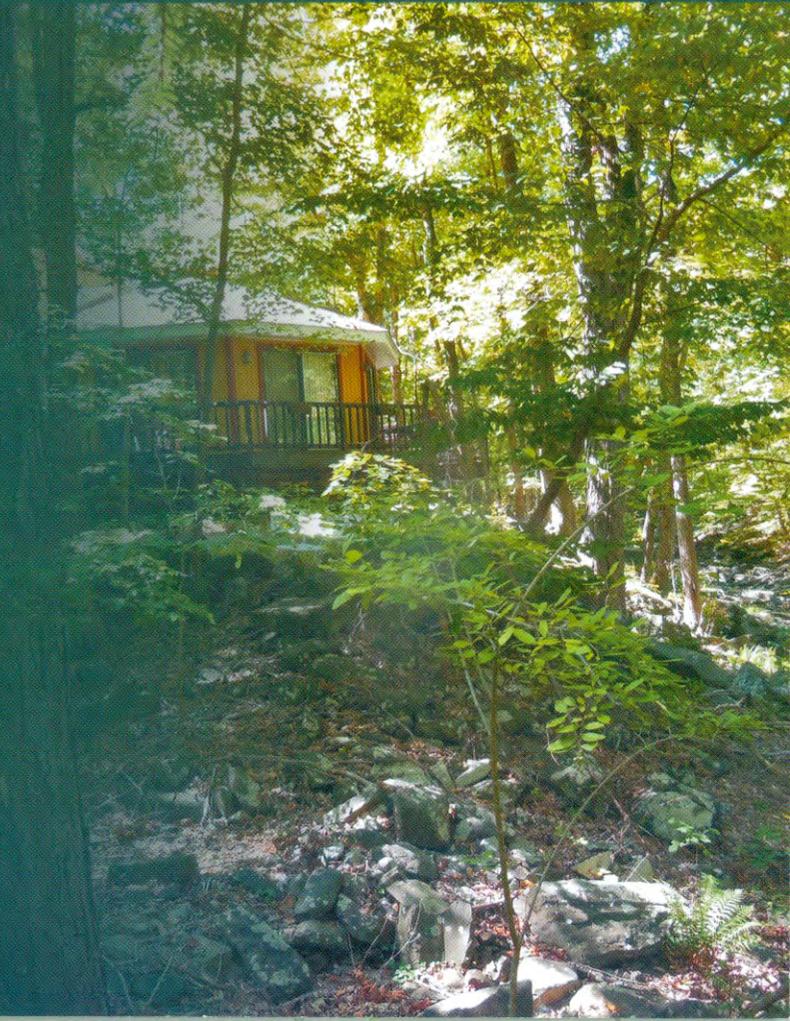


---

# *My Healthy Woods*

A HANDBOOK FOR FAMILY WOODLAND OWNERS  
managing woods in  
New Jersey



# About the Publishers

## ALDO LEOPOLD FOUNDATION

Aldo Leopold (1887-1948), noted wildlife expert, conservationist and writer, understood the importance of the relationship between people and land. The Aldo Leopold Foundation works to weave a land ethic into the fabric of our society; to advance the understanding, stewardship and restoration of land health; and to cultivate leadership for conservation. The foundation is committed to the ongoing restoration of the Leopold Shack and Farm, where, in 1935, Aldo Leopold and his family undertook a revolutionary experiment in returning health to a depleted landscape. Celebrated in Leopold's classic *A Sand County Almanac*, the transformed land now supports vibrant forests, wetlands, and prairie and draws visitors from around the world. First published in 1949, *A Sand County Almanac* has sold over two million copies in ten languages. Leopold's words have inspired many to understand their relationship to land. The foundation's goal is to share the legacy of Aldo Leopold. As long as we care about people, land, and the connections between them, we have hope for sustainable land, economies, and communities.

## AMERICAN FOREST FOUNDATION

The American Forest Foundation (AFF) is a nonprofit 501(C)(3) conservation and education organization that strives to ensure the sustainability of America's woodlands for present and future generations. Our work is critically important to 10 million family forest owners in America, who own more than 264 million acres. Our outreach and education programs nurture and promote the power of private stewardship on America's family forestlands – forests that provide clean air and water, carbon sequestration, green space and critical wildlife habitat; that ensure a sustainable supply of wood and paper products; that support rural economies; and enrich our quality of life. AFF's educational programs prepare citizens to make thoughtful, reasoned decisions about the future of forests, and related natural resources. We provide tools and resources to cultivate and support a network of conservation and research partners who can advance AFF's conservation goals.

