after the fact—sometimes months or years later. If the theft is on-going, safety dictates that the forest owner call the authorities and allow them to confront the thief. Timber thieves are not true loggers. Often they have a history of trouble with the law and have gravitated toward timber theft as a crime that they believe has fewer risks.

Timber theft cases are seldom simple and often the culprit has to be identified. Environmental Conservation Officers usually end up referring these cases to the DEC Investigators for the region. There are currently two of these investigators for each of the two DEC Regions (5&6) that encompass the Adirondacks. The investigator will ascertain the facts of the case. Before any formal charges can be made, the value of the timber must be determined. Unfortunately, the victim must bear the cost of hiring a forester to make an appraisal of the timber's value. The Department of Environmental Conservation can usually recommend several foresters qualified to make such an appraisal.

Timber Theft Value Appraisal

Estimating the value of timber that has been removed is an involved process. The volume of the timber that was taken must be determined, by species. All of the factors that contribute to value must be taken into account in determining accurate stumpage prices for the date of the theft. Prices and volumes are used to arrive at an estimate of the value of the timber.

Recall that in Chapter 3 a straightforward method of measuring tree volumes was explained. Measurements of a tree's DBH and merchantable height are used to reference its volume from established tree volume tables. When the trees are no longer available for measurement, the DBH and merchantable height have to be determined by alternate means.

Tree stumps are the primary evidence available for the appraisal. Each stump can be identified by species. The diameter of the stump, inside the bark, can be measured. Stump diameters can be used to infer tree DBH from established tables.

Merchantable heights are determined by one of two means. Sometimes the distance from the stump to the tree's top (if it was left behind) can be measured to determine merchantable height. If the tree was on a slope, the position of the tree top will exaggerate height because the tree fell part way down the slope when it was cut down. In other cases the tree top was pushed from its original position by a skidder, meaning that its position is no longer a reliable indicator of height.

The alternative way of estimating merchantable height is to measure the heights of comparable trees in the stand and use an average height for each species. Tree heights tend to be fairly uniform, by species, within a stand. If all of the merchantable trees were removed in the theft, trees in a comparable nearby stand can be used for height measurements. An average height for each species is determined in this way.

It is important to count all of the trees that were removed or destroyed, regardless of the merchantability. This is be-

cause of the clause in ECL Article 9 that assigns a potential penalty of $250 per tree.

Once timber volumes have been calculated by species and product category (e.g. sawtimber, pulpwood), the next step is to determine appropriate stumpage prices. Both the DEC's Stumpage Price Report and comparable sales can be used. The prices must be appropriate for the date when the theft took place. The relative quality of the timber plays a role in determining the prices, as do factors that contribute to harvesting and trucking costs. Most of the things that relate to harvesting and trucking costs can be summed up as access and operability. Recall from an earlier chapter that access refers to how close a truck can get to the harvesting site without excessive road building costs, while operability refers to how difficult it is to operate logging equipment on the harvesting site.

With volumes and prices determined, an estimate of value is made by multiplying each species or product volume by the appropriate price and summing the results. The count of smaller trees that were cut and destroyed but were not merchantable should be multiplied by $250 to assign a potential value to them. A timber theft appraisal report is written with a statement of value. This value helps law enforcement officers determine what charge to use when the thief is arrested. Any value over $1,000 is considered a felony. Values over $3,000 are a more serious category of felony. In terms of timber value, $1,000 and $3,000 are minor hurdles. In most timber thefts, the most valuable trees are taken. A relatively small number of trees worth $100 to $200 or more each will easily add up to a felony charge.

Enforcement Strategies

DEC Investigators develop knowledge of the various jurisdictions where they work. This helps them develop a strategy for charging the timber thief that is most likely to result in restitution to the victim and punishment of the culprit. If the suspect is charged with a felony it is usually

prosecuted by the county district attorney's office. The New York State Attorney General's Office can also prosecute cases and did pursue one right after the timber theft law was amended, probably as a means of promoting the new law.

One enforcement strategy is charging the suspect with a felony. Depending on the county where the theft took place, the crime may or may not be prosecuted enthusiastically by the district attorney's office. A few assistant district attorneys understand the crime and have become experienced in prosecuting it. Other district attorney offices have caseloads of violent crimes that take precedence. A few district attorneys simply do not understand timber theft or the values involved. In one particularly disappointing case, an assistant district attorney from an Adirondack county actually allowed the thief to set the amount of restitution!

Since timber thieves are not the most conscientious operators in harvesting timber, there are often additional violations that they can be charged with. Thieves typically do not obtain required stream crossing permits and do not hesitate to violate wetlands regulations. Violations of this nature can potentially incur expensive fines of $10,000 each, or more. Charging suspects with any violations that occur can increase the possibility that they will be punished.

Felony charges go before a grand jury. The grand jury will issue an indictment in most cases, meaning that the suspect will have to stand trial. From here a plea bargain may be reached that includes restitution to the victim or the case may proceed to trial. Plea bargains are the most likely result. Conscientious prosecutors will ensure that the victim is adequately compensated as part of any plea bargain. If the victim does not believe the compensation is adequate, civil remedies may be pursued. Depending on what the thief admitted in the plea, a strong civil case may have been established by the criminal proceedings.

Another enforcement option is to charge the suspect with a violation of the Article 9 of the Environmental Conservation Law. The specific section (1501) is as follows:

Timber thieves seldom bother with stream crossing permits or make any provision to prevent erosion into the streams that they cross.

"No person shall cut, pull or dig up for the purpose of removal, injure or destroy or cause to be so removed, injured or destroyed, any tree on the lands of another without consent of the owner. Any peace officer, acting pursuant to his or her special duties, or police officer may enforce the provisions of this section."

Violations of this nature go before a local Justice of the Peace for the jurisdiction in which the theft occurred. Criminal intent is not necessary to be guilty of a violation. The suspect can plead guilty without incurring a criminal record. More importantly, if the suspect has liability insurance, this insurance can be used to pay some or all of any compensation ordered by the Justice of the Peace. There are some limits to the amount of compensation the Justice of the Peace can order, but a guilty plea by the suspect places the victim in a very strong position to pursue a civil case.

The violation charge enforcement strategy is preferable when it appears that the timber theft in question will not receive the attention it deserves in a criminal court. Law enforcement officers are constantly striving to find the best way to pursue timber thieves. Each successful prosecution and properly compensated victim discourages future thefts and makes the identity of thieves recognizable to the public.

Important Topics in this Chapter

- Understanding the property tax assessment
- Grieving a property tax assessment
- The Forest Tax Law (480a) program
- Forest Tax Law costs and Benefits
- Calculating potential tax savings from 480a entollment

Property Taxes and the Forest Tax Law

Property Taxes and the Forest Tax Law

Property taxes are a significant burden for private non-industrial forest owners in the Adirondacks. Taxes vary by town, county and school district, but usually range from $4 to $12 per acre annually on private timberland. The chief inequity in the property tax system is that forestland, unlike developed property, requires few services and does not result in the enrollment of children in schools. High property taxes have prompted many forest owners to enroll their property under the Forest Tax Law (Section 480a of the New York State Real Property Tax Law). This enrollment gives the forest owner a significant reduction in the property tax assessment on eligible land in exchange for a long-term

commitment to timber production. Both property taxes and the Forest Tax Law program are explained in detail in this chapter.

Property Taxes

Many forest owners seek to minimize their tax burdens. The first step is to understand how property taxes work. Land and other real property are assigned assessed values, set by local assessors. This value is, in theory, based on the fair market value of the property in its current use. The assessed value is multiplied by the tax rates for the town, county, school and any special assessment districts (e.g. water, sewer, fire) to arrive at the tax burden (billed at two different times of the year). County taxes have risen sharply in recent years, in large part due to unfunded mandates for Medicaid. In some counties it is easy for legislators to raise budgets when the burden will be borne primarily by taxpayers in towns with little or no representation. One Adirondack town supplies 40 percent of the county's property tax revenue, while it is home to only three percent of the voters.

There is little or nothing that an individual forest owner can do about the tax rates. Local elections and school budget votes give little influence to absentee landowners who are in the minority on many issues. This leaves the assessment as the primary item of concern.

Forest owners should review their assessments every couple of years, particularly when the periodic re-valuations are completed. Two broad questions should be asked. First, is the land being assessed on par with comparable properties in the same town? If not, there are grounds to grieve the assessment. Reasonable assessors will have some justification for the difference in the assessments, or will be willing to correct the mistake.

The second question is whether the assessment is in line with fair market values for comparable forestland, as evidenced by recent transactions throughout the Adirondack region. A forest owner may find this to be a difficult ques-

tion to answer without the input of outside professionals. If an assessment is substantially higher than fair market value, it should be grieved. The assessment review and grievance process is outlined in detail at the end of this section.

Consolidating Parcels

Apart from contesting assessments, forest owners should question local assessors to learn if there is any way to lower assessments by consolidating lots. Large forest owners often have multiple lots, each valued individually. Consolidation of them into fewer, larger lots may bring economies of scale into the valuation process. For example, 160 acres of timberland is usually thought of as more valuable on a per acre basis than 1,600 acres. Consolidating ten 160-acre parcels would create a single lot with a lower value per acre.

When lake frontage is involved, consolidation can provide significant relief in the assessment. Often there is a valuation formula that is two- or three-tiered. The first 100 feet of frontage is valued at the highest rate, with subsequent frontage valued at a lesser rate. For example, suppose a forest owner has 1,000 feet of frontage in five separate tax parcels, each having 200 feet of frontage. A total of 500 feet would be valued at the highest rate (5 x 100') and the other 500 feet would be valued at the lesser rate. Consolidating these five parcels would mean that only 100 feet would be valued at the highest rate and the remaining 900 feet would be valued at the lower rate.

The most substantial way for large forest owners to lower their property taxes is enrollment under Section 480a of the New York State Real Property Tax Law (often called the Forest Tax Law). This program is outlined in detail in the following section.

Assessment Review and Grievance Process

Each year the local assessor must file a tentative assessment roll, usually by May 1. If there has not been a townwide reassessment or a recent sale of a forest owner's prop-

erty, chances are the assessed value will not undergo an arbitrary change from one year to the next. The filing of the tentative assessment roll is made public by the publishing of a legal notice. The roll itself is made available through the town clerk or assessor's office for public inspection.

A key way to judge the fairness of an assessment, within the context of the specific town, is in comparing the assessed value on a per acre basis to similar properties. Select truly similar properties for accurate comparisons. A 75-acre tract might be fairly compared to the 100-acre property a few miles away, but a comparison with a 5,000-acre parcel on a per acre basis is probably inaccurate.

Some assessments are inaccurate simply due to incorrect information about the property. Perhaps the acreage or amount of road frontage in the assessor's data is wrong. Such mistakes are readily corrected by competent, professional assessors. Other inaccurate assessments in the Adirondacks and other places have been known to arise from a local mentality of entitlement to a certain amount of revenue from absentee or seasonal property owners. Though not nearly as widespread as many people imagine it to be, this bias does exist. A similar inequity is the belief that some have a greater ability to pay, regardless of their residency, causing the assessments of a select few to be unfairly higher. Again, this is not a widespread bias. A factual challenge to unfair assessments of these types should ultimately prevail.

Confounding efforts to compare similar properties within a town are those examples where forestland is over-assessed throughout an entire town. Some assessors do not understand how to value forestland. Occasionally they will pick a somewhat arbitrary value per acre and apply it to all forestland throughout the town, regardless of the terrain or location.

