Welcome to Your Woods

Learn about the benefits of owning woods in Pennsylvania and the resources that are available to help you

Craig Highfield and Eric Sprague
Acknowledgements

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Welcome to Your Woods!

The woods of Pennsylvania are what give our state its name — Pennsylvania means “Penn’s Woods.” Where would we be without these trees that filter pollutants from the air and water, provide jobs and products for the economy, and add value and energy cost savings to your property?

Pennsylvania is home to nearly 17 million acres of woodlands, the vast majority of which are owned by people just like you. That means that you can play a significant role in managing and conserving much of the wildlife habitat, drinking water, wood products, and clean air that result from Pennsylvania’s woodlands.

As a forest landowner, be sure to enjoy the wonders and benefits provided by your woodlands. Go out and use your woods: take a hike, go bird watching, collect firewood. Through continued exposure to your woods, you will gain an appreciation for what you value the most, whether it’s conserving natural resources, viewing scenic vistas, producing forest products — like maple syrup — on site, or spending quality time outdoors with your family.

This guide will help you become better acquainted with your woods by discussing the myriad benefits that your woodlands provide, giving you an overview of the make-up of Pennsylvania’s forests over time, and showing you how to connect with the various people, organizations, and resources — including the Pennsylvania Bureau of Forestry and its partners — to help you meet your woodland management goals.

We’re glad that you have joined the ranks of the 738,000 private forest landowners in Pennsylvania. Take the time to learn all that you can about your woods and enjoy your time outdoors.

Sincerely,

Chris Plank
Acting State Forester
Pennsylvania Department of Conservation and Natural Resources
Bureau of Forestry
Welcome to Your Woods

Your Woods are Working for You

The trees, shrubs, plants, animals and soil that make up your woods provide you and your neighbors with a host of natural benefits that you use every day: clean air and water, lower energy bills, opportunities to see wildlife, and even higher property values.

- **Cleaning the air**
  Your woods will make the air and water around your house cleaner. Trees reduce surrounding air temperatures by providing shade and releasing water into air through their leaves. The lower temperatures reduce the chemical reactions that form ozone pollution. Tree canopies also scrub the air of many other pollutants like dust, smoke and ash. These pollutants can induce health problems like asthma and lung cancer.¹

- **Cleaning the water**
  Your woods improve water quality by scrubbing pollutants from the air and soil before they enter nearby streams. Cleaner water means safer and better swimming, fishing and canoeing. Trees that line streams are particularly important for keeping pollutants out of streams, cooling the water for fish, stabilizing stream banks and providing wildlife habitat.

- **Creating a quiet retreat**
  One of the reasons you likely enjoy the countryside is the opportunity “to get away” — and a wooded setting is a peaceful setting in more ways than one. A band of trees one-hundred feet wide can reduce noises by 50 percent or more.² Trees have also been shown to change moods and reduce stress.³

Your woods are at work for your neighbors too

We all give back to our communities in different ways, such as volunteering, donating money or participating in local politics. Did you know that you are giving back to your community by maintaining your woods?
Your woods are also part of a big system that provides a host of natural benefits to a much larger area. Clear air produced by the woods on your property improves public health region-wide. Cleaner water flowing from your property helps your downstream neighbors enjoy clean water, too, and supports jobs, tourism and recreational opportunities that rely on healthy waterways.

Your woods also protect fresh drinking water. Approximately, 75 percent of the people across the Mid-Atlantic region rely on surface water as their drinking water source. Water that flows to our streams and rivers from forests are the cleanest and costs less money to treat at drinking water plants. Water from forested land is better for our health and easier on our wallets.

Wildlife near and far also depend on woods like yours. The mix of birds, mammals, and fish vary from place to place, as wildlife lives and travels in the “eco-regions” that suit them best. Your woods are part of these eco-regions and allow wildlife to stopover and feed while traveling or find shelter and raise families.

Maintaining trees on your property (and planting more if possible) is the most important way you can contribute to clean air, clean water and healthy wildlife. Healthy woods provide the highest quality and most varied services.
Welcome to Your Woods

Penn’s Woods

You may already “see your forest for the trees,” but do you “see the trees in your forest”? Why are those particular types of trees growing there? What vibrant colors should you expect to see from them in the autumn? How old are your trees? Which of your trees does wildlife prefer? What will your woods look like in five, ten, or twenty years? To understand what is going on in your woods, it is important to know how the different kinds of life in your woods interact with each other and with their environment.