*Primary author:* Steve Swenson, Aldo Leopold Foundation  
*Primary design:* Jeannine Richards, Aldo Leopold Foundation

New Jersey edition

*Author:* Dr. Mark Vodak, Rutgers Cooperative Extension  
*Author and design:* Mandy DiMartino, NJ State Forestry Services  
*Design:* Christina Yuncza, NJ State Forestry Services

Jon Carlucci



Rosa Yoo



Dan Jeffrey



# Contents

Introduction ..... 2

Where does my land fit in the big picture? ..... 4

My woods are a whole system ..... 7

What types of woods do I have? ..... 12

Managing change in my woods ..... 26

Invasive species in my woods ..... 30

Prescribed fire: A hot topic ..... 42

Wildlife depend on my woods ..... 47

Tending my trees: creating a sustainable and healthy forest ..... 53

Other products from my woods ..... 59

Planning...Do I need to? ..... 66

Thinking long-term: What are my opportunities? ..... 71

Financial support for action ..... 75

Afterward: Where do my woods and I end up? ..... 80

Handbook partners ..... 82



# *Introduction*

Charlie Newlon

**When you step away from the outside world into your woods, what do you enjoy?** Perhaps you seek a quiet escape, the adventure of a great hunt, or simply the time shared with family in nature. You may appreciate fragrant flowers along your walking trail, the potential value of vigorous trees, or a glimpse of the red-headed woodpecker that has taken residence in a snag. These environmental, economic, and emotional rewards are the product of a good relationship between you and your land. This handbook will help you build that relationship.

*The landscape of any farm is the owner's portrait of himself.*

Aldo Leopold, "The Farmer as a Conservationist," (1939)

## **Your relationship with your land**

You will find that you go through different stages in your relationship with your land. At first, you may expect little beyond what is freely given, you appreciate the simple experiences such as when you see wildlife, find a big tree, hear birds singing, pick out a hunting spot, or enjoy fall colors.

**Conflict**—As expectations for your land take shape, the relationship demands more effort and planning on your part. You may encounter conflicts when you try to align your vision with your land. For example, you may struggle to establish a tree species in an area where it is poorly suited. As expectations grow, it becomes increasingly necessary for you to create a plan for your forest. A plan ensures that your relationship with your land doesn't fall apart when the going gets tough.

**Cooperation**—After you have successfully worked through problems with your land, you reach a stage of cooperation. The emphasis shifts from “me” to “we.” You’ll find that you begin to choose actions that are more acceptable to both you and the land. For example, you choose to plant tree species well-suited for the site, even when it’s a compromise from what you had originally both wanted. This stage can lead to lasting solutions that suits both people and land.

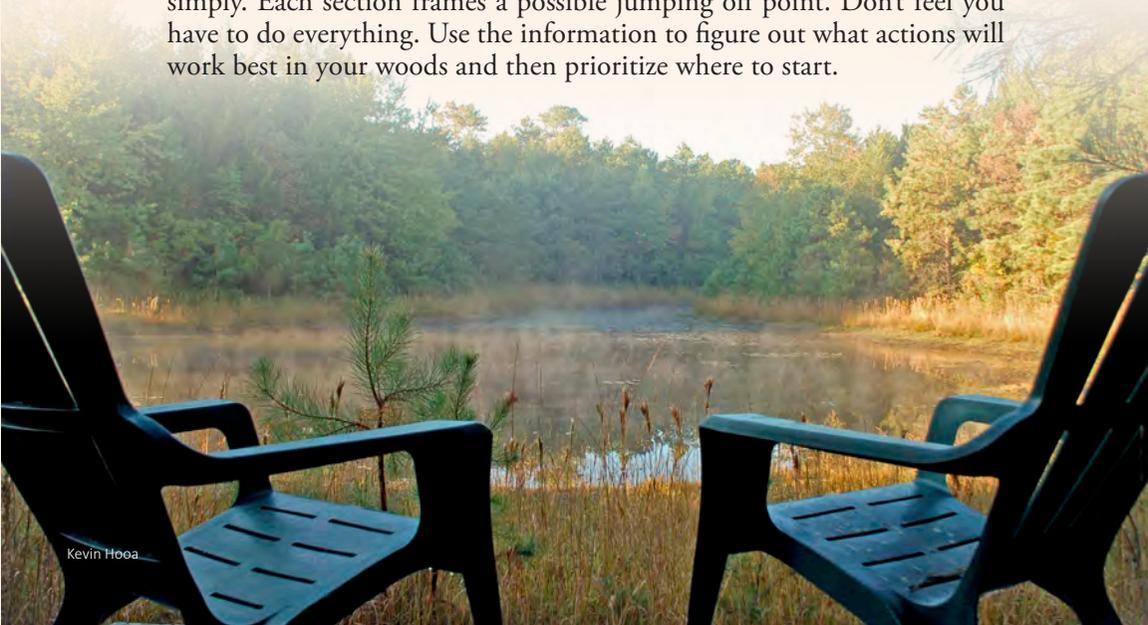
All of the practices in this handbook are aimed at finding ways of cooperating with your woods. Timber harvest ideas, invasive species control, and prescribed burning all benefit your land and promote values that may be important to you, such as natural beauty, wildlife, hunting, and economic returns—the rewards of a mutually beneficial relationship.