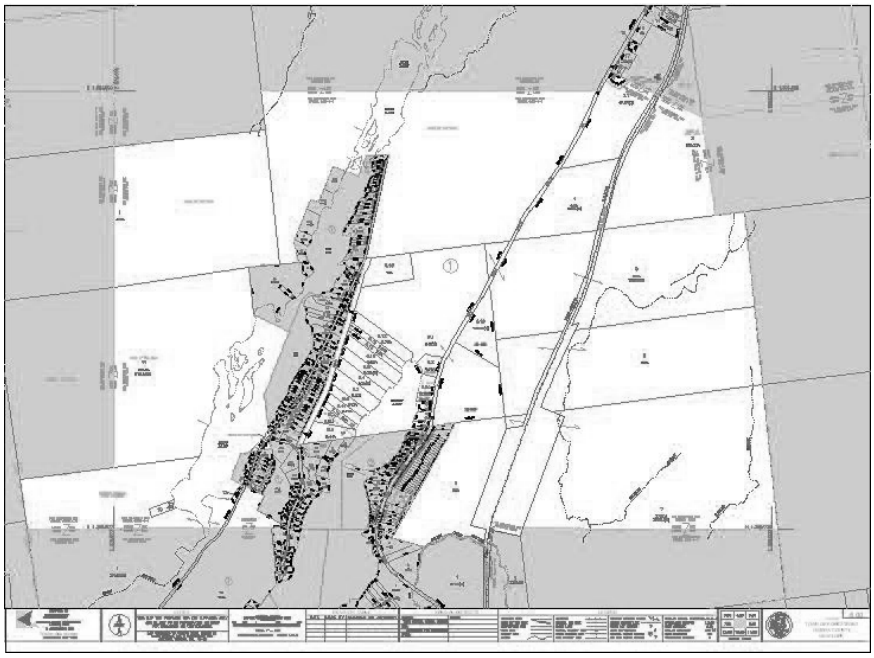
If the assessed value of a property is incorrect, the owner has the right to seek a review. A positive first step is to arrange for an informal meeting with the assessor. Assessors should be able to explain how they arrived at the assessed

value, citing the recent comparable sales that were used. Assessed values can not appear from thin air, so there should be a transparent, easily-described process that was used to arrive at the assessment of the property. The ability and conduct of assessors varies from town to town, though most are willing to correct any glaring errors in the assessment. An informal meeting or property visit with the owner to ascertain the facts will often clear things up. The owner and the assessor may have an honest disagreement about the actual comparability of the sales cited as a basis for the assessment, or about the adjustment made to such sales. Therein are the grounds for requesting a review.

If things are not resolved satisfactorily after an informal meeting, a formal request for a review is the next step. The owner must fill out a Complaint on Real Property Assessment form. This form must be submitted on or before the state grievance day for the town, usually the fourth Tuesday in May, for consideration by the town's Board of Assessment Review. Non-resident owners can request a date for review after the official grievance date, provided they do so on or before that date. The board must set a date for this review some time within 21 days of grievance day.

There are several grounds under which to grieve an assessment, as outlined in the Complaint on Real Property Assessment form. An *unequal assessment* exists when a property is assessed at a higher percentage of market value than other properties in the town. An *excessive assessment* happens when the assessed value exceeds the fair market value of the property or when one or more exemptions the property is eligible for have been denied. An *unlawful assessment* happens when the property is truly exempt from assessment or does not fall within the town in question. A *misclassification* occurs when the property has been placed in the wrong category or the division between homestead and non-homestead portions of the property is incorrect.

The town's Board of Assessment Review is comprised of three to five local residents who will presumably have some



Each tax parcel is mapped and given a unique number for identification.

knowledge of local property values. The owner or a representative (usually a family member or a lawyer) can appear before the board to present the owner's case. The assessor will be there as well, to answer questions from the board and to make the case supporting the original assessment. Neither the grieving owner nor the assessor may be present when the board makes its final decisions.

It may be necessary to have a lawyer guide the owner through the process. A formal appraisal, while it may be expensive, is the best means of demonstrating the discrepancy in values. An appraisal done by a qualified licensed appraiser with the MAI designation from the Appraisal Institute will have the most credibility.

If the Board of Assessment Review rules against you, that is the end of the matter in its opinion. The property owner has the right to take the property tax case to court. This can be expensive. In most of these cases, the judge urges the two parties to reach a settlement in advance of a trial. Experi-

enced lawyers and appraisers can advise property owners when they have a case worthy of pursuing to this extent.

The Forest Tax Law (480a) Program

The most substantial way for large forest owners to lower their property taxes is enrollment under Section 480a of the New York State Real Property Tax Law (often called the Forest Tax Law). Enrollment in this program grants substantial property tax relief to forest owners who make a long-term commitment to timber production. Owners must have at least 50 contiguous acres of eligible forestland to enroll in the program.

Requirements and Benefits

Forest owners can exempt up to 80 percent of the assessment on their qualified land from property taxes. The New York State Department of Environmental Conservation (DEC) administers the 480a program. The regional forester for each portion of the state is the contact person. Only forestland may be enrolled, meaning that developed areas, wetlands, open water, cropland, pasture, and other non-timber producing areas are subtracted from total acreage. Some of the eligible forestland in a property may remain uncommitted, as long as the minimum acreage requirement is met. The property tax assessment exemption applies only to eligible, committed acreage.

A timber management plan, including quantitative descriptions of forest stands, a 15-year work schedule and detailed map, must be prepared for the property prior to enrollment. Ultimately, timber must be harvested from the property. This plan is completed at the forest owner's expense and must be prepared by a qualified forester. A forester with sufficient qualifications to be listed on the DEC's list of cooperating consulting foresters is acceptable. On smaller properties, the cost of the plan should be carefully weighed against the potential tax savings.

The management plan must meet the requirements out-

lined by the DEC and be approved by the regional forester. A plan containing each of the elements discussed in the planning chapter of this manual meets all of these requirements. The USDA Forest Service's stewardship plan requirements, discussed earlier, also meet the requirements of 480a, with minor additions.

Prior to enrollment, the forest owner must identify and permanently mark and maintain the boundary line of eligible tracts, including un-enrolled areas.

Once the land is enrolled in the program, the forest owner has several responsibilities. Each year the forest owner must submit an *Annual Commitment Form* to the assessor and the DEC Regional Forester and the local assessor. This form ensures the property tax exemption and commits the forest owner to following the approved work schedule for a ten-year period. Note that the initial commitment is a lien on the property filed with the county clerk.

Requirements of the approved work schedule for the property remain in place even if the forest owner opts to leave the program in subsequent years. In each year that a timber harvest is scheduled, the forest owner submits a *Notice of Commercial Harvest Cutting.* The forest owner is required to pay six percent of the stumpage value from the timber cutting to the county treasurer. While six percent of stumpage can be a significant amount, it is still far less than the taxes would be without the 80 percent exemption.

Every five years after the original certification of the property, the forest owner must submit a revised management plan to the DEC Regional Forester. To avoid penalties, the forest owner must comply with the work schedule that was filed and approved for the property. The land is committed to timber production and the work schedule must be directed toward producing the forest crops listed in the initial application.

Withdrawal of all or part of the property from the program is possible. The forest owner may simply cease to file the annual commitment form. In this case, the property tax

assessment goes back to 100 percent and the forest owner is bound by the last annual commitment. This path requires following the management plan for the next nine years. After the plan has been followed and property taxes paid in full for this entire time period, the property is formally removed from the program. The other alternative is immediate withdrawal and payment of a penalty equal to 2.5 times the amount of the property taxes that would have otherwise been paid for up to the previous ten years, plus compound interest of at least 12 percent per annum. Partial withdrawal incurs twice this penalty.

Who Uses this Program?

Many non-industrial forest owners in the Adirondacks, including both investors and private parks, have chosen to enroll under 480a. It is a good match for large properties under stable, committed ownership. This is especially true when future development of the property is incompatible with the legacy of ownership. The program should be particularly appealing for owners who are already committed to following a sound timber management plan as a part of their overall stewardship or those who are required to under the terms of a conservation easement. The structure of the plan requirements often serves to remind forest owners of their responsibilities, as their internal leadership changes over time.

Some forest owners have examined enrollment under 480a and decided it is incompatible with their goals. Others have resisted enrolling because they fear having state control over the management of the resources. In general, the regional DEC offices responsible for administering individual properties in the program are staffed with professional people who strive to be helpful—far from the stereotype of New York State employees. Professional foresters offer advice and assistance to ensure compliance, but do not interfere with specific operations or management decisions. Still, forest owners should be aware the DEC staff changes

Forest owners who enroll their property under the Forest Tax Law receive a substantial reduction (usually 80 percent) in the assessment of the enrolled land in exchange for a long-term commitment to timber production. When timber is harvested, these owners must pay a six percent yield tax on the proceeds from the sale.

over time and that some people view their responsibilities as a license to control things and enforce strict interpretations of the rules, rather than to foster stewardship.

Almost all of the large Adirondack properties enrolled in 480a have undergone unscheduled plan revisions in response to unforeseen circumstances. The DEC staff understands that changes will be necessary from time to time and will help the forest owner meet the requirements for amending plans.

Enrolling Property under 480a

Qualifying forestland for a real property tax exemption under Section 480a of the New York State Real Property Tax law involves several steps. A formal application to the Department of Environmental Conservation's regional forester

Table 1. Potential property tax savings for various sizes of eligible forestland parcels enrolled under Section 480a of the New York State Real Property Tax Law.*

acreage	annual taxes	480a enrolled taxes	annual Tax savings
100	$747	$149	$598
150	$1,121	$224	$896
200	$1,494	$299	$1,195
250	$1,868	$374	$1,494
300	$2,241	$448	$1,793
350	$2,615	$523	$2,092
400	$2,988	$598	$2,390
500	$3,735	$745	$2,990
1,000	$7,470	$1,490	$5,980
2,000	$14,940	$2,980	$11,960
3,000	$22,410	$4,470	$17,940
4,000	$29,880	$5,960	$23,920
5,000	$37,350	$7,450	$29,900
6,000	$44,820	$8,940	$35,880
7,000	$52,290	$10,430	$41,860
8,000	$59,760	$11,920	$47,840
9,000	$67,230	$13,410	$53,820
10,000	$74,700	$14,900	$59,800
15,000	$112,050	$22,350	$89,700
20,000	$149,400	$29,800	$119,600
25,000	$186,750	$37,250	$149,500
30,000	$224,100	$44,700	$179,400
35,000	$261,450	$52,150	$209,300
40,000	$298,800	$59,600	$239,200
45,000	$336,150	$67,050	$269,100
50,000	$373,500	$74,500	$299,000
100,000	$747,000	$149,000	$598,000

** These estimates assume an assessed average value of $366 per acre and a combined annual tax rate of $20.42 per thousand dollars of assessed value. In general, assessed values per acre will be lower on larger acreages and higher on lower acreages.*

includes a completed *Application for Certificate of Approval* form, a management plan for the property, and a property map. There is no application fee.

After the full application package is submitted, the regional forester has 60 days to inspect the property and approve the application or to suggest necessary revisions to the plan. Upon acceptance, the regional forester issues a *Certificate of Approval.* An initial *Commitment of Land to Continued Forest Crop Production* form is then signed and notarized by the forest owners and filed with the county clerk. This simple one-page form must be filed with the regional forester and the local assessor in all subsequent years. With these items complete, an *Application for Real Property Tax Exemption for Forestland* form is submitted to the local assessor. Acceptance of this form by the local assessor completes the process.