Our region’s natural land cover is forest and has been for thousands of years. Most of Pennsylvania’s woodlands are deciduous, which is the most prevalent vegetative cover of the eastern United States. A deciduous forest is dominated by broad-leaf tree species like oaks, maples, and birch, often referred to as hardwoods. Most deciduous trees drop their leaves in the autumn as the weather becomes colder, and moisture and sunlight is less available for use. Their growth and development temporarily cease until favorable conditions return in late winter and early spring. Pockets of coniferous forests, which are composed of “evergreen trees” like pines, spruces, and hemlock, also exist in Pennsylvania but don’t dominate the landscape like deciduous forests. You are more likely to find forests with a mixture of coniferous and deciduous tree species. Pine plantations, which are planted primarily for commercial purposes, are found sporadically throughout Pennsylvania.

Regardless of whether they are deciduous, coniferous or a mixture, forests are complex ecosystems, comprised of layers of vegetation that interact and change as they mature. The trees, shrubs and other plants that comprise Pennsylvania’s woodlands vary dramatically depending on their location. Geologic landforms across the commonwealth are quite different. In fact, someone travelling from Erie to Philadelphia will have moved through six separate geologic provinces or landforms — the Central Lowlands, the Appalachian Plateau, the Ridge and Valley, the New England, the Piedmont, and the Coastal Plain — and dropped over 2,000 feet in elevation.
Welcome to Your Woods

The characteristics of these landforms along with their latitude and aspect affect the local climates, moisture availability, and soil types and, therefore, offer a diversity of growing sites. Each site typically supports a plant community with similar growth requirements. These forested communities, also called forest associations, are typically named for the most dominant trees in the canopy. So, a Maple/Beech/Birch (Northern Hardwoods) forest association, which provides the most vibrant autumn colors, is common in the cooler and higher latitudes of northern Pennsylvania but non-existent on the warmer more humid Piedmont in the southeast.

The most common forest type in Pennsylvania is the Oak/Hickory forest association and covers much of the area of the central and southern latitudes. It contains many species of oak trees, including white oak, northern red oak, black oak, and chestnut oak, along with a variety of hickory species like shagbark and pignut hickory. You’ll likely find a plethora of other trees, shrubs and herbs growing in this forest type, including tulip poplar, red maple, dogwood, red bud, blueberry, mountain laurel, Solomon’s seal, and may apple.

How Your Woods Work

All plants need basic resources to live: light, water and nutrients (growing space too). The plants in your woods are constantly competing with each other for these resources. Those that lose this competition simply perish. Most forest plants would probably grow best on moist, well-drained, fertile soils with plenty of sunlight and growing space, similar to plants in a well-tended garden or a greenhouse. On these ideal, productive sites, however, competition is fierce and resources are quickly occupied by the species that are most efficient in growing fast, spreading out roots, extending their crowns and producing plentiful seeds.

The plants in our woods have developed adaptations to help them better tolerate the incessant competition for resources on a variety growing sites. This is called “ecological tolerance.” For example, sugar maple, a common tree in Pennsylvania, has the ecological tolerance to develop and grow in low levels of light under the shade of a forest canopy. Pitch pine, which would probably grow best in fertile soils, has the ecological tolerance to grow in shallow, less fertile soils. Black willow has the ecological tolerance of surviving in flooded and wet soils far better than most of its competitors.

Eastern deciduous forests typically have ample annual precipitation and well developed soils, so the resource generally most limiting to the vegetation and, therefore, most
competed for, are light. In most cases, the more light your trees get the faster they can photosynthesize (make their food), develop and grow as long as the other two resources are in good supply. As trees grow, they need to generate more food resources to maintain existing tissue while developing new growth. Therefore, they need to expand their crown to capture more sunlight.

In your woods, the trees in the canopy that shade the forest floor are those that have won the long-standing competition for light. However, forests are dynamic ecosystems, and this canopy dominance does not last forever. Although you may not see it on a regular basis, change is always happening in your woods.

One of the most important changes in a forest ecosystem is called “succession.” Succession is the replacement of one plant community by another as a result of natural and progressive development. This concept explains why your forest looks the way it currently does and how it will likely change in the future. Succession in the eastern forests is mainly influenced by the vegetation’s ability to grow and develop in various levels of sunlight.
Many centuries ago, Pennsylvania was almost completely covered with forests. As settlers arrived, these forests were cleared for farming and put to human uses for building, chemicals and fuel. So in more recent times, your woodland was likely a farm field. Once farming ceased, succession continued.

Initially during this old field succession, the land is invaded by fast-growing plants that require full sunlight. In the first few years, these fast-growing species include short-lived grasses and forbs, but perennial herbs and woody shrubs soon replace them. Fast-growing, shade-intolerant trees also take advantage of the light. These trees eventually shade out the early shrubs and herbs, as the forest canopy closes and significantly reduces light to the forest floor.