**Commitment**—After years of cooperating, you will feel a sense of commitment to your land. At this point, you are comfortable in the relationship. You know your land, warts and all, better than anyone. While earlier in the relationship the land’s limitations frustrated you, you now accept them as boundaries. You and your land have a history, and it is difficult to imagine yourself outside of this relationship. The attachment you feel is a great reward in itself, and the more you continue to work with your land, the richer other rewards become.

As New Jersey’s landscape rapidly changes, use this handbook to help better understand issues facing your woods. We hope this information inspires you to act. Remember even small efforts add up over time, so start simply. Each section frames a possible jumping off point. Don’t feel you have to do everything. Use the information to figure out what actions will work best in your woods and then prioritize where to start.



NJ State Forestry Services





WHERE DOES MY LAND FIT IN

## *The Big Picture*

Nathan Siemers

If you own woods in New Jersey, there is a good chance you have purchased your land recently. The trend has been toward subdividing large parcels of land into smaller ones, while the average length of land ownership has dropped to less than 10 years. More parcels and higher turnover means many new landowners are on the landscape. The majority of these landowners, and perhaps you, have purchased land for personal enjoyment and recreation, such as hunting, viewing wildlife, or for solitude and privacy.

### **Why do trends in the region matter to my woods?**

When parcels of land become smaller and are managed by more landowners, the quality of wildlife habitat, the spread of unwanted plants, timber management, and resilience to natural variations, among other factors, are all impacted. All is not lost, yet certain realities should be kept in mind as you develop your relationship to your land.

If you purchased your land for hunting larger game such as deer and turkey, you may have noticed that these animals move freely between your land and your neighbors' properties. A particular animal's habitat (*or home*) can include a much larger area than your ownership. Non-game species, such as song birds, may rely on a certain area of tree cover for breeding territory—their territories may encompass both yours and your neighbors' land.

Similarly, unwanted plants (*which we frequently refer to as invasive species*) can grow aggressively and spread quickly from property to property. If your woods are surrounded by many neighboring landowners, who each likely create more trails and foot traffic, there are just that many more points of entry for these plants to find your property.

Small parcels of woods also offer fewer options for timber management. If a timber harvest requires a certain volume of wood, then on a larger piece of land, there are more options for producing that volume than on a smaller parcel. On a smaller parcel, you will likely find yourself having to harvest more trees per acre to reach an acceptable economic return.

Your woods are constantly changing. In simple terms, let's assume that change can be toward "darker" or "lighter" conditions in your woods. Both are good, natural, and necessary in New Jersey. "Darker" conditions (*more technically, "succession"*) occur naturally as the current trees create shade, favoring the growth of certain types of tree seedlings. For example, maple seedlings grow well in the shade of oak trees, while oak seedlings do not, so over time the oak woods convert to maple woods. "Lighter" conditions (*more often called "disturbance"*) occur naturally with changes to the current mature trees, increasing the amount of light for tree seedlings. "Lighter" conditions may be created through fire, a timber harvest, or blow-down from wind, benefiting oak seedlings over maple seedlings. Oak woods in New Jersey are declining because "darker" (*later successional*) conditions are now more common across the landscape.

Be aware that all woods are not equal—the history of your property (*grazing, fire, timber harvesting, etc.*) has a great influence on the quality and condition of your woods today. In many cases, the previous landowner's choices creates your options and priorities for your land today. For example, if your woods previously had all the highest-value trees removed (*a bad practice known as "high-grading"*), you will likely have a good deal of work to make it economically productive again.