Calculating Annual Property Tax Savings

How much are the potential savings? Individual forest owners can make an informed estimate of their own circumstances with the assistance of a qualified forester. An example drawing from actual tax rates helps illustrate the savings. Suppose you own a 25,000-acre property in the Adirondacks. Subtracting acreage for inaccessible areas, open water, stream corridors, wetlands, developed (or developable) and sensitive areas might leave you with 17,000 acres eligible for enrollment. In a sample of Adirondack towns in Herkimer and Hamilton counties, average assessed values of $366 per acre and average combined tax rates (school, county, town, etc.) of $20.42 per thousand dollars of assessed value were found. The annual property tax for undeveloped forestland that results is $7.47 per acre.

Using the large example property, this comes to $127,000 per year in property taxes on the 17,000 acres of productive timberland. Enrolling the property under 480a would lower the assessment by 80 percent. Instead of $366 per acre, the forest owner would be paying taxes based on a value

High property taxes have forced some forest owners to sell their land.

of $73.20 per acre. Annual property taxes drop from $7.47 per acre to $1.49. In this example the property taxes drop to $25,400. This is a saving of $101,600! Following these parameters, potential annual property tax savings for a range of property size are shown in Table 1.

The savings are dramatic in this case because of the large size of the property, but savings at any level are often eye-opening because they free up some of the forest owner's funds for other aspects of stewardship and enjoyment. They also reduce the pressure to make short-term timber management decisions to keep up with the annual pressure to pay the bills.

A grid showing potential property tax savings per acre for a wide range of assessed values and tax rates is shown in Table 2 on the following page. For an accurate estimate of potential savings specific for a specific property, contact a qualified consulting forester.

Table 2. Annual property tax savings per acre resulting from enrollment under Section 480a of the New York State Real Property Tax Law for various assessed values and annual tax rates.

assessed value per acre	**tax rates per $1,000 of assessed value**				
	$ 10.00	**$ 15.00**	**$ 20.00**	**$ 25.00**	**$ 30.00**
$ 100	$ 0.80	$ 1.20	$ 1.60	$ 2.00	$ 2.40
$ 150	$ 1.20	$ 1.80	$ 2.40	$ 3.00	$ 3.60
$ 200	$ 1.60	$ 2.40	$ 3.20	$ 4.00	$ 4.80
$ 250	$ 2.00	$ 3.00	$ 4.00	$ 5.00	$ 6.00
$ 300	$ 2.40	$ 3.60	$ 4.80	$ 6.00	$ 7.20
$ 366	$ 2.93	$ 4.39	$ 5.86	$ 7.32	$ 8.78
$ 400	$ 3.20	$ 4.80	$ 6.40	$ 8.00	$ 9.60
$ 450	$ 3.60	$ 5.40	$ 7.20	$ 9.00	$ 10.80
$ 500	$ 4.00	$ 6.00	$ 8.00	$ 10.00	$ 12.00
$ 550	$ 4.40	$ 6.60	$ 8.80	$ 11.00	$ 13.20
$ 600	$ 4.80	$ 7.20	$ 9.60	$ 12.00	$ 14.40
$ 650	$ 5.20	$ 7.80	$ 10.40	$ 13.00	$ 15.60
$ 700	$ 5.60	$ 8.40	$ 11.20	$ 14.00	$ 16.80
$ 750	$ 6.00	$ 9.00	$ 12.00	$ 15.00	$ 18.00
$ 800	$ 6.40	$ 9.60	$ 12.80	$ 16.00	$ 19.20
$ 850	$ 6.80	$ 10.20	$ 13.60	$ 17.00	$ 20.40
$ 900	$ 7.20	$ 10.80	$ 14.40	$ 18.00	$ 21.60
$ 950	$ 7.60	$ 11.40	$ 15.20	$ 19.00	$ 22.80
$ 1,000	$ 8.00	$ 12.00	$ 16.00	$ 20.00	$ 24.00
$ 1,500	$ 12.00	$ 18.00	$ 24.00	$ 30.00	$ 36.00
$ 2,000	$ 16.00	$ 24.00	$ 32.00	$ 40.00	$ 48.00

Important Topics in this Chapter

- Understanding stumpage
- Assessed values for property taxes
- Appraised values of forestland and timber
- Pre-merchantable and future timber values
- Valuation for income tax purposes
- Timber valuation gimmicks

Forest Valuation

Valuation

What are timber and forestland worth? There are several measures of value, each appropriate to a different purpose. The immediate sales value of timber is referred to as stumpage. Assessed values are those placed on land by local taxing authorities. Appraised values are determined from an in-depth examination of the land and the market for it, with more than one approach employed. Timber increases in value over time as it grows, making measurements of future values and the value of pre-merchantable timber important. Income tax considerations necessitate a different approach to expressing value, known as capitalization. Still other valuation schemes are used as a means of marketing the services of potential timber buyers and in the sales of timberland. The forest owner should be familiar with each of these

means of stating, expressing or asserting value. Determinations of value should be made with the help of a qualified forester.

Stumpage

Stumpage is the right to harvest timber. When the timber is sold, the cash amount that is received by the seller is the stumpage value. Stumpage has an immediate value: an answer to the question of what the timber is worth if it could be harvested at the present time. Stumpage value may be discussed or expressed in terms of a total monetary figure, rates and prices.

The most easily grasped form of stumpage value is a lump-sum payment for a specified quantity of trees or estimated volume of timber. For example, a buyer might pay a seller $60,000 for an estimated volume of 120 MBF of hardwood sawtimber, comprised of 700 trees marked with paint in a 35-acre stand. The $60,000 payment is the value of the stumpage.

Occasionally some of the stumpage value is realized in the form of an exchange. For example, suppose that a buyer and seller agree upon a lump-sum stumpage price of $25,000 for all of the marked timber on a specific 30-acre tract. The seller would like to have some road improvements completed on another portion of the property, which the buyer agrees to do in exchange for a $10,000 credit toward the sales price of the timber. The stumpage value for the marked timber on the 30-acre tract is still $25,000, but $15,000 will be realized in cash and $10,000 in roadwork. A partial exchange has taken place.

Stumpage rates may be set in two ways. Fixed prices may be stated per unit of production—$100 per MBF, for example. Alternatively, a stumpage rate may be based on the sales value of products processed directly from timber. An example of this is a stumpage rate of 50 percent of the sales price of hardwood sawlogs.

The most common form of stumpage rates have been set

prices used in pay-as-cut timber sales. For example, a buyer might agree to pay $100 per MBF for spruce sawtimber. If this buyer then harvests 40 MBF of spruce sawtimber, as scaled in the logs that are produced, multiplying this volume by the stumpage rate of $100 per MBF results in a stumpage value of $4,000 (40 x $100). Rates are generally applied to various species/product combinations. Veneer and sawlogs of each species tend to have unique stumpage rates, as do the various types of pulpwood (e.g. spruce-fir, pine, hemlock and hardwood pulpwood).

Another type of stumpage rate is a percent of the price realized from the sale of the logs produced from the timber. For example, a buyer might pay 60 percent of the log sale price for hard maple sawtimber. Suppose that 50 MBF of hard maple sawlogs are sold for $900 per MBF, resulting in a value of $45,000 for the logs. Applying the stumpage rate of 60 percent of the value received from the sale of the logs results in a stumpage value of $27,000. In effect, the seller has financed the purchase of the timber by loaning the buyer the stumpage value until the buyer realizes a return from processing the timber into salable products such as logs and pulpwood.

Stumpage prices are nearly analogous stumpage rates, but in all cases are expressed in dollars for the species/product combination in question. Buyers who are preparing a lump-sum offer for timber will do so by valuing each species separately, multiplying a price by each estimate of volume and then summing all of the individual values. It is important to note that the processing costs are about the same for every species, but the demand for each is different. In general, a buyer determines a stumpage price by comparing the value received for the logs, roundwood and chips produced from the timber and then subtracting processing costs and some acceptable margin of profit.

A good set of general guidelines for the value of different species and types of pulpwood is found is the New York State Department of Environmental Conservation's *Stump-*

Stumpage rates are sometimes based directly on the sales price of the logs produced from the timber.

age Price Report. This report is published twice each year (summer & winter). Subscriptions are free. The DEC surveys timber buyers and sellers to compile the report. The report divides the state into regions and reports stumpage prices per MBF by species for sawtimber, as well as for pulpwood. The most common, highest and lowest reported prices are included. These prices comprise a range of value for each species. The prices paid for timber in any given forest stand can be expected to vary with the quality of the wood, location, access, quantity, harvesting difficulty and other factors.

Chapter 6 provided an in-depth look at selling timber and realizing the best return.

Assessed Values

Assessed values were discussed in detail in Chapter Eight. Timberland is assessed at the local level for property tax purposes, along with all of the other taxable real property in each town. Assessments in each town are expressed as

a uniform percentage of full fair market value. Many towns are using 100 percent of fair market value, while other towns are using varying levels of less than 100 percent. The equalization rate, determined by the New York State Office of Real Property Services, is the relationship between the level of assessment and fair market value. If a town has an equalization rate of 75 percent for the current tax year, it means that property is being assessed at 75 percent of fair market value.

Local assessors or those contracted to do valuations for towns may or may not have the expertise to accurately value timberland. As noted in Chapter Eight, it is not uncommon to find that all of the timberland within a town is assessed at the same value per acre, regardless of the many differences between one parcel and the next. Timber values are currently not taken directly into account in the assessment process. If they were, there would be a significant expense involved in getting accurate information. Timber values fluctuate significantly between parcels.

Using the same value per acre for every parcel in assessing timberland is convenient and has a superficial appeal as being fair and equitable. In reality, timberland values, even at the local level, can be expected to vary by parcel size, location, terrain and timber stocking. Owners of the more valuable tracts benefit from being undervalued by this average value approach. Owners of the more remote or otherwise less valuable tracts, on the other hand, are overvalued by this approach. Owners of these overvalued properties will want to pursue the property tax assessment process outlined in Chapter Eight.

If a property has an inordinately high assessment and the initial appeal of the assessment is unsuccessful, an appraisal may be necessary to prove that the property is overvalued. Appraised values take much more site-specific information into account than assessed values and are considered to be more accurate.

Appraised Values of Land and Timber

Those who want to know the value of timberland or of timber will often commission an appraisal of these values. Depending on the circumstances, a comparable sales approach or an income approach might be used for timberland appraisals. Appraisals estimate a value at specific point in time.

Appraisals of land should be done by New York State licensed appraiser, with sufficient qualifications and experience for the job. A qualified appraiser with the proper credentials is the best source of reliable information. The MAI credential from the Appraisal Institute is the most widely recognized designation. Some foresters who specialize in timberland appraisal are well qualified for this undertaking. Other appraisers work with foresters who handle the timber valuation aspect of the appraisal.

An appraisal of timber value is occasionally needed as a stand-alone document that is not part of a land appraisal. Such appraisals are usually occasioned by a need to make some decision about what to do with the timber. For example, when partnerships dissolve, an equitable division of timber might be the basis for a partial timber sale or a subdivision of the land. Another example of the need for a timber appraisal is in making a basis allocation for income tax purposes (discussed in detail in a subsequent section of this chapter). In the case of a timber theft, an appraisal of the timber that was stolen will be necessary both to press charges and pursue compensation. This type of appraisal is discussed in detail in the chapter on timber theft.

The comparable sales approach is usually used to appraise timberland. Sales of comparable properties from within the region are used. The sale prices of the comparable properties are adjusted by removing the contribution of the timber and any improvements from the sale price. Bare land values result. After making site-specific adjustments to these values for differences between the comparables and the subject property, they are applied to the subject property.