Growing along with these shade-intolerant trees, however, are trees that can tolerate partial to significant shade. These species tend to use their food resources more efficiently to survive with less light, but they grow more slowly. These new communities of shade-tolerant understory plants become established in the new forest. (Shade tolerance is not always constant in a species. Many trees like oaks, maples and eastern white pine become more intolerant of shade as they age.6)

Eventually, trees die and leave gaps or openings in the forest canopy that allow these intermediate and shade-tolerant tree species to flourish with the additional sunlight. These trees tend to live longer and, once in the canopy, can persist. Shade-tolerant species can regenerate and mature under their own shade, so they can continually replace the forest canopy. When this occurs, succession has reached a climax. Further changes in vegetative species are limited without a disturbance. Stability, of sorts, takes hold, as long as the environment doesn’t change.

But of course the environment does change. Fires, storms, droughts, ice, insect infestations, diseases or human activities can disturb the forest structure. These events have always been a part of our forests, periodically creating space for new plants to grow or for surviving plants to expand. Our plant and wildlife communities have come to depend on such gaps, which are critical for maintaining diversity.
Where are the wild things?

When you purchased your woodlands, you also inherited a host of wild critters who don’t necessarily recognize property lines. Wildlife viewing is a fast-growing activity and hopefully you’ll have ample opportunity to appreciate your land’s inhabitants.

The type of wildlife you should expect to see in your woods depends on the food, water, cover and space your land provides. During early forest succession, the grass/forbs stage will attract wildlife that feeds on plants and seeds (like insects, meadow voles or eastern cottontail rabbits). As woody shrubs become established, they can attract additional species like bobwhite quail that need the woody cover. Early successional forests will also attract animals like American kestrels, red-tailed hawks and foxes that hunt in open fields but find cover in other habitats.

Mature forests provide important food sources like acorns, hickory nuts, beechnuts and wild cherries, and have a more diverse vertical structure from herbs on the forest floor to the crown of the tallest trees. Forests that support trees of various ages usually have standing dead trees with nesting cavities that can support a whole host of birds and mammals. Some species require large tracts of mature forest to breed successfully and maintain viable populations. These include barred owls, scarlet tanagers and wood thrush, which seek cover deep in the forest in order to protect their eggs and young from the predators on the forest edges.

The habitat needs of many species also vary at different times of the year or at different stages in their lives. Eastern wild turkeys, for example, rely on both early successional fields and mature forests for habitat requirements.

The woods within your property lines will not completely account for the wildlife you see there, because wildlife often depends on the resources of a broad area. Ten acres of woods surrounded by agricultural land or subdivisions will attract different animals than ten acres that are part of a larger contiguous forest. Think about how your woods fit into the surrounding landscape. Does your land provide a unique need for wildlife? If not, could it?
## Wildlife Food Plants

<table>
<thead>
<tr>
<th>Plant Species</th>
<th>Wildlife species using plant for food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oaks</td>
<td>most wildlife species</td>
</tr>
<tr>
<td>Dogwoods</td>
<td>bluebird, cardinal, cedar waxwing, rabbit, ruffed grouse, wild turkey, wood thrush</td>
</tr>
<tr>
<td>Hawthorn</td>
<td>fox sparrow, gray fox, raccoon, ruffed grouse</td>
</tr>
<tr>
<td>Hickories</td>
<td>chipmunk, red-bellied woodpecker, rose-breasted grosbeak, squirrels, wood duck</td>
</tr>
<tr>
<td>Eastern hemlock</td>
<td>black-capped chickadee, porcupine, red squirrel, ruffed grouse, white-footed mouse</td>
</tr>
<tr>
<td>Sumacs</td>
<td>bluebird, cardinal, black-capped chickadee, hermit thrush, rabbit, robin</td>
</tr>
<tr>
<td>American beech</td>
<td>black bear, blue jay, chipmunk, porcupine, ruffed grouse, squirrels, tufted titmouse, white-tailed deer, wild turkey</td>
</tr>
<tr>
<td>Cherries</td>
<td>black bear, cedar waxing, raccoon, red squirrel, rose-breasted grosbeak, ruffed grouse, white-footed mouse</td>
</tr>
<tr>
<td>Pines</td>
<td>beaver, black-capped chickadee, brown creeper, gray squirrel, mourning dove, porcupine, nuthatches</td>
</tr>
<tr>
<td>Wild grapevine</td>
<td>black bear, cardinal, fox sparrow, gray fox, mockingbird, ruffed grouse, wild turkey</td>
</tr>
<tr>
<td>Virginia creeper</td>
<td>bluebird, great-crested flycatcher, pileated woodpecker, red-eyed vireo</td>
</tr>
<tr>
<td>Blackberry</td>
<td>brown thrasher, chipmunk, gray catbird, rabbit, ring-necked pheasant, robin, white-tailed deer</td>
</tr>
<tr>
<td>Blueberry</td>
<td>black bear, gray catbird, rabbit, rufous-sided towhee, skunk, white-footed mouse, white-tailed deer</td>
</tr>
</tbody>
</table>