John Bloomfield

Yellow Rumped Warbler



## Why does what I do on my land matter to the region?

The success of wildlife populations are best measured at a regional level. When changes in individual parcels of land start to be regional trends, wildlife populations begin to reflect those changes. Birds can serve as strong indicators of regional changes because their populations have been studied for a long time at a regional level, and because they have specific requirements for the place they nest and raise young—if their preferred habitat is not present, populations will decrease. In New Jersey, populations of songbirds such as whip-poor-will are in decline because they depend on mixed deciduous woods.

As the trend toward “darker” (*later successional*) conditions in our woods continues across the region, it also means fewer desirable species, particularly oak.

You may have kitchen cabinets or furniture made from oak, and most likely the wood did not come directly from your land, making it difficult to connect our wood products with what is happening in woods somewhere else. But “somewhere else” in New Jersey, red maple and other commercially less desirable species are likely replacing oak and more desirable species because harvest methods don’t regenerate them. Across the region, this trend means that the availability of these species and the businesses that depend on them will have to adapt in coming generations.

*When land does well for its owner, and the owner does well by his land; when both end up better by reason of their partnership, we have conservation. When one or the other grows poorer, we do not.*

Aldo Leopold, “The Farmer as a Conservationist,” (1939)

### More Information:

USDA Forest Service’s United States Forest Atlas: [forest-atlas.fs.fed.us](https://forest-atlas.fs.fed.us)

New Jersey’s Forest Action Plan: [www.forestactionplans.org/states/new-jersey](http://www.forestactionplans.org/states/new-jersey)



MY WOODS ARE

# *A Whole System*

F. A. Martin

Think of your woods like a car—your woods functions as a whole system made up of parts (*also known as an ecosystem*). Some parts are critical, while others are nice to have but have less influence. Nearly every car owner can identify an important part of a car (*e.g., engine*) from a less influential part (*e.g., hubcap*). Learning to see the important parts in your woods can help you create priorities.

## **How are the parts of my woods connected?**

A critical part missing in your car can prevent the whole system from working. Certainly, a car without tires is no more capable of getting you to the grocery store than a lawn chair.

Likewise, the important parts of your woods only work when they are connected to each other. Trees, soil, water, sunlight, insects, fungus, and many more parts are all connected, making your woods function as a whole system. If you were to take away one important part—water, for example—the entire character of your woods would change.

When troubleshooting a system, it is important to see the connections between all of the parts. For example, if your tires wear out faster than expected, you may want to blame the tire manufacturer. However, tire

*The first precaution of intelligent tinkering is to keep every cog and wheel.*

Aldo Leopold, "Conservation," (1946)



wear is connected to wheel alignment, driving habits, road conditions, brakes, wheel bearings, and more. Your mechanic, after considering all the connections, may inform you that your driving habits are to blame.

Similarly, to really understand the process of timber production, a forester will consider all of the connecting parts—annual rainfall, tree species, sunlight, nutrients, soil type, and wildlife impacts (*e.g., deer browse*)—to determine an appropriate tree harvest and how best to regenerate the new trees to replace them.

## How do I know which parts are important?

Some parts of the system are more important than others. To help you determine how significant a part may be, you can ask two questions:

### 1. Is the part common or unique in the system?

**COMMON** – there are many in the system.

**UNIQUE** – there is only one or few in the system.

### 2. Is the part influential or less influential in the system?

**INFLUENTIAL** – can change the system.

**LESS INFLUENTIAL** – does not change the system.

Let's go back to the example of the car. An engine, as a part, is unique (*there is only one*) and influential (*the car will not run without it*). Car doors are more common (*usually there is more than one*) and less influential (*the car will function without them—although less safely!*). Tires are common and influential. You can start to think about the parts of your woods in these terms.

## Which parts of my woods are most important?

There are many important parts that make up your woods, and we will not be able to cover everything in the space of this handbook. We have selected an overview of parts which are unique or have the greatest influence on the whole system. Your woods grow and change every day. Some changes are positive (*new wildlife species*) while other changes can be negative (*invasive species out-competing native species*). But through planning, you can determine your priorities and manage your woods to create a balance between the parts.