Once a bare land value has been established for the subject property, the contribution of the timber value must be taken into account, along with any buildings or other improvements. The most accurate way of doing this is to know the volume of timber on the property by species and product and calculate the values using appropriate stumpage prices. A caution that must be observed in doing this is to avoid overvaluing pre-merchantable or immature timber by grouping its volume with larger and more valuable timber. The timber value, after it has been determined, is usually discounted before adding it to the bare land to arrive at a total appraised value.

The timber value is usually discounted by fifty percent on larger tracts. The discount is justified by the theory that a buyer would purchase the timberland with the intention of making a profit from the sale of the timber. This theory is borne out by sales evidence. This discounting of the timber value also appears to be the justification many owners use for selling most of the merchantable timber on a property immediately prior to a sale.

The income approach is sometimes used for appraising timberland. This approach is not suitable for property tax assessment appeals, but it is worthwhile for other purposes. This type of appraisal is best suited for investment analysis on larger tracts. A current inventory of timber is made and then projected harvest levels are plotted out over time. Projected timber harvests and any other revenue streams (e.g. sporting leases) are taken into account, along with management expenses and property taxes. A discounted cash flow analysis is used to arrive at a net present value.

The timberland value arrived at using this type of analysis is very sensitive to the discount rate. In effect, it is possible to arrive at any value that might seem acceptable by altering the discount rate that is used. For example, the present value of $100,000 in the revenue that will be realized in 20 years is $55,368 when a discount rate of three percent is used, but only $25,843 when the discount rate is changed

to seven percent. The wide variation in present values calculated for $100,000 to be realized in 20 years when different discount rates are used is shown below:

Discount Rate	Net Present Value of $100,000 in 20 years
1 percent	$81,954.45
2 percent	$67,297.13
3 percent	$55,367.58
4 percent	$45,638.69
5 percent	$37,688.95
6 percent	$31,180.47
7 percent	$25,841.90
8 percent	$21,454.82
9 percent	$17,843.09
10 percent	$14,864.36

In theory, the discount rate used should be equal to the rate of return for the individual's next best alternative investment, with a comparable level of risk. In practice, discount rates are often selected by how well they provide the answer that the analyst is seeking. The more sophisticated institutional investors in timberland get around this by using the Internal Rate of Return method of investment analysis—a topic a bit beyond the scope of this manual.

The income approach results the projected net present value of a series of cash flows from operating a timberland investment. Knowing this net present value of intended operations is useful in evaluating the asking price for land. Any time a net present value exceeds the asking price for a particular parcel of timberland, it will appear to be a sound investment. Suppose the potential sales price exceeds appraised value. If the value a prospective buyer places on her personal enjoyment of the property is greater than the difference, a satisfactory transaction might still take place.

The income approach to appraising timberland in the Adirondacks is less reliable than comparable sales because of the uncertainty in some of the assumptions. First, the timber volume estimate must be accurate. In general, the more accurate the timber cruise the more expensive and time con-

suming it will be to complete. Growth rates will vary by site, so the average growth rate that will be used must take the full range of productivity into account. Northern hardwood stands contain multiple species and significant differences in quality between stems that must be quantified. There is uncertainty in forecasting future stumpage prices. In general, prices continue to rise, but it is difficult to know how much. Historical trends in hardwood stumpage prices are encouraging, but the specialized nature of the demand for various species makes it difficult to project price trends in the same way that they are done for commodity grade products such as pulpwood, softwood logs and hardwood pallet logs.

Pre-merchantable and Future Values

Forestry requires planning for the future. Often this involves the harvest of timber at some future time—a time when the timber has reached financial maturity. Comparison of net present values of trees and forest stands with present values is a good way to illustrate the benefit in foregoing the harvesting until trees have reached financial maturity.

The net present value of the tree is the value of that tree when it has reached financial maturity, discounted to the present. The present value of a tree is what it could be sold for today. When net present value of a tree exceeds present value, it does not make sense to harvest it.

It is possible to quantify the volume of individual trees before they grow to a merchantable size. Similarly, it is possible to measure the volume of merchantable trees before they have reached an optimal size range for maturity. As discussed earlier in the chapter, merchantability has to do with whether or not someone is willing to purchase a certain type of tree or the products that can be made from it. A small or low-quality tree may be merchantable on a highly accessible site and unmerchantable on a site where harvesting costs exceed the return from processing it.

A hard maple tree that is six inches in DBH and 24 feet in height before excessive branching takes place contains 0.04

cords of pulpwood. Expressing it another way, it would take 25 such trees to equal one cord of pulpwood. One cord of pulpwood might have a stumpage value of $5, so the single six-inch DBH hard maple tree would return $0.20 ($5/25) to the forest owner. This tree might be worth 20 cents, if only someone was willing to harvest it. In most cases it simply isn't cost effective to harvest trees of this size.

Suppose this small hard maple tree grows to be ten inches in DBH and has a merchantable height of two 16-foot logs. The tree is now large enough to determine its volume in board feet. A tree of this size should contain 61 board feet or 0.061 MBF (International ¼" log rule). A glance at the Stumpage Price Report reveals an average stumpage price of $600 per MBF. Does it follow that this tree is worth $36.61 (0.061 MBF x $600 per MBF)? It does not, because a tree of this size will not yield logs large enough for the efficient production of valuable hardwood lumber. If this tree were harvested, the small logs that would result would only be large enough for lower-valued uses such as pallets and flooring. At a stumpage rate of $30 per MBF for timber of this size, the tree is worth just $1.83. Using a more generous stumpage rate of $50 per MBF will result in a value of just $3.05 for this tree. A tree of this size could be used as pulpwood. It would contain 0.14 cords. At the rate of $5 per cord, the tree is worth 70 cents when employed in this use.

It is seldom worthwhile to harvest sound hardwood trees of good form in the 10-12 inch DBH size range. Comparing the net present value of what these trees will yield in the future against their current liquidation value bears this out. Suppose that the ten-inch hard maple tree is left to grow for another 30 years until it reaches 16 inches in DBH, a size that places it in the higher price range of financially mature sawtimber. The tree's volume has increased from 0.061 MBF to 0.183 MBF. If prices remained constant for 30 years, and the $600 per MBF stumpage rate is used, this tree would be worth $109.80 if it were sold and harvested. Discounting this sales price back to the present with an interest rate of five

percent, the net present value of the tree is $25.41. The net present value of the tree is more than 13 times its liquidation value of $1.83! Assume that inflation has been accounted for in the discount rate.

The preceding calculations were made with the assumption that stumpage prices would remain the same. Real price appreciation over time seems likely, based on past trends. A doubling in hard maple stumpage prices is probably a safe assumption. Using a price of $1,200 per MBF, the hard maple tree would be worth twice the original assumption, selling for $219.60. The net present value then doubles as well, going from $25.41 to $50.82. Note that as the discount rate increases in the calculation, the net present value will decrease.

The foregoing example was used to illustrate the point that delaying harvesting until timber has reached an optimal size range is financially beneficial. Calculations are seldom done on an individual tree basis, but rather for forest stands as a whole. Stands in the poletimber and light sawtimber size range will appreciate in value considerably as the average tree diameter increase. Not only is more volume added to the stand, the existing volume shifts into a higher price category as the trees grow larger.

For example, if a stand with an average DBH of ten inches and a current stocking of 2 MBF per acre is growing at a rate of three percent per year, it will be stocked with more than 3.6 MBF per acre in 20 years. If the average stumpage price for all of the species in the stand is $150 per MBF in the present time, the stumpage value of the stand is $300 per acre. Allowing the timber to grow into a larger diameter class might allow the average stumpage price to increase to $300 per MBF. The combination of a jump in the stumpage price and the physical growth of the timber volume increases the stumpage value per acre to $1,080 per acre in 20 years. The net present value of this $1,080 per acre value is $407 per acre, when a discount rate of five percent is used. There is clearly a significant financial advantage in allowing the stand to grow.

Pre-Merchantable timber can experience significant value growth over time when allowed to grow into larger diameter categories.

Capitalized Values for Income Tax Purposes

Capital expenditures are amounts spent to acquire real property, such as timberland. Capitalization is the process of recording capital costs in a set of accounts. This book value, also known as a basis, is recovered for tax purposes as an offset (deduction) against gross income from timberland through process called depletion. It is important to recover capital expenditures for timber through depletion as timber is sold, both to minimize the income tax burden and to recoup the initial capital before its value is eroded over time by inflation.

The IRS hasn't overlooked timber in the long and complicated Internal Revenue Code. This agency created a special form just for timber: Form T (Timber) to be exact, for "Forest Activities Schedule." Form T can be obtained from the IRS website (www.irs.gov). The form itself is useful for record keeping purposes, even when filing it isn't necessary.

The basis of purchased assets is the amount that is paid

for them, including any associated costs, such as sales tax or closing costs. For inherited assets, the basis is the market value or special use value that is reported on the Federal estate tax return, when required, or on state inheritance tax returns. The basis is the market value of the asset on the date of death of the decedent if a federal or state return is not required. For assets received as a gift, the donor's basis is used. If the gift is taxable, the basis is increased to include any gift tax paid on the appreciated portion of the gift if it occurred after 1976.

In making a basis allocation for timberland, the total basis is allocated among various accounts (land, merchantable timber, structures, improvements, etc.) in proportion to its fair market value. First, the fair market value (FMV) of each asset is determined separately and then they are added together to arrive at a total FMV. Next, the FMV of each asset is divided by the total FMV to determine the percentage of total value represented by each asset. The percentage of FMV for each asset is multiplied by the actual basis to arrive at the original basis for each account.

An example will help clarify this process. Suppose that a family purchases a 160-acre tract of forestland for $95,000. Closing costs and surveying fees come to $5,000 so the original cost basis of the entire property is $100,000.

A subsequent timber cruise of the property reveals that there is 202.5 MBF of sawtimber worth $44,550 and 405 cords of hardwood pulpwood worth $2,025 on the property. A real estate appraiser determines that the bare land is worth $440 per acre ($64,000 total) and that the replacement value of the small hunting cabin on the property is $10,000.

The FMV of each of these items is added together to arrive at a total FMV of $120,575. Dividing the FMV of each item by the total FMV results in an allocation factor. This allocation factor is multiplied by the total basis to arrive at the basis for each of the four accounts (sawtimber, pulpwood, cabin and land). A summary of these calculations is shown as follows:

Account	FMV	Allocation Factor (% of total FMV)	Alloc. to Basis (% x total FMV)	Account Basis
cabin	$ 10,000	8.3%	8.3% x 100,000	$ 8,294
land	$ 64,000	53.1%	53.1% x 100,000	$ 53,079
harwood pulpwood	$ 2,025	1.7%	1.7% x 100,000	$ 1,679
sawtimber	$ 44,550	36.9%	36.9% x 100,000	$ 36,948
Total FMV	$120,575		**Total Basis**	$ 100,000

The sawtimber and hardwood pulpwood accounts are further refined by calculating depletion units. If there is currently 202.5 MBF in the sawtimber account, dividing the account basis of $36,938 by this volume results in a depletion unit of $182.46 per MBF. Dividing the hardwood pulpwood account basis of $1,679 by the current volume of 405 cords results in a depletion unit of $4.15 per cord.

What is the significance of the depletion unit? As timber is sold, this amount is the offset against the proceeds of the sale that is used to arrive at the taxable value of the sale. For example, if 50 MBF of the sawtimber were sold right away for $15,000, the depletion recovered through the sale would equal $9,122.95 (50 MBF x $182.46 per MBF). The taxable gain from the sale (assuming there were no other costs involved in the sale) would equal $5,877.05 ($15,000 - $9,122.95).