## Shade tolerance of common trees in Pennsylvania

<table>
<thead>
<tr>
<th>Shade tolerant</th>
<th>Intermediate tolerant</th>
<th>Shade intolerant</th>
</tr>
</thead>
<tbody>
<tr>
<td>American basswood</td>
<td>Red maple</td>
<td>Yellow poplar</td>
</tr>
<tr>
<td>Sugar maple</td>
<td>Yellow birch</td>
<td>River birch</td>
</tr>
<tr>
<td>American hornbeam</td>
<td>Shagbark hickory</td>
<td>Bitternut hickory</td>
</tr>
<tr>
<td>Eastern hemlock</td>
<td>Eastern white pine</td>
<td>Pin Cherry</td>
</tr>
<tr>
<td>American beech</td>
<td>White oak</td>
<td>Eastern red cedar</td>
</tr>
<tr>
<td>Flowering dogwood</td>
<td>Northern red oak</td>
<td>Black cherry</td>
</tr>
<tr>
<td>Black gum</td>
<td>Chestnut oak</td>
<td>Sweet birch</td>
</tr>
<tr>
<td>Eastern hophornbeam</td>
<td>Sycamore</td>
<td>Pin oak</td>
</tr>
</tbody>
</table>

USDA Forest Service; Silvics of North America; Ag Handbook 654; 1990
Welcome to Your Woods

Your Woods and Your Wallet

In addition to helping you breathe a little easier and giving you chances to see wildlife, your woods can benefit your pocket book. Some financial benefits come with simply allowing the woods to exist. Others come through forest management and tax credits.

Higher property values

Maintaining healthy trees and woods on your property is a good investment. Wooded lots sell for 7 percent more than equivalent houses on open lots. Similarly, 83 percent of realtors believe that mature trees have a “strong or moderate impact” on the salability of homes listed for under $150,000; on homes over $250,000, this perception increases to 98 percent. Landscaping can add approximately 10 to 20 percent more value to a property — especially landscaping that incorporates mature trees.

Lower energy bills

Trees can also help lower your energy bills. Through shading in summer and blocking wind in winter, trees can lower a home’s annual energy costs by 25 percent. The National Arbor Day Foundation reports that the net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating twenty hours a day.

Lower taxes

Local and state governments have developed a number of programs to help you maintain healthy trees on your property.

If you own 10 or more acres of woods, then you are eligible to receive lower property taxes through the Pennsylvania Farmland and Forest Land Assessment Act, which is also called Act 319 or, as most commonly known, the Clean and Green Program - Forest Reserve. Participating in this program allows your land to be assessed at its current use value rather than its market value. Rates for woodland are based on the average value of timber or wood fiber within your county and are calculated annually by the Penn State University.
Clean and Green is available to all eligible landowners in Pennsylvania and is administered locally by county tax assessor’s offices. The annual deadline for application submission is June 1 for reduced assessment for the tax year following.

There are also significant tax benefits available for permanently protecting your woods from development through a conservation easement. An easement allows you to retain ownership of the land and authority to make decisions about its management, but you give up most or all of the rights to develop and subdivide the land. In exchange, you can enjoy local, state and federal tax breaks. The Pennsylvania Land Trust Alliance can provide you with more information on the benefits of conservation easements and connect you with your local land trust.

Opportunities to make money

A thoughtful forest stewardship plan allows you to produce periodic income from your trees by selling wood to paper producers, sawmills, furniture manufactures and other wood users. Timber harvest for these purposes will not threaten your woods if you have an informed and responsible management plan for your property. In fact, strategically cutting trees can actually help create wildlife habitat and encourage the healthiest trees to grow. The income generated by a harvest will depend on a variety of factors, including the type of trees, volume of wood harvested, current market prices and the effort needed to harvest the trees. Working with a consulting forester will often help you attain the highest value for your harvest while maintaining the integrity of your forest. Information about foresters is detailed in the next chapter.

There are also many other ways to generate income and while enjoying your woods at the same time such as leasing your woodland to hunters or anglers or producing non-timber products like mushrooms, medicinal herbs or maple syrup.