## Understanding the Parts

What might be unique today could be common or influential in the future. These categories are designed to help you simplify the complex system that is your woods and prioritize your actions.

	common	unique
influential	 <p>These plants and animals are numerous and change the whole system. Such as when invasive plants left unchecked can spread in your woods and negatively influence other species of plants and animals.</p>	 <p>These are usually processes that can change the whole system. Examples include fire, a southern pine beetle infestation, successive gypsy moth defoliation, and climate change.</p>
less influential	 <p>These species are the most common animals and plants in the region. They generally do not require specific action to be successful and do not greatly influence how your woods functions.</p>	 <p>These rare species may be threatened, endangered, or simply uncommon. Although they don't have much influence on the whole system, some indicate a healthy forest as unique species are usually only found in healthy systems.</p>

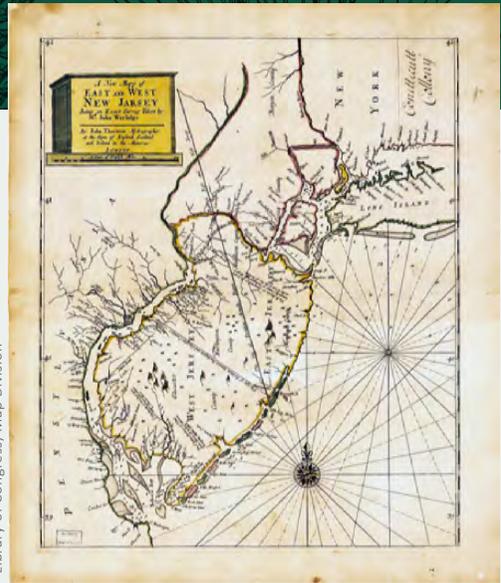
Garlic Mustard, Evelyn Fitzgerald, Warren Grove Forest Fire, NJ State Forestry Services, Raccoons, Timothy Wildey, Yellow Lady Slipper, John Beetham

## How do these parts fit together in New Jersey?

To understand how New Jersey operates as a system, it is helpful to remove the more recent human influences and look back to a point in time often referred to as pre-settlement—roughly, prior to the 1640s. Native Americans had lived on the land for thousands of years and shaped the landscape through practices such as burning. Then European settlement brought many changes, including cities, highways, and agriculture—which affected the whole system.

In the pre-settlement landscape, two parts influenced and helped define how the whole system worked: landforms (*the shape of the land*) and fire. The varied topography of northern New Jersey was shaped by glaciers and the force of running water and erosion as the glaciers receded millions of years ago. The landform was distinguished by south and west-facing slopes exposed to the sun and prevailing winds, and sheltered north and east-facing slopes.

Fire interacted with landform to create the plant and animal communities of the pre-settlement landscape. Imagine a wildfire being pushed by a west wind across a landscape with few barriers aside from rivers. The fire would race up the south and west-facing slopes, scorching any trees growing there, and then move much slower or die out on the cooler and wetter north and east slopes. Oaks withstand fire better than most hardwood trees because of their thick bark, making them common even where fire was a regular influence. The mosaic of burned and unburned areas across the landscape allowed a great diversity of woods to develop and be sustained for thousands of years.



Library of Congress, Map Division

New Jersey Map, 1706

## What does that history mean for my land today?

The influence of fire has probably changed significantly on your land since European settlement. In the absence of fire, tree species that do not tolerate fire well are able to grow. As a result, the oak in New Jersey's mixed deciduous woods are being replaced by the maple, birch, cherry, hickory, and beech that used to only grow in unburned areas. This conversion is a natural process, but it is important to understand what it means for the future of your woods. It is easy to think that today's mature oaks will be naturally replaced by new oaks, but it is almost never true. To find out what your woods will look like in the future, look at the tree seedlings and saplings of today.

### More Information:

New Jersey Threatened and Endangered Wildlife Species:  
[www.state.nj.us/depl/fgw/tandespp.htm](http://www.state.nj.us/depl/fgw/tandespp.htm)

New Jersey Endangered Plants:  
[www.nj.gov/depl/parksandforests/naturalheritage/spplant.html](http://www.nj.gov/depl/parksandforests/naturalheritage/spplant.html)

Arbor Day Foundation's Tree Identification Field Guide:  
[www.arborday.org/trees/whattree/](http://www.arborday.org/trees/whattree/)

# Landowner Story

## The Whites: Bobolink Dairy and Bakehouse Milford Township, Hunterdon County

Nina and Jonathan White moved from Vernon to Milford, NJ in 2010 to expand their Bobolink Dairy and Bakehouse to a historic 184-acre spread in Hunterdon County. They moved into the 1820s farmhouse and modernized part of the somewhat newer dairy barn into a bread making and cheese making facility. Fifty acres of small stands of trees are delineated among the pastures. The trees now average about 100 years old.



Bobolink Dairy and Bakehouse



Bobolink Dairy and Bakehouse



Charlie Newlon



Charlie Newlon



Charlie Newlon

The farm's forested acres are divided into seven forest stands varying in size from 3.5 to 11 acres and lie on eight different soil types. The major timber species are ash, black oak, northern red oak, and sugar maple. Black walnut, black cherry, hackberry, and white oak are scattered in some of the stand.