The amount in the sawtimber account basis is then reduced by the amount of basis that was recovered in the timber sale ($9,122.95) so that the new account basis is equal to $27,825.01 ($36,947.96 - $9,122.95). This new value of the account is known as the adjusted basis. The sawtimber volume left in the account is now 152.5 MBF.

The depletion unit in the sawtimber account will initially remain the same. The timber will grow over time, spreading out the account basis over a larger volume of timber. Suppose that timber is sold again for this property after ten years. The sawtimber volume has grown from 152.5 MBF to 183 MBF. The new depletion unit is calculated by dividing

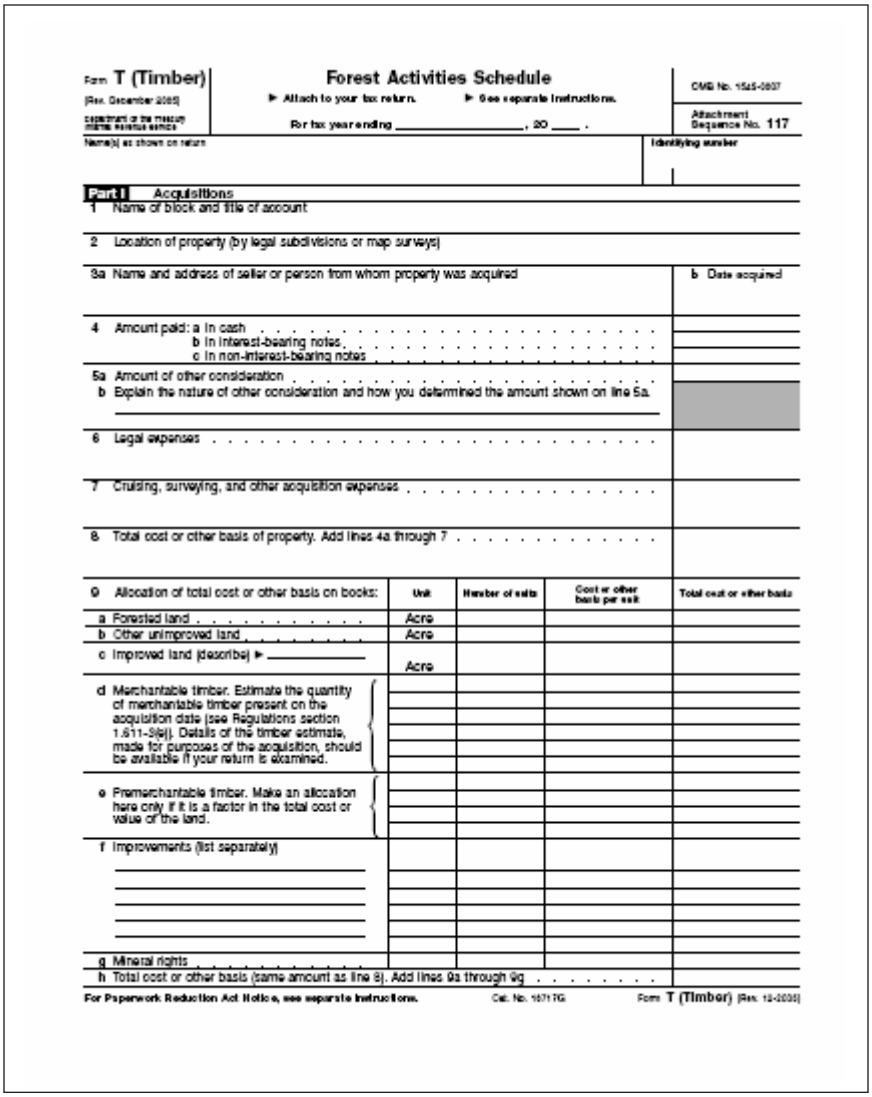
this amount remaining in the sawtimber account by the new volume. Dividing $27,825.01 by 183 MBF results in a depletion unit of $152.05 per MBF.

Ideally, forest owners would make basis allocations in a timely fashion soon after they acquired land. If a taxpayer fails to recover a portion of the basis when the timber is sold, efforts to recover the entire basis against the proceeds from the sale of the land could be disallowed by the IRS. Although basis allocations may seem like a cumbersome process, the effort makes financial sense.

In practice, timely basis allocations are seldom done. Basis allocation can be made retroactively, though there is more work involved. Timber volumes must be reduced to account for growth since the acquisition and timber price data for the original acquisition date must be found. If the property has been owned for 25 years or more, a retroactive basis allocation might not be worth its cost, because of increases in timber value. The retroactive basis allocation work could cost more than the potential income tax savings.

In this brief example, the timber volume was divided into two accounts based on products. IRS guidelines allow timber to be divided into accounts based on logical divisions by species, products and locations. In general, those who purchase forestland and plan to cut the most valuable timber soon thereafter will benefit from basing accounts on individual species or distinct stands. This allows them to recover most of the original cost basis in the timber sooner, as this timber is sold and serves to minimize their income tax burden as much as possible.

Conversely, those who purchase forestland and plan to harvest the least valuable timber soonest, thereby improving timber values over time, will usually benefit from one or more averaging accounts for the timber. In an averaging account, the entire timber value is divided by the entire volume to calculate a depletion unit. When the lower value timber is sold and the basis is recovered through depletion, little or no taxable gain results or a loss might even be shown. The



Form **T (Timber)** (Rev. December 2005)
Department of the Treasury Internal Revenue Service

Forest Activities Schedule

► Attach to your tax return. ► See separate instructions.

For tax year ending _____, 20 ____ .

OMB No. 1545-0007

Attachment Sequence No. **117**

Name(s) as shown on return | Identifying number

Part I Acquisitions

1 Name of block and title of account

2 Location of property (by legal subdivisions or map survey)

3a Name and address of seller or person from whom property was acquired	b Date acquired

4 Amount paid: a In cash	
b In interest-bearing notes	
c In non-interest-bearing notes	
5a Amount of other consideration	
b Explain the nature of other consideration and how you determined the amount shown on line 5a	
6 Legal expenses	
7 Cruising, surveying, and other acquisition expenses	
8 Total cost or other basis of property. Add lines 4a through 7	

9 Allocation of total cost or other basis on books:	Unit	Number of units	Cost or other basis per unit	Total cost or other basis
a Forested land	Acre			
b Other unimproved land	Acre			
c Improved land (describe) ► _____	Acre			
d Merchantable timber. Estimate the quantity of merchantable timber present on the acquisition date (see Regulations section 1.611-3(j)). Details of the timber estimate, made for purposes of the acquisition, should be available if your return is examined.				
e Premerchantable timber. Make an allocation here only if it is a factor in the total cost or value of the land.				
f Improvements (list separately)				
g Mineral rights				
h Total cost or other basis (same amount as line 8). Add lines 9a through 9g				

For Paperwork Reduction Act Notice, see separate instructions. Cat. No. 16717G Form **T (Timber)** (Rev. 12-2005)

IRS Form T (Forest Activities Schedule) is used for reporting timber sale income and related activities.

further advantage in this method is recovering more of the basis early on, before inflation erodes its actual value.

This has been a simplified discussion and example of a dry topic. Nevertheless, it is topic that merits considerable attention from forest owners. Hiring a reputable professional to work through this will eliminate the boredom and allow

a forest owner to focus on the financial merit. Most non-industrial forest owners in the Adirondacks will be eligible for capital gains treatment for the proceeds from a timber sale. Depending on the forest owner's tax bracket, capital gains rates are considerably less than the rates for ordinary income. Many forest owners have had to educate their accountants on this topic. A forester with timber income tax experience can be a valuable resource in this process.

For a more detailed and extensive information in the income tax aspects of forest ownership, see USDA Forest Service agriculture Handbook No. 718, Forest Landowner's Guide to the Federal Income Tax, as well as the national timber tax website (www.timbertax.org).

Other Valuation Schemes

The topic of timber values can be confusing enough without the self-serving advice of those who wish to influence harvesting decisions or market timberland as an investment. When values are used as a marketing ploy they should be both viewed with a healthy skepticism and independently confirmed.

One such strategy is for a potential timber buyer to float a target amount of stumpage that the forest owners should realize from a sale. While some of these figures are earnest, at best they are only educated guesses. Others are far less credible. A timber buyer might approach a couple to purchase their timber on a pay-as-cut contract, enticing them with an estimate that the proceeds should exceed some large number. Usually the proposed value is higher than any casual estimate or value range that could be received from a reliable source. The purpose of this figure is to short-circuit competition and discourage the forest owner from selling the timber through a consulting forester or to a buyer who has mentioned a lower, but more accurate sales price. The true test of these pie-in-the-sky purchase offers is the buyer's willingness to make a lump-sum payment for the value they claim the timber has, or to make any sort of contractual

guarantee of how much the seller will receive. In some areas, these types of buyers are known as "pin-hookers."

Consulting foresters often receive inquiries from forest owners who have been approached in this manner. If the consultant is hired to handle the sale, there is almost always an overture from the pin-hooker to see if there is any way, above board or below, to get a foot in the door to purchase the timber. When these parties are invited to submit a competitive bid for the timber, after it is marked, estimated and the proper contractual safeguards are put in place, they almost always fail to do so.

This description is not meant to taint every timber buyer who makes an unsolicited attempt to purchase timber, but rather to serve as a fair warning about things that have happened to others.

Another valuation scheme that is purely a marketing ploy is the invention of made-up terms to confuse unsophisticated investors. Some large real estate companies that specialize in the sale of timberland have conjured up something known as "timber capital value" (alternatively, it has been called "capital timber value" as well). This term sounds so good that it has its own acronym—"TCV." Timber capital value is not a textbook term from the field of forest finance, but rather a means of overstating the value of immature or pre-merchantable timber.

When a real estate firm prepares a timberland sales prospectus, it will usually include a summary of the timber volume on the property. It is not uncommon for these volumes to be overstated. Often every quantifiable bit of timber will be measured and included, even though some of the trees are not yet of a merchantable size. This in itself is not a problem, as long as all of the species and product categories are clearly delineated. When the cordwood or tonnage volumes of the pulpwood from small stems (4,6 and 8-inch DBH) are grouped and valued with larger diameters, and when financially immature hardwood sawtimber trees (less than 14 inches DBH) are grouped and valued with mature

Forest owners and prospective buyers should be cautious about valuation schemes that overstate the value of small diameter hardwood timber.

ones, timber value can be overstated.

"TCV" is not the capitalized value of the timber, nor is it a net present value calculation. It is simply a hopeful way of overstating potential returns to unsophisticated investors. A common ploy is to compare this unsubstantiated value to the asking price for the property, with the implication that some or all of the purchase price could easily be recouped by liquidating the timber. There have been a significant number of lawsuits by unhappy timberland purchasers when actual timber volumes and values were found to be substantially different than those that were advertised. Careful investors commission their own estimates of timber volumes and values, making accurate financial projections that meet their needs.

Some realtors will take the average of the ratio of the "TCV" values to land sales prices and try to apply it in estimating other land values. Timber value to land value ratios

tend to be a poor rules-of-thumb for comparisons, because the characteristics of individual land tracts vary, with the many conservation easements on the landscape serving to make each property even more unique. The reliability of the timber volume estimates vary as well, undermining both sides of this ratio.

The old adage that "if it sounds too good to be true, it probably isn't" has a lot of applicability where timber values, timber sales and land acquisition are concerned. Due diligence in the face of an offer or opportunity has saved many potential buyers from making poor or rushed decisions they would later regret.