Leasing land to an energy development company is another way some Pennsylvania landowners generate income, but it does require the conversion, and potential high impacts, of portions of your woodlands. See Appendix D for recommendations on protecting your interest and woodlands while working with energy companies.
Welcome to Your Woods

Keeping Your Woods Working for You

As a new woodland owner, the best thing you can do for your woods is to simply get outside and enjoy them. Take a walk. Discover how the terrain changes. Find easy ways to navigate through them. Learn to identify some of the trees. Look and listen for signs of wildlife. Figure out what you like about your woods — what you value the most (and even what you like least). Think of how you might use them now and in the future:

- Hiking, walking or jogging
- Viewing birds and other wildlife
- Hunting and fishing
- Harvesting wild mushrooms, medicinal herbs or other edible plants (wildcrafting)
- Enjoying privacy and seclusion
- Forest gardening
- Harvesting timber
- Cutting firewood
- Making maple syrup

How do you know if your woods are healthy?

As mentioned earlier, healthy woodlands provide the highest quality and the most varied services to you and the region. Measuring forest health can be complicated, but healthy woods do share common qualities, especially as they mature.

- **Structure:** There should be distinct and complex layers to mature woodlands consisting of forest soils, a duff layer (fallen leaves, branches and twigs), an herb layer, a shrub layer, understory trees and tall trees in the canopy.

- **Regeneration:** Seedlings and saplings (young trees) should be growing naturally in the understory that could eventually replace canopy trees lost to mortality.

- **Diversity:** There should be a variety of native trees, shrubs and herbs growing in your woodlands. A diversity of vegetation provides a diversity of habitat and helps to buffer your woods from the impacts of devastating pests, pathogens and other disturbances.
Our woods have always faced disturbances, but now experience a new set of threats. This limits the ability of woodlands to provide the very benefits we enjoy, expect and rely on.

- **Development**: Today, woodlands cleared for development are unlikely to ever become forested again. The permanent loss of forests is a serious concern for the region’s environment, including clean air and clean water. Sprawl development, which places low-density development relatively far from community services like schools, stores and waste water treatment facilities, breaks up contiguous forests into smaller parcels. This makes them more vulnerable to pests and limits benefits to wildlife. Conserving the remaining woodlands in such areas is critical.

- **Invasive plants**: Invasive plants are non-native plants introduced to our region both intentionally and unintentionally. They are well adapted to grow in their new environment and generally out-compete native plants. Invasive plants in your woods threaten the existing vegetation as well as future regeneration of the woods.

- **Invasive insects and diseases**: Invasive insects and diseases, like invasive plants, are introduced species that thrive in our environment. Native vegetation typically has not developed resistance or defenses to combat these invaders. Chestnut blight, gypsy moth, and emerald ash borer are common examples that have drastically altered forests in Pennsylvania.

- **Overabundant deer**: White-tailed deer have always been part of our forests and Pennsylvania heritage. They were quite rare in Pennsylvania one-hundred years ago due to over-hunting and habitat loss. Now their numbers have exploded in some areas of the commonwealth due to conservation efforts, loss of natural predators, and their ability to thrive in a fragmented landscape. Deer are herbivores and, in large populations, can denude a forest of most vegetation within their reach.

- **Excessive fuels**: Fire has always been a component of our forest ecosystems. Naturally occurring, low-intensity fires regularly reduced forest vegetation, leaving more fire-resistant trees like oaks to thrive. The drive to suppress all fire in the last century has unintentionally lead to an accumulation of fuel in our woods and an abundance of trees less tolerant to fire, both of which increases forest vulnerability to a catastrophic fire.

- **High-grade harvesting**: Timber harvesting is and has always been important to Pennsylvania jobs and communities. Sustainable harvesting practices can also be used to improve forest health. High-grade harvesting, however, does more harm than good. Often marketed as a selective cut or a diameter limit cut, high-grading is a harvesting practice that cuts the highest valued trees from the woods.
without regards to the present conditions or future composition of the woods. It is sometimes described as “cutting the best and leaving the rest.” (See Appendix B for a case study)

Recognizing and dealing with forest threats can be challenging, but most changes are gradual and forests are resilient. The important thing is to enjoy your woods and develop goals or objectives for the ways you’d like to use them. Caring for your woods with specific goals in mind is much easier and more focused than battling ceaseless threats. This is a first step in forest management.

Forest management is simply a process to improve the overall health and vitality of your woods. Managing your woods can reduce the risk of wildfire, increase its ability to withstand pests and enhance its wildlife diversity. Managing your woods will help ensure that they provide you and your neighbors with a host of lifetime benefits. Consider it to be like a form of insurance that nurtures the natural benefits of trees. Fortunately, there are lots of resources in Pennsylvania to help you.