While the levels of invasive species are relatively low throughout the stands, the potential for their growth is high and their management is a challenge. Most stands lie on gentle slopes except for one stand on a south-facing slope that has a ravine used by the dairy herd for loafing, shade, and protection from severe storms. The Whites will cut vines and control invasive plants to protect the higher-quality walnut trees.

A timber sale in the 11-acre stand to selectively remove about 80,000 board feet of timber of about 50 percent ash and 50 percent northern red oak trees. The goal was to salvage standing trees damaged or felled by Superstorm Sandy, harvest ash before the emerald ash borer arrives, to restrict movement of the ash logs, and directionally fell trees so as not to damage sugar maples planed for maple syrup operation.

And as the name suggests, bob-o-links, small birds that nest in the pastures, can be seen here. You will know them by their black under parts and white backs, kind of like a tuxedo worn backwards. Learn more at: [www.cowsoutside.com](http://www.cowsoutside.com)



WHAT

# *Types of Woods*

DO I HAVE?

Charlie Newlon

From the expansive views from the mountain ridges of the Ridge & Valley and Highlands areas in the northwest and north, to the rolling hills of the Piedmont in the central part of the state, and the flatter, sometimes sandy soils of the Coastal Plain in the south, New Jersey has a varied and striking landscape. Although a few types of forest cover most of the landscape, elevation, aspect (*the direction a slope faces*), moisture, and soil type determine the types of trees and other plants growing on a particular site.

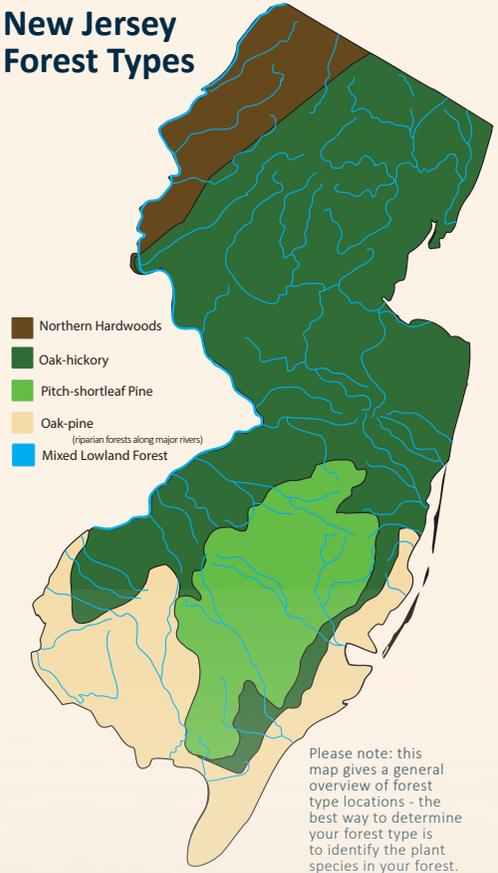
The vegetation growing on cool, moist, well-drained, fertile sites in northern New Jersey will vary greatly from that growing on the drier, sandier, fire-prone sites in the pinelands. Understanding what type of woods you currently have or could potentially have can help you see your land for what it is, and what it is capable of being. For example, a forest growing on a dry, south-facing sandy soil will grow trees more slowly than on a moist, deeper, north-facing soil. Both sites support different tree, plant, and animal species—the value of a physically diverse landscape.



In the previous section, we referred to your land as a whole system, or ecosystem. An ecosystem is made up all of the living (*trees, flowers, wildlife, etc.*) and non-living (*bedrock, water, soil*) parts of the system. In this section, we will describe common types of forests, or natural communities. Natural communities are simply the living parts in the whole system. Natural community names are widely used by foresters, field biologists, and other natural resource management professionals.

Although the boundaries (*dividing lines*) of natural communities are not always distinct and often overlap, in this section we will introduce you to five natural communities occurring in New Jersey: northern hardwoods, oak-hickory, oak-pine, pitch-shortleaf pine, mixed lowland forest, and mixed lowland forest.

## New Jersey Forest Types



Pine seedlings at a nursery



Chestnut oak



Red maple



# Northern Hardwoods



John Beetham

Chestnut Oak



H. Zell

Tulip Poplar Flower



Evelyn Fitzgerald

White Ash

## What is it?

Northern hardwood forests include what are sometimes called maple-beech-birch and white pine-red pine forest cover types. Dominant trees are sugar maple, red maple, beech, yellow birch, sweet birch, and red oak. Many other trees are found in these forests, including tulip poplar, hemlock, basswood, white pine, white oak, black oak, chestnut oak, hickories, elm, white ash, and aspen.