Important Topics in this Chapter

- What are conservation easements?
- Understanding the demand for conservation easements
- Tax advantages of conservation easements
- Important details of conservation easement agreements

Conservation Easements

Conservation Easements

The desire to protect open space has been expressed in part by the creation of a market for conservation easements. The State of New York and various private land trusts and conservancies have acquired conservation easements encumbering more than one million acres in the six-million-acre Adirondack Park. Granting conservation easements and the acquisition of lands encumbered by easements has been a worthwhile stewardship strategy for many forest owners in the Adirondacks.

An easement is an ownership interest in land. Easement ownership is typically categorized as a less-than-fee interest (a full fee interest can be thought of as outright ownership). Ownership of land is actually the ownership of a bundle

of rights to the land. In granting an easement, the owner transfers some of the rights to another party. This party then owns a specific smaller set of rights to the land. Landowners may create conservation easements by selling, donating or exchanging them. Occasionally some combination of these three means of transfer is employed.

Conservation easements have been defined in general by statutes. There is considerable variation in the specifics from one conservation easement to the next, but a few key items are common to most of them. Conservation easements typically restrict development. Some easements grant rights of public access for recreation. The most recent trend in conservation easements is specifying land management standards that the landowner must follow.

Demand for Conservation Easements

Protection of land from development has a long history in the Adirondacks. Many large tracts of land are under the long-term stewardship of families and clubs who have a tradition of protecting the land. The history of public policy for protecting open space in the Adirondacks is nearly as long as that of the private sector. As a result, nearly half of the Adirondacks is in state ownership as forever-wild Forest Preserve and the remainder of the region has been given various levels of open space protection through conservation easements and the regional zoning of the Adirondack Park Agency. Public open space policies currently recognize that the acquisition of further large tracts for the Forest Preserve would rule out many acceptable and desirable working forest uses. Outright fee acquisitions would also be very costly. Acquisition of conservation easements by the State of New York protects open space, allows the continued benefits that arise from working forests and stretches land protection budgets further.

Most of the state's purchased acquisitions of conservation easements include the acquisition of full or partial rights for public recreation. In examining the historic and contin-

ued private use of forestland in the region, it is easy to see that recreation rights have a significant financial value. The demand for additional public recreation opportunities in a region where more than half of the land area is now open to the public is open to debate, but the reality of an expanding public domain is not. The sale of a conservation easement to the State of New York will most often involve some rights for public recreational access.

Industrial owners, such as paper companies, and institutional investors, such as pension funds, are motivated to realize a financial return on the recreation value of the land. Families, individuals and clubs more often realize a return on the recreational value of the land in the form of their own private use and enjoyment. With this in mind, the sale of a conservation easement to the State of New York and the subsequent loss of the private enjoyment are a far less desirable option for these forest owners.

The State of New York has received a few donated conservation easements. These donated easements usually do not include public access rights. More commonly, the market for conservation easements that do not include public access rights consists of private land trusts. A handful of private land trusts are active in the Adirondacks. When they are not partnering with the State of New York to facilitate conservation easement acquisitions that will eventually be held by the state, these groups most often acquire easements through donations. Often they target sensitive lands where public access would not be consistent with their land protection goals. In addition to the donation of the conservation easement, these land trusts often ask for an endowment to cover stewardship costs. Land trusts exist to protect land, so the more desirable a particular property is in meeting their protection goals, the more leverage the landowners have in dictating the terms of the donation.

Most of the active land trusts in the Adirondacks have embraced the working forest concept. They have become comfortable with the compatibility of timber production and

Conservation easements purchased by New York State most often provide for public recreational access to private land, while donated conservation easements almost always reserve recreational rights for the private enjoyment of the forest owner.

traditional sporting uses with open space protection. This attitude has allowed these groups to protect more land and in turn be embraced as part of the problem-solving community in natural resources.

A Forest Owner's Guide to Conservation Easements

The following sections will discuss the specific details of conservation easements, including why landowners find them to be advantageous, important considerations in negotiating conservation easements and suggestions for drafting agreements. For an in-depth discussion of conservation easements from a landowner's perspective, see *The Landowner's Guide to Conservation Easements* (Bick & Haney, 2001, Kendall Hunt Publishing, 179 p.).

Granting Conservation Easements

Why would a forest owner grant a conservation ease-

ment? Why give up some rights or forego some of the land's value? Grantors have their own private sets of motives, but the short answer is that it makes them better off in their pursuit of their objectives. Revenue from the sale is an important motivation for some. The combination of income, estate and property tax advantages is often the driving force behind donations. Perpetuating stewardship of the land across generations or among subsequent owners is the primary motivating factor for some landowners, and plays a role in combination with tax savings for others.

The sale of a conservation easement is the easiest transaction to describe and understand. A landowner receives a price that is high enough to make up for the rights that are given up, or the transaction does not take place. The assistance of a qualified appraiser can be critical in ensuring that a forest owner properly values the easement in negotiations. Donations and bargain sales are more readily described in the context of the tax advantages that accompany them.

Tax Advantages

The donation of a conservation easement can qualify as a federal income tax deduction as a charitable donation. The easement must be given in perpetuity, so terminating easements do not qualify. The recipient of the conservation easement must be authorized as a charity under the auspices of Internal Revenue Code Section 501(c)(3) and have an "exemption letter" to prove it. Beyond this, the recipient, or grantee, must have sufficient resources to monitor and enforce the easement.

Conservation purposes of easements acceptable to the IRS are as follows:

1) the preservation of land areas for outdoor recreation by, or the education of, the general public;
2) the protection of a relatively natural habitat of fish, wildlife, or plants, or similar ecosystem;
3) the preservation of open space (including farmland

and forestland) where such preservation is:

4) for the scenic enjoyment of the general public, or
5) pursuant to a clearly delineated federal, state, or local governmental conservation policy, and will yield a significant public benefit, or
6) the preservation of an historically important land area or a certified historic structure.

The easement does not have to serve all of these purposes; one may be sufficient. Several are readily served by the protection of forestland in the Adirondacks.

The conservation easement must be appraised to establish a basis for the federal income tax deduction. Federal income tax deductions can be claimed for up to 30 percent of adjusted gross income in general and up to 50 percent for "public type" charities. Excess contributions (i.e., the value of the conservation easement that exceeds 30 percent of adjusted gross income in a given tax year) can be carried over for five years. This allows a taxpayer to deduct part of the conservation easement value each year, if this is necessary to realize the complete value of the deduction. Depending upon a taxpayer's circumstances and the value of the easement, it might be necessary to make multiple donations on portions of a property over a period of greater than five years to take full advantage of the income tax deduction.

Forest owners must be careful to use a qualified, reputable appraiser to evaluate conservation easements. Inflated appraisal values for some conservation easements have resulted in large income tax deductions that were undeserved. The backlash from this has led some to call for a re-examination of federal tax policies for income tax deductions for donation of conservation properties. In truth, some conservation easements have been granted encumbering land that had no serious immediate threat of development or little long-term development value. This does not negate the long-term benefit of perpetual open space protection, but it does put the onus on the donor to ensure that an accurate appraised value is used.

A variation on the full donation of a conservation easement is a bargain sale. If the sale price of a conservation easement is less than its appraised value (again, using an accurate appraisal), and all of the other qualifications are met, the difference between the appraised value and the sale value can be considered a charitable donation. The donor then uses this as a deduction for federal income tax purposes. Bargain sales are most often used when a land trust pays the landowner an amount equal to the owner's out of pocket costs for the transaction (legal and appraisal fees).

If granting a conservation easement lowers the value of the property, it may provide a substantial estate tax advantage. Many large landowners are land rich and cash poor. This can leave their family vulnerable to selling the family's landholdings in order to pay estate taxes. When continued family ownership of the land is the owner's goal, keeping the value of the estate lower than the federal exclusion will help avoid federal estate taxes.

With federal estate tax policy in a state of flux, it is difficult to outline specific financial thresholds where property and estate values make granting a conservation easement particularly advantageous. If the movement to permanently do away with estate taxes is successful, it will be a boon to forest owners.

As discussed in Chapter Seven, property taxes have a significant influence on how forest owners use and plan for their land. Granting a conservation easement should, in theory, lower the fair market value of a property. Lowering the value of a property should decrease the property tax assessment and result in lower property tax bills. When examining this theory in practice, unfortunately, there are less than perfect results. If a forest property is already assessed in its current use, with no value placed on development options, extinguishing development rights in a conservation easement might not result in a significant reduction of the assessed value.

There is considerable variation from one local assessor

to the next in how properties encumbered by conservation easements are assessed. Some assessors are simply unwilling to do anything that decreases a community's tax base or shifts more of the burden to other taxpayers. When decreasing property taxes is a driving force behind considering a conservation easement, a consultation with the local assessor beforehand to discuss how the property would be assessed should be informative. There is no guarantee that the results of a discussion with the assessor will be positive, but this practice should at least help forest owner's in their decision making process.

There is some definite property tax relief available from the donation of a conservation easement. Beginning in 2007, owners of land encumbered by conservation easements in New York State will receive an annual refund of 25 percent of the property taxes paid on that land, up to $5,000 per year. It doesn't matter when the conservation easement was created. The only condition is that the easement must have been wholly or partially donated to a land trust or government agency.

The State of New York pays a portion of the property taxes for lands on which it holds conservation easements in the Adirondack Park. This portion is usually defined in the conservation easement agreement as being commensurate with the easement's value as a percentage of the property's value. The state sets this percentage, and revisits it every five years. In practice, the portion of the property tax burden borne by the state can be negotiated along with the rest of the details of the agreement.

There is nothing to prevent negotiating away a portion of the property tax burden to a land trust along with the donation of an easement, though there are no reported instances of any landowners who have been successful at doing this in the Adirondacks. Property taxes are not a popular obligation. Most conservation easement held by land trusts state that the landowner and its successors will be responsible for all property taxes. Some even require that proof of payment

Traditional management activities on working forests are often protected in conservation easements.

be furnished to the land trust annually.

Conservation Easement Agreement Details

As an ownership interest in the land, a conservation easement is recorded in a deed and filed in the county clerk's office. The deed contains the agreement in its entirety. The extent and complexity of the agreement has a lot to do with its size. There are conservation easement deeds for land in the Adirondacks ranging from one to more than 200 pages in length! It has been suggested that clarity and brevity favors the landowner. Since a deed is a legal document, the advice of a qualified attorney is essential in drafting the agreement. Similarly, the advice of a qualified natural resource management professional, with a fiduciary responsibility to look after the forest owner's interests, is also desirable. An attorney will know the best way to word a legal agreement while

a forester or other land management professional will know the issues and uses that are important in managing the land.

The conservation easement agreement, as recorded in the deed, represents a set of intentions about the use and future of the land, agreed to by both the grantor (landowner) and grantee (recipient). In devising such an agreement, it is critical to be far-sighted so as to prevent unintended conflicts and difficulties for heirs or other future owners of the land. Leaving the agreement silent on some issues may be desirable. This leaves future owners on equal footing with the grantee in negotiating certain issues as they arise. In general, a clear statement of purpose can serve as the guiding hand determining how new potential open space uses and threats to the land are addressed as they arise.

The State of New York and a handful of land trusts have been the recipients of most of the conservation easements in the Adirondacks. These organizations have learned over time how to shape conservation easement agreements in ways that they find workable. Some of what they have learned will undoubtedly be a benefit to both parties in the transaction. This should not be used as an excuse to pattern a new conservation easement directly on one that was intended for another property. It is easy to generalize about the similarities between private landowners and different tracts of forestland. It is the differences, unique to each, that must be accommodated in designing a conservation easement. Innovation in conservation easement comes from learning from other's mistakes and looking outside a narrow set of land management standards to find working solutions.