Where to start

Forests for the Bay was developed to be an easy starting place for new private woodland owners to discover the benefits of their woods, to learn about resources and opportunities to help them care for their land and to connect them to a variety of natural resource professionals. The program is coordinated by the Alliance for the Chesapeake Bay, with support from the U.S. Forest Service and Pennsylvania DCNR Bureau of Forestry. The program’s website serves as a clearinghouse for woodland and natural resource information. Visit www.forestsforthebay.org or call 410-267-5723.

Planning for the future

Whether you want to improve wildlife habitat, harvest some timber or just improve the aesthetics of your forests, it’s best to have a game plan. A forest management plan lays out the values you place on the property, your goals and your strategy to achieve or maintain them. There are a variety of tools, templates and professional services that can help write your plan.

Can someone come to my woods?

A professional forester can provide a variety of services, such as developing your personalized forest management plan, enhancing wildlife habitat, improving fall color, helping you harvest and sell timber, controlling your invasive plants, establishing trails through your woods, and so much more. Foresters understand how trees, other vegetation, and soil interact in your forest and how manipulating the vegetation affects this interaction.
Currently there is no state licensure for professional foresters in Pennsylvania. Anyone can provide forestry services regardless of their education, certification or level of experience. Many practicing foresters, though, attain certification through professional organizations like the Society of American Foresters, the Association of Consulting Foresters or the Pennsylvania Council of Professional Foresters in order to distinguish their credentials and improve their proficiency. These membership organizations promote high professional standards, verify a baseline education in forestry and advance continuing education amongst its members.

There are several types of foresters in Pennsylvania who work directly with landowners:

- **Service foresters** are employed by the Pennsylvania DCNR Bureau of Forestry and are required to have gone to forestry school. They are based in one of twenty Forest Districts throughout the state and work on the county level to encourage sustainable management on private woodlands. These professional foresters have specific knowledge and expertise in their local forests and are also involved in managing the state forests. A service forester can offer you advice about the stewardship of your land and inform you of potential opportunities, cost-share programs and other incentives. They can provide information about hiring an experienced consulting forester, help you in writing and developing a Forest Stewardship Plan and re-establish woodlands on your land. Because service foresters work for the public, they cannot be involved in timber sales.

- **Consulting foresters** are independent, professional foresters who can be hired for a variety of services, from developing a forest management plan to administering timber sales to controlling invasive species. Consulting foresters work for you and should incorporate your interests and goals in their management recommendations and subsequent work. Discuss your goals with multiple consultants to find one that best fits your needs. See Appendix C. for information about choosing a consulting forester that meets your needs.

- **Industrial foresters** work for businesses in the forest products industry, like a saw mill, timber company or paper company. They work with private landowners to procure timber or pulp for their employer. They can conduct an inventory of your woodlands, appraise your timber value, draw up a procurement contract and conduct the harvest. Typically there is no fee for their service if your current or future intentions involve selling them your timber. Using a forest management plan while engaging the services of an industrial forester ensures that timber harvests are planned in concert with your goals and result in enhancing your future objectives.

- **Extension foresters** are employed by Penn State Extension. Their main role is to provide private landowners with forestry education, research and outreach based on sound science. They also organize and lead a variety of events, trainings and other learning opportunities throughout the state.
Helpful Organizations

Additional information about the following organizations including contact information is conveniently assembled and updated for you on the Forests for the Bay website: www.forestsforthebay.

Pennsylvania DCNR Bureau of Forestry
The Bureau of Forestry works to promote the sustainable use and management of the state’s forests and offers technical assistance and resources to Pennsylvania’s private woodland owners. They maintain offices throughout the state.

USDA Natural Resources Conservation Service (NRCS)
NRCS assists private landowners with conserving their soil, water and forests. Although NRCS works mostly with farmers, the agency also offers natural resource assistance and cost-share programs to private (non-industrial) forest landowners. They maintain local offices throughout the state.

Penn State Extension
Extension is part of the College of Agriculture Sciences at the Penn State University. A wide range of educational programs and problem-solving assistance are available to landowners. Offices are located throughout Pennsylvania.

Pennsylvania Woodland Owners Associations
The Pennsylvania Woodland Owners Associations are comprised of independent, local groups of woodland owners organized to promote forest stewardship through educational programs, demonstrations and the sharing of our collective experiences with other members of the association. For additional information about the groups, call 1-800-235-9473.
Pennsylvania Forestry Association
The Pennsylvania Forestry Association is a membership-based organization comprised of private woodland owners, foresters, forest industry representatives, environmentalists, educators and others whose mission is to conserve and enhance forests in Pennsylvania.

Conservation Districts
This state and county partnership initiative is implemented to help farmers and other landowners protect and conserve their local natural resource. They maintain office in all counties except Philadelphia.

The American Tree Farm System
The American Tree Farm System® is a national program of the American Forest Foundation. It is committed to sustaining forests, watershed, and healthy habitats through the power of private stewardship. The Tree Farm System is the largest and oldest sustainable family woodland system in America.