## What maintains it?

These forests generally occur on rich, well-drained soils, and are the product of succession, the gradual replacement of one group of species with another. While farming and the use of fire have historically greatly influenced species composition, fire becomes less of a factor in determining species composition as species such as maple, beech, and birch become established. Deer density, however, must still be considered when maintaining northern hardwoods.

## Where is it found?

Northern hardwood forests are found primarily in the Ridge and Valley and Highlands sections of the northern part of the state. They sometimes extend into the Piedmont in Central Jersey. They are generally found on fertile, moderately moist (or “mesic”) soils, and commonly on middle and upper slopes of north and northeast-facing slopes.



Liz West



## How can I recognize it?

Look for sugar maple, birch, beech, and red oak. Hemlock and/or white pine are conifers that could also be present.

## What common plants can I find in northern hardwoods?

Many plant species can be present in the northern hardwoods community. Spicebush, arrowwood, witch hazel, and blackhaw are shrub species; violets, anemones, and woodland aster are wild flower species; and there are a variety of grasses, sedges, mosses, and ferns.

## What animals can I find in northern hardwoods?

Black bear, coyote, wood thrush, ovenbird, marbled salamander, and wood turtle are examples of the many animal species that can be found in northern hardwood forests.



Black Bear



Violet



Hooded Warbler



Morristown National Historic Park



Kelly Coigan Azar

Scarlet Tanager

## *Oak-Hickory*

### **What is it?**

Oak-hickory forests are found throughout the state on soils ranging from dry to well-drained but retaining some moisture (or “*dry-mesic*”). Dominant species are white, red, black, chestnut, and scarlet oaks; pignut, shagbark, and mockernut hickories. Other tree species include tulip poplar, sugar maple, red maple, elm, black cherry, and black walnut. Depending on the site and successional stage, some eastern redcedar and yellow pine species (which include *pitch, shortleaf, and Virginia pines*) may also be present.

### **What maintains it?**

On many sites and in different areas of the state, frequent disturbance and fire resulted in the predominance of oak species. On sites with moderate soil moisture and infrequent disturbance, many species may have been able to thrive in this community type. Where harvesting has occurred in this forest type with little or no attention to oak regeneration, shifts have occurred in the community toward fewer oaks with more species such as red maple, elm, tulip poplar, and black gum.

## Where is it found?

Oak-hickory woods are found on a range of sites, including steeper slopes, ridge and hilltops, and upland areas of the piedmont and coastal plain. They are found on soils with fertility ranging from poor to moderately rich, and soil moisture ranging from dry to moderate, but well-drained.

## How can I recognize it?

Oak-hickory woods are quite common. Well over 50 percent of the dominant trees will be oak, primarily red, white, and black oaks, with some chestnut, scarlet, or southern red oaks on some sites. The most common hickory species are shagbark, pignut, and mockernut.

## What common plants can I find in oak-hickory forests?

Shrubs, herbaceous plants and wildflowers are quite diverse in this forest type. Maple-leaf viburnum, witch hazel, and blueberry; white wood aster, rue anemone, and various fern species; and jack-in-the-pulpit, wild geranium, and partridge berry are examples of other associated plants in the oak-hickory community.

## What animals can I find in oak-hickory woods?

Animals found in the oak-hickory community include wild turkey, great horned owl, black bear, grey and red fox, scarlet tanager, wood thrush, black snake, eastern box turtle, and red-backed salamander.



Highbush Blueberries



Eastern Box Turtle



Jack-in-the-Pulpit

James Van Gundy

Patrick Coiro

Fritz Flohr Reynolds



Charlie Newlon



John Beetham

Sassafras

## *Oak-Pine*

### **What is it?**

Oak-pine forests are forests in which upland oaks are the dominant species, composing 50 percent or more of the forest composition. Pines compose 25 percent to 50 percent of the forest. White oak, black oak, chestnut oak, scarlet oak, and red oak are the most common oak species. Pitch pine, shortleaf pine, and Virginia pine are the predominant pine species. Associated species include black gum, sweetgum, sassafras, beech, and hickory.

### **What maintains it?**

Infrequent and low intensity fire enables the oaks to dominate and provides the diversity of species found in this community. Higher fire frequency and intensity, especially on drier sites, will favor a change to a pine-dominated community over time. Harvesting requires special attention in order to insure that new oaks, and not pine, replace the oaks that are removed.