As worded in the deed, the landowner is the grantor of the conservation easement and the recipient is the grantee. While a variety of formats have been used, the contents can usually be divided into several categories: a statement of purpose; those things the grantee is allowed to do on, with, or in relation to the protected property (affirmative rights); those things the landowner is prohibited from or limited in doing (restrictions); uses and options for use of the land

the landowner retains (reserved rights); and the terms and conditions that frame the agreement. There is considerable interaction between the clauses in each of these categories, as dividing ownership interests in land raises many questions and exceptions.

A healthy dose of poetic boilerplate is found in many agreements as well—even lawyers need a creative outlet for their musings. Such language is fine, as long as it doesn't create confusion about the intent of specific clauses or create ground for conflicting interpretations.

Purpose of the Conservation Easement

The Statement of Purpose often serves as a reference point for further clauses in the agreement. A clear and concise statement of purpose can prevent future problems. The intent of most conservation easements on forestland is to protect the land from future development and ensure continued use and enjoyment by its owners. If this is the case, the statement of purpose should address both protection and use. Occasionally the statement of purpose will include mention of the conservation values of the property. If this is so, it's important to define these values in a manner that is understood by both the grantor and grantee.

On-Site Rights of the Grantee

Affirmative rights are those things the grantee is allowed to do on or with the protected property. At a minimum, the grantee will require the right to periodic inspections of the property to ensure compliance with the easement and the right to take emergency action to protect the property from unforeseen threats. Under ordinary circumstances, the grantee inspects once a year, at the landowner's convenience, and upon prior notice. The landowner is given reasonable notice of any violations and is required to correct them. Failure to do so triggers the grantee's option to bring legal proceedings to force correction of the violations. If the grantee has a right to allow some form of pubic access to the property, it is

important to distinguish between easement violations of the landowner and those of outside parties.

Beyond these minimums there is an array of potential affirmative rights that are open to negotiation. One common inclusion is a limited right of the grantee to enter the property for scientific or nature studies. This has often been included in easements to ensure that they meet the minimal requirements to qualify for an income tax deduction as a charitable contribution.

Affirmative rights have the greatest potential to detract from the forest owner's quiet enjoyment of the property, so they must be granted and constrained carefully. This is also the reason why they may have significant financial value, in the form of public recreation access. If public access detracts from their personal use or from potential revenue streams from sporting leases, forest owners will be reluctant to grant them without compensation. The willingness of others to pay for recreation on private land is ample evidence of the financial value of access rights.

There are several means of constraining the on-site rights of the grantee that may be employed to protect private enjoyment. These include limitations or restrictions on specific activities (e.g. no motor boating or horseback riding by public users), seasonal constraints (e.g. no public access during hunting season), and spatial constraints (e.g. no public access to a specific privacy envelope; restricting public access to a well-defined trail corridor). Further requirements are essential in monitoring public access, including the right to approve a public recreational access plan and a requirement that any trail or road construction follows best management practices for water quality. Granting conditional approval for certain activities, subject to periodic review and revision, is another approach to ensuring landowners don't allow something they will come to regret due to future abuses.

An interesting approach to recreation rights has emerged in recent conservation easements acquired by New York State. The landowners have granted broad public recreation-

al access while retaining the right to exclusive one-acre windows that are leased to private parties who want hunting or fishing cabins of 500 square feet in size or less. This has allowed the landowner to cash in some of the recreational value of the property while still retaining lucrative revenue streams into the future.

Restrictions on Uses

Restrictions prohibit or limit activities, except to the extent that they are allowed under the reserved rights. Restrictions can be viewed as the most tangible means of protecting land with conservation easements. The earliest conservation easements focused on preventing potential changes in ways that kept the open space intact. Sweeping and all-inclusive restrictions make it important to temper them through connections to reserved rights. Most stated restrictions include a phrase such as "except as allowed in the grantor's reserved rights," or words to that effect.

The most important open space restriction extinguishes development rights, at least to the extent that development potential could significantly alter the character of the land. This restriction extinguishes all development rights on some properties; however, reserving one or more development rights is quite common. Frequently this is done to allow children or grandchildren to build homes on family properties. While some restrictions explicitly convey all development rights to the grantee on the condition that they never use them, others simply prohibit all commercial, industrial, residential, and institutional activities.

In addition to restrictions on development, there are some other basic limitations. Mining and the commercial extraction of soil, sand, gravel, rock, oil, natural gas, fuel, or any other mineral substance is prohibited. If the mineral rights belong to a third party, the easement will fail to qualify as a charitable contribution for conservation purposes. Exceptions are made when the likelihood of the exercise of the mineral rights by the third part is negligible. A separate,

though related restriction, prohibits alteration of the surface topography. Virtually all deeds contain a restriction barring the dumping or accumulation of trash or refuse. Somewhat less common is a clause preventing billboards and similar signs. Mobile homes are viewed as a blight on the landscape and are restricted in many conservation easements.

Beyond these basic restrictions are additional protections against a vast array of diverse activities. Examples of actual restrictions found in existing deeds include limits on everything from storing of junk cars, to walking pets, to hang-gliding, to building windmills. Forest owners in particular must be careful to ensure that their forest management activities remain unhampered. Restrictions that guarantee that the landowner follow best management practices (BMPs) may be a reasonable safeguard, but be wary of the wording, as progress may render these practices obsolete. Forest owners should be cautious about binding themselves to the equivalent of BMPs at some future time, as it is difficult to foresee who will make these rules in years to come. A restriction that binds the land to current BMPs or their technological equivalent, as determined by a member of the Society of American Foresters employed by the landowner, is good way to demonstrate commitment to sound practices and also look out for the landowner's interests.

The most recent trend in conservation easements in the Adirondacks has been to require that a set of land management standards be followed in the owner's use of the property. This is effectively a restriction, regardless of where it is included in the agreement. Often this takes the form of a requirement that the landowner has a professionally prepared forest management plan, to be approved by the grantee. Minimal requirements for the plan are specified. These requirements are generally consistent with those plan details discussed elsewhere in this publication.

An alternative to the management plan requirement that the State of New York has used in conservation easements it has purchased is to give the landowner the option of seeking

and maintaining third party certification for the property. Third party certification in turn, depending on which program is chosen, often has a forest management plan requirement.

While many restrictions in the agreement are the grantee's ideas or for the grantee's benefit, the grantor can seize this opportunity to place limits on subsequent owners of the protected property. For example, owners who dislike the thought of hunting on the property can bind future owners to this condition by restricting it in the conservation easement deed.

Uses and Options Retained by the Landowner

In framing the reserved rights, landowners must cautiously examine the restrictions and modify them in anticipation of future contingencies in their use and management of the land. Broadly defined conservation values of a property are often coupled with the right of the grantee to protect these values and a wide-ranging restriction against all activities that might impair them. Failing to address a use of the property beforehand may render it inconsistent with the property's conservation values when the need for the use arises. If a grantee is willing to accept a particular reserved right, it is implicit evidence that this right is consistent with the conservation values. Landowners must anticipate uses and options for future uses that they want to keep, as well as options for future uses that may be important to heirs. The same consideration applies to the future marketability of the property to prospective buyers.

The most basic and all-encompassing right landowners retain preserves the protected property for all purposes consistent with the stated restrictions. Included in this comprehensive provision is the option to sell, lease, exchange, or otherwise divest oneself of the property. The right to subdivide the property into two or more parcels is sometimes reserved, though the terms of the easement extend to any future divisions. Grantees often object to subdivisions as this

may raise the costs of monitoring and enforcement.

Forest owners should reserve the right to practice forestry and explicitly define everything this right entails. A consulting forester can provide invaluable assistance when it comes to devising reserved rights that allow a landowner to continue practicing forestry. Few private land trusts have a forester on their staff. The New York State Department of Environmental Conservation negotiates and acquires conservation easements on behalf of the state and involves their professional forestry staff in the process. Even if the land trust has a forester, this person is obligated to provide advice in the best interest of the land trust, rather than the landowner.

Some of the provisions necessary for continuing the practice of forestry are the right to harvest timber, to build temporary or permanent logging roads and trails, to reforest trees, to restrict public access (if there is any) during harvesting periods and immediately after reforestation, to use appropriate silvicultural techniques (prescribed fire, herbicides, fertilization, and improved genetic stock), and to lease the property for the purposes of hunting and fishing.

Owners of large tracts of forestland often must retain the option of granting right-of-way access to neighboring landowners for timber harvesting operations—an important bargaining chip when a similar accommodation might be needed from the neighbor at some future date.

Reserving some development rights is quite common. In reserving such rights, be careful to include any associated rights that go with construction of new homes. These include required utilities, wells, septic service, outdoor lighting, and driveways. A further extension of these rights includes home offices or studios that might otherwise be viewed as restricted because they constitute commercial use of the property.

Terms and Conditions

Several terms and conditions are commonly included in the agreement. Some are necessary for IRS's qualifying requirements in order to take a federal income tax charitable

deduction. Others are essential in protecting the forest owner's interests.

Conservation easements are usually perpetual and run with the land. Any subsequent owners of the property are bound by the same agreement as the grantors. This is a requirement in qualifying for a charitable income tax deduction. If the income tax deduction is not important, then the term of the easement should be open to negotiation. Do not be surprised, however, if it is difficult to find a grantee willing to accept an easement that doesn't provide for the protection of land for a substantially long time period.

In nearly all conservation easements donated to land trusts, the grantor has accepted the entire property tax burden for the property. This tax burden is, in theory, negotiable, but it is difficult to find a land trust willing to take on any portion of this burden. As noted earlier, in conservation easements acquired by the State of New York in the Adirondacks, the terms and conditions specify that the state will pay a portion of the property tax burden, commensurate with the portion of the property's value held by the state. This percentage of value is supposed to be determined by the state after the fact and updated periodically. In practice, the portion of the property tax burden borne by the state can be negotiated along with the rest of the details of the agreement.

Grantors commonly indemnify grantees against any and all loss, damage, cost, or expense arising from the exercise of their rights to the property. In contrast, grantors should insist on a clause that gives them the same liability protection. In most cases, this grantor indemnification is lacking, but the presence of this clause in some agreements indicates that there are grantees willing to reciprocate. When public access is involved, it is essential that the grantee indemnify the landowner

Since it is impossible to foresee how future events will affect the use of the property, provisions for amending the easement are necessary. A simple clause that allows amend-

ments to the agreement that are consistent with the intent of the original agreement and mutually agreeable is the most common approach.

As many as a dozen more legal clauses relating primarily to ownership administration, rather than management of the land, are commonly included. Among these are contingencies relating to notification, eminent domain, enforcement and subsequent transfers of the land.