Pennsylvania Game Commission
The Game Commission offers its Private Landowner Assistance Program to landowners interested in enhancing the wildlife habitat on their property. The program is coordinated by Regional Wildlife Diversity Biologists in each of the Game Commission’s six regional offices.

International Society of Arboriculture – Penn-Del Chapter
This association of individual arborists and tree care companies specialize on the care or removal of individual trees like the ones around your house. All ISA certified arborist must pass a competency test and must attend continuing education to maintain certification.
Appendix A

Physiographic Provinces of Pennsylvania
<table>
<thead>
<tr>
<th>PHYSIOGRAPHIC PROVINCES OF PENNSYLVANIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEGMENT OF PROVINCE</strong></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Northeastern Lowlands</td>
</tr>
<tr>
<td>High Plateau</td>
</tr>
<tr>
<td>Ridge and Valley</td>
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<tr>
<td>Appalachian Mountains</td>
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Notes:
1. Elevations are in feet.
2. Elevations are in feet.
3. Elevations are in feet.
A Tale of Two Harvests: A Case Study

This article was written by a private consulting forester to describe not only the potential economic and ecological perils of high grade harvesting practices to your woods, but also the advantages of working with a professional who is able to consider your interests and goals.

In 2003, a forest landowner in his mid-fifties approached me. A timber company had offered to buy a select cut of timber from his 200-acre property. They offered $89,000 for a cut that he was assured would not only be sustainable, but would also allow him to harvest timber again at his retirement ten to fifteen years hence. His trees were already marked for the cut, yet this landowner wanted a second opinion on the value of his timber and the sustainability of the proposed cut.

I gathered more information. While the landowner welcomed immediate income, his first priority was to ensure that a significant income would be available to him through a harvest at the time of his retirement. He also wanted to be sure that the land — an inheritance from his parents — would be healthy and have value even after his retirement harvest. However, he felt he did not have immediate financial resources to develop a plan and care for the land in the short-term without some kind of immediate harvest.

I identified both high quality and low quality timber on the 100 acres of forested area (the other 100 acres were open field). The trees currently marked for harvest indicated a “diameter-limit cut” that would take all of the desirable trees measuring fourteen inches and bigger. Not only would this remove all of the genetically superior trees, it would completely rid the forest of cherry. Such a cut would leave the landowner with a genetically inferior forest that would have a significantly reduced value at the time of a second harvest. Although an exact dollar value was not immediately certain, it appeared that a harvest that considered the integrity of future forest could generate as much or more income if the timber were offered to a variety of buyers.

I proposed a stewardship plan that would generate enough income to pay for itself while enhancing the property for both short- and long-term goals. The plan would focus on a “Crop Tree Release” — a form of harvest that allows the very best trees in the stand to grow while removing the trees that are competing with them. In addition, only half of the forested area would be included in the immediate harvest. This would allow the rest of the area to receive a much needed invasive plant removal before it was harvested in order to ensure a re-growth of the desired species. It would also allow for five more years of growth, which would allow the timber to mature before harvest.

I marked about 50 percent of the trees that were originally marked for sale. This new selection of timber was offered to a variety of competitors through a sealed bid. The final bid came in at $120,000. This price was 25 percent more than the original forester’s offer, and this harvest left the best trees in the stand.
That additional 25 percent was used to pay for a stewardship plan, the removal of invasive species, and all costs associated with the sale. Another harvest was scheduled for a portion of the property in 2008, with an estimated worth of $10,000. In addition, the previously harvested area will be ready for a second harvest in the desired ten-to-fifteen-year timeframe with an estimated income of $120,000-$150,000. Thus, the final income from the property over fifteen years totals between $250,000 and $280,000. Even after the last currently planned harvest, the property will retain its genetic integrity, long-term health, and potential for generations to come.

Brian Knox is a licensed consulting forester and president of Sustainable Resources Management, Inc., a natural resources management company based in Easton, Maryland. SRM delivers a variety of services throughout Mid-Atlantic region.
Choosing a private forester to assist you in managing your woodlot is an important process in addressing the challenges you may face in sustaining multiple benefits and resources from your forest. Currently in Pennsylvania, anyone can legally claim to be a forester or forestry consultant, regardless of training, certifications, or experience. Therefore, the decision you make today in hiring a forester to assist you in managing your property can either positively or negatively impact your ability to reach set goals and interests for your forest.

A trusted professional forester can be utilized for the life of your ownership to carry out management planning on the property, implement recommendations within the plan, and assist you with other important aspects of your forest, such as tax planning and estate planning. The following are some guidelines for forest landowners to consider when hiring a forester.