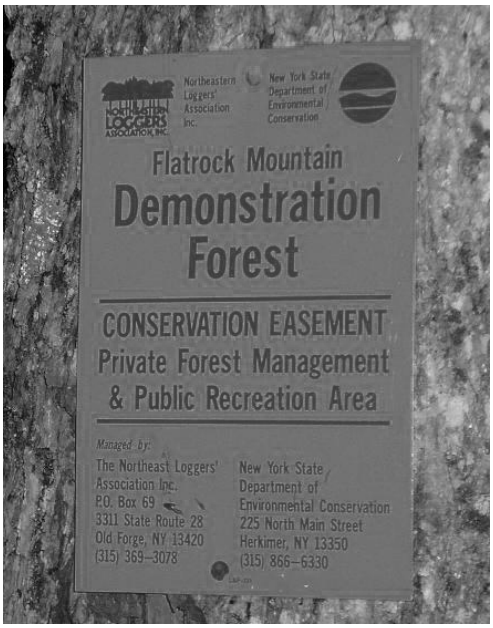
Decisions and Negotiations

Reading through the previous section on the contents agreements reveals that the grant of a conservation easement is a complicated transaction that must be treated as a negotiation. Even the straightforward donation of a conservation easement between like-minded, motivated parties can take a year to complete. Negotiating a conservation easement agreement is just one part of the overall process of a landowner's decisions about encumbering a property with a conservation easement.

Potential grantors should involve their attorneys and land management advisors as much as possible in the process. The preceding discussion gives a basic idea of the details contained in conservation easement agreements. With these basics in mind, it is important to note that most conservation easement deeds contain many more clauses—pages and pages of them! An existing agreement might provide some good starting points for the essentials, but an individual forest owner's goals should set the parameters of the discussion, rather than those the grantee used on some other property.

A Market for Your Conservation Easement

Is there a market for a conservation easement on most private forestland in the Adirondacks? Probably, but the terms may or may not be acceptable to individual forest owners. The way to find out is to look at what other forest owners have done in granting conservation easements and



Conservation easements in the Adirondacks are an example of a national trend of public-private partnerships in open space protection and a regional trend of protecting working forests.

to enter preliminary discussions with the groups that purchase or accept them.

New York State has an open space plan that details its priorities for conservation easement acquisitions. The state, working with third party intermediaries such as The Nature Conservancy and the Open Space Institute makes up most of the direct or eventual market for purchased conservation easements. The exceptions to this include properties with rare or natural features that would be of special interest to one of the private land trusts.

The market for donated conservation easements is broader. The advantages of donations have been discussed. There are national land trusts active in the Adirondacks, along with smaller groups focused only on the regions or specific areas or themes within it—too many to accurately list and describe here. Contact the Land Trust Alliance in Washington D.C. or visit its website (www.lta.org) as a starting point

Important Topics in this Chapter

- Forest Service Publications
- New York State publications
- Bibliography of Adirondack and forestry publications

References and Resources

References and Resources for Forest Owners

A wide range of forestry and related publications have been prepared with forest owners in mind. This section will discuss a number of essential publications, most of which are available for free. Many Adobe PDF formatted versions of these publications may be found by visiting the USDA Forest Service's website (www.fs.fed.us) and following links that eventually allow a search the Forest Service's various web sites. Other publications are available through the NY Department of Environmental Conservation's (www.dec.state.ny.us) and Adirondack Park Agency's (www.apa.state.ny.us) websites. A few publications are available only in hard copies and must be picked up or requested directly from the agency.

In addition to the publications that are described here is

a bibliography of relevant publications. Some of these can be found on the Internet or in public libraries, while others must be purchased or obtained from other sources.

Forest Service Publications
Important Forest Trees of the Eastern United States is a 109 page pocket-sized manual with excellent color diagrams. It is published by the USDA Forest Service, with illustrations courtesy of the Golden Guide Field Series *Trees of North America*. Identification, biological characteristics and wood properties and uses are all discussed. This publication is available upon request from the Forest Service.

Those wishing a more rigorous reference on trees should download a free copy of ***Silvics of North America***, Volumes 1 and 2 (USDA Forest Service Agricultural Handbook 654).

Forest Landowners' Guide to the Federal Income Tax (USDA Forest Service Agricultural Handbook 718) by Haney L. Haney, William L. Hoover, William C. Seigel and John L. Greene, is essential to any forest owner's library. This publication discusses all aspects of the federal income tax as it applies to ownership of forestland and the sale of timber. Forest owners who neglect to acquaint themselves with this information have made costly errors in overpaying their taxes.

Continual updates made to timber tax reference materials can be found on Purdue University Professor William Hoover's **National Timber Tax Website** (www.timbertax.org).

A Landowner's Guide to Building Forest Access Roads by Richard L. Wiest is another terrific resource published by the USDA Forest Service. This guide covers all aspects of planning, construction and maintenance of forest roads with a sound emphasis on preventing erosion. There is an

Many state and federal agencies provide useful publications and advice for forest owners.

online version of the text, or a copy can be requested from the Forest Service's Radnor, PA office. See the Forest Service website for details.

Forest Landowner's Guide to Internet Resources: States of the Northeast is the USDA Forest Service's dedicated website (currently located at www.na.fs.fed.us/pubs/misc/flg/index.cfm) for sharing important information for landowners from a variety of sources. This site is frequently updated and it allows users to generate and save Adobe PDF files of the most recent version of the guide.

The Forest Service maintains a "Treesearch" website

that allows users to search publications and software by keyword, author or title. Start at the main Forest Service website—www.fs.fed.us—to reach the Treesearch web page.

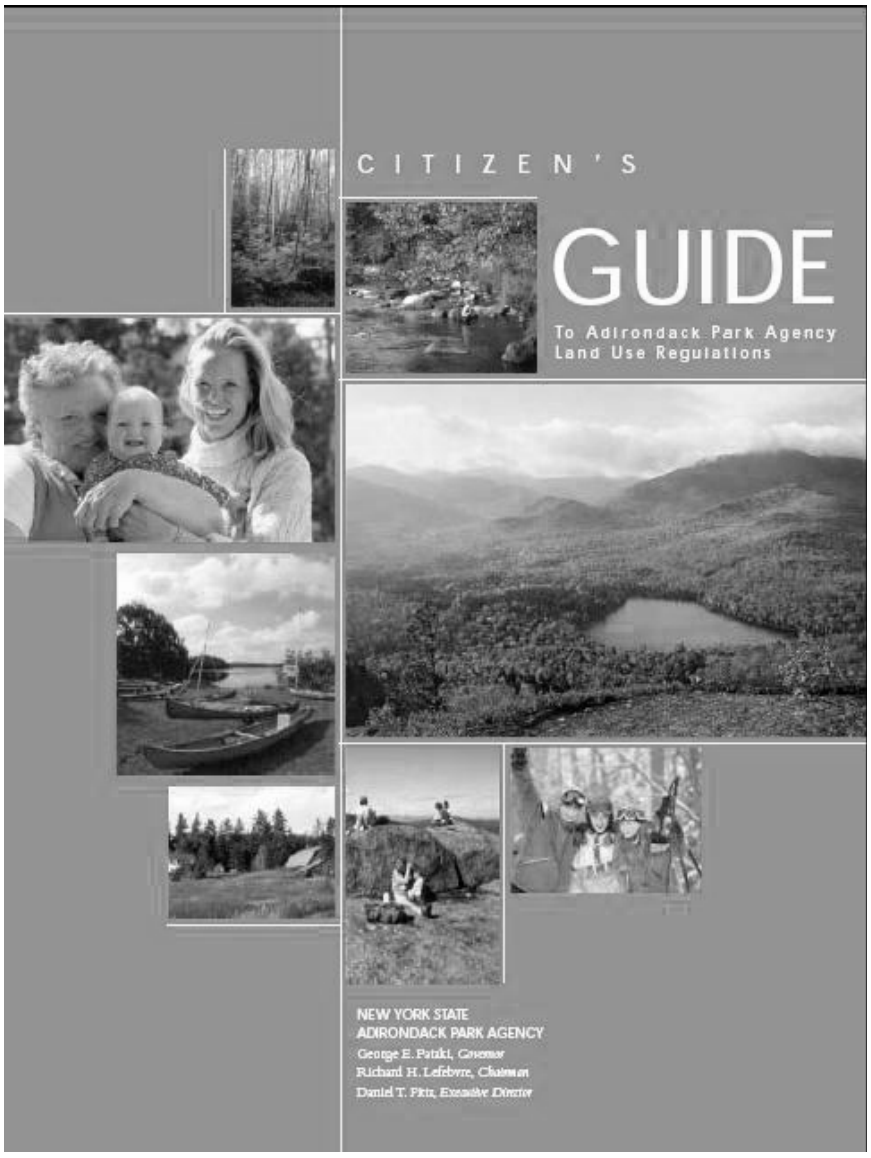
New York State Publications and Resources
The **Adirondack Park Agency** is the source of a number of useful publications (available through the APA's website—www.apa.state.ny.us).

The ***Citizen's Guide to Adirondack Park Agency Land Use Classifications*** explains the agencies zoning requirements and regulation of private land uses. The ***Adirondack Park Agency Rules and Regulations*** details all of the specifics that govern the use of both public and private lands within the park.

The ***Adirondack Park State Land Master Plan*** is a document that governs the administration of state-owned lands within the park. Many private forest owners border state lands or interact with them in other ways. Often private lands serve as a home base for recreational activities such as hunting, hiking and snowmobiling that extend onto nearby State Forest Preserve. This publication can help forest owners understand the policies and processes that serve to limit how these neighboring lands can be used.

Caring for our Rivers and Roads: A Homeowner's Guide to Erosion Control is a joint publication of the Adirondack Park Agency and The Au Sable River Association. It explains how the water that falls or crosses individual parcels of land impacts the larger watershed and details techniques for preventing erosion.

The **New York State Department of Environmental Conservation's** website (www.dec.state.ny.us) contains a great deal of useful information for forest owners and those who enjoy the outdoors.



Forest owners should obtain a free copy of the Citizen's Guide to Adirondack Park Agency Land Use Regulations.

Two publications found on the DEC website are of particular interest to forest owners. The entire text of ***Section 480a of the Real Property Tax Law*** can be found here. ***Forest Tax Law Regulations*** explains the requirements of the program.

Perhaps the best publication to come from the DEC in years is the ***New York State Forestry Best Management Practices for Water Quality BMP Field Guide***. Despite the unwieldy title, it is a compact, pocket-sized full color manual that all forest owners in the state should be familiar with. The DEC built upon the work done in other states to put together one of the best collections of information on this topic. Copies can be requested from the NYSDEC's Division of Lands and Forests (625 Broadway, Albany, NY 12233). This important publication is unavailable on the DEC's website as of this writing.

The **New York State GIS Clearinghouse** website contains a wealth of shared information that even less sophisticated users will enjoy. This free site provides users with the ability to locate a specific location in the state and then zoom in to a high resolution aerial photo. Photos may be downloaded and there is advice on free viewing software downloads. Visit this site at www.nysgis.state.ny.us.

Additional Resources

Northeast Forests, LLC maintains a comprehensive "Adirondack Landowner Information Kit" collection of useful publications on the www.northeastforests.com website for the benefit of forest owners. Many public domain publications are included. Topics include the Adirondack Park Agency, conservation easements, flora and fauna, forest products and measurements, general forestry, property, income and estate taxes, roads and erosion, trees and more.

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A rustic reading room is an essential property improvement for forest owners who want to quietly research and contemplate forest management topics.

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Steve Bick is a consulting forester and principal in Northeast Forests, LLC. He makes his home in the Adirondacks and works with many landowners, large and small, in practicing forestry here. Steve holds a Ph.D. in Forest Management and Economics from Virginia Polytechnic Institute and State University. He is an adjunct professor in the Department of Forest and Natural Resources Management at SUNY College of Environmental Science & Forestry. Steve is author of *Timber Measurements: A Practical Guide for Working in the Woods* and co-author of *The Landowner's Guide to Conservation Easements.* In 2006 he was a Lone Mountain Fellow at the Property & Environment Research Center in Bozeman, Montana. A member of the Association of Consulting Foresters, he is also an SAF Certified Forester.

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