Obtain lists of foresters in your county - Contact your local DCNR Service Forester to obtain an up to date list of foresters that do business in your county. This list will provide contact information, services offered, and potentially professional certifications the forester has obtained.

Contact several foresters on your list. Ask them about:

1. **Professional Certifications** - Membership in the Association of Consulting Foresters, Society of American Foresters Certified Forester Program, or Pennsylvania Council of Professional Foresters. These organizations promote high standards of professionalism for members along with a code of ethics.

2. **Education** - Foresters should have at the minimum a 2 year degree in forestry and be able to provide documented proof of this degree upon request.

3. **Work experience** - The forester should have documented experience of carrying out the types of services you wish to carry out in the management of your forest. Ensure the forester always is representing your goals and interests first and foremost.

4. **Local references** - The forester should be able to provide at least three references for forest landowners they have done business with in the past. Contact these references, ask them if they were satisfied with the job that was done, and if possible, consider touring the properties where the work was done. Ask these references if the project was carried out as per a professional forest management plan, such as a Forest Stewardship or Tree Farm Plan.

5. **Join a local Woodland Owners Association** - Twenty Seven organizations exist in PA at this time, made up of woodland owners whom are informing themselves about sustainable forest
management. Many of these landowners will be able advise you on foresters that will represent your best interests in the local area. Contact your local DCNR Service Forester for more information on local Woodland Owner Associations.

**Secure a written contract** - Ensure you secure a written, legal work contract, with fees, services, obligations, terms, and principal parties clearly identified. You may wish to ask an attorney to review the document before signing it.

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Appendix C

Natural Gas Lease Terms

By Teddy Borawski and Arianne Proctor, Bureau of Forestry Minerals Division

If you are approached by a natural gas company to lease your lands for gas exploration and development, keep in mind that any agreement offered to you can be modified to meet your needs for protection of the lands at any level you wish, usually without decreasing your bonus or royalty income from the agreement. Leases can be crafted to allow for full development at the surface, which is the usual language the operators offer, to a full non-development lease that does not allow any construction activity on the lease surface. Other lease terms to consider relate to how the approval process for any surface facilities will be granted to your operator and what reclamation you may want to see after drilling is completed and production begins later in the distant future when the well pads are finally retired and reclaimed. Keep in mind that including environmentally-friendly terms in the original agreement is far easier than asking for them later when the operator may be less interested in working out the details on a custom basis. The other important clause to consider crafting into your agreement is one stating that no deductions are allowed for post-production expenses, fees, or taxes on your royalty share. This has become controversial in the recent past and language forbidding the charges will settle the issue at the beginning.

The income received from any lease agreement will involve rentals and royalty to be paid over the life of the lease. The life of the production may easily be measured in multiple decades providing a declining income into the far future. A customary bonus payment for signing the agreement in the first place is the first year’s rentals. Large bonus payments are not unusual and are definitely market driven both for the area and the current natural gas prices in the market, which usually relate to the operators activity and interest in new leasing ventures. The New York Mercantile Exchange (NYMEX) gas pricing is usually used as the benchmark for market movements. If the rentals are paid up, no more rentals will be due for the life of the agreement, as is seen in most industry lease agreements. If a small annual rental per acre is negotiated, then the rental is collected on the anniversary date of the lease agreement. The royalty payments only begin when the operator successfully drills, completes, and markets production from the wells on the lands. Your lands may also be unitized with other private lands to create a larger working area for the operator. In the case of unitization, the landowner can expect their proportionate share of the royalty payments from the wells included in the unit area. Once production begins your operator will furnish you with monthly statements detailing the wells that have been produced over the period, the amount of gas produced, the gas price for that period received in the market, the percentage net royalty interest you will receive, and the net royalty amount included as your payment.

In all cases it is wise to engage a qualified oil and gas attorney when crafting your lease agreement, and if your payments are substantial, to also engage a financial advisor that can help you with tax questions and long range planning for the income so that your family and your lands are provided for
into the future as per your wishes. In the case of substantial payments where you are elderly and wish to take care of your heirs after you pass, some consideration should also be given to estate planning, which will provide the continuity from you to the next generation. Establishment of substantial gas production from your lands can be a life changing event, so plan carefully and take your time in getting it right as what you set in motion may outlast you and be a legacy for your heirs for many years to come.
Endnotes

4. C. Oliver and B. Larson- Forest Stand Dynamics; John Wiley & Sons, Inc. 1996; pg 10
5. E. Braun; Deciduous Forests of Eastern North America; Free Press 1950
6. W. Clatterbuck. Shade and flood tolerances of trees; University of Tennessee Extension; Fact Sheet SP656
9. Ibid.