## Where is it found?

Oak-pine woods are found on dry, rocky ridge tops in Northern NJ and the dry to dry-mesic uplands of the piedmont and coastal plain in the central and southern parts of the state.

## How can I recognize it?

On dry, well-drained upland sites, look for woods that are predominantly mixed oak and pine. The pine will compose a significant percentage—25 percent to 50 percent—but oaks will make up 50 percent or more.

## What common plants can I find in oak-pine forests?

Common plants in these woods include dogwood, sassafras, spicebush, sumac, and may apple on more mesic sites; scrub oak, huckleberry, and wintergreen on dry, well-drained sites.

## What animals can I find in oak-pine woods?

Animals found in these woods may include red-tailed hawk, gray squirrel, white-tailed deer, red-headed woodpecker, white-eyed vireo, whip-poor-will, corn snake, and carpenter frog.



Mike Van Valen

Carpenter Frog



Kelly Colgan Azar

White-eyed Vireo





Keith Survell

Jamie Richmond

Pitch pine

# *Pitch-Shortleaf Pine*

## **What is it?**

Elsewhere, this forest community is known as loblolly pine-shortleaf pine; but loblolly is native to only a few areas in South Jersey and is not abundant. Pitch pine, on the other hand, is the state's most abundant pine. Pitch pine-shortleaf pine woods are basically pine forests. Fifty percent to 100 percent of the trees are pine, where pitch pine, shortleaf pine, and Virginia pine are the most common species. Associated species include black oak, white oak, chestnut oak, scarlet oak, blackjack oak, post oak, black gum, southern red oak, and hickory.

## **What maintains it?**

A history of disturbance, frequent and often intense fire, and sandy, poor, dry, to excessively drained soils maintain this forest community.

## **Where is it found?**

Pitch pine-shortleaf pine woods are commonly found on sandy, upland soils that are dry and nutrient-poor. This is the predominant forest community

on the Outer Coastal Plain in South Jersey known as the Pinelands, which occupies almost one-quarter of the state. This forest type can be found as far north as Middlesex County in central New Jersey.

### How can I recognize it?

Look for woods that are primarily pine, with a mix of oaks in the overstory and understory, growing on dry, sandy soils.



Alejandro Erickson

Red crossbill

### What common plants can I find in pitch pine-shortleaf pine forests?

Common plants in these woods may include many small woody plants such as huckleberry, blueberry, sheep laurel, and mountain laurel; shrub oaks such as bear oak, scrub oak, and chinkapin oak; and grasses and herbaceous plants such as little bluestem grass, turkeybeard, bracken fern, gallberry, and sweetfern.

### What animals can I find in pitch pine-shortleaf pine woods?

Animals found in these woods include rufous-sided towhee, red squirrel, American redstart, Carolina chickadee, Pine Barrens tree frog, pine warbler, big brown bat, northern pine snake, pine barrens tree frog, and timber rattlesnake.



Pine Barrens tree frog



Anthony Bley, U.S. Army Corps of Engineers

An aerial view of the wetlands of Cape May, NJ

# *Mixed Lowland Forest*

## **What is it?**

Mixed lowland forest includes what is also called floodplain forest, bottomland forest and oak-gum-cypress cover types. Species vary from the swamps and floodplains of the Ridge and Valley and Highlands regions of North Jersey to those of the Piedmont and Coastal Plain of Central and South Jersey, but can include red maple, ashes, basswood, tulip poplar, black gum, hornbeam, hophornbeam, elm, silver maple, swamp white oak, willow, sycamore, box elder, and river birch in northern and central New Jersey; sweetgum, tulip poplar, beech, pin oak, willow oak, southern red oak, sassafras, sweetbay, black gum, red maple, swamp white oak, and Atlantic white-cedar in southern New Jersey.

## **What maintains it?**

Species of this community are adapted to wet soils, high water tables, and frequent flooding.

## **Where is it found?**

Mixed lowland forest is found on floodplains of rivers and streams and in freshwater swamps.

## **How can I recognize it?**

Look for standing or slow-moving water, wet soils and frequently flooded areas along streams and rivers dominated by water-tolerant trees such as red maple, silver maple, box elder, willow, river birch, black gum, pitch pine, sweetbay, sweetgum, and Atlantic white-cedar.

Andrea Pokrzywinski



Sphagnum moss

John Beetham



Trout Lily

## What common plants can I find in mixed lowland forest?

A great variety of plants can be found in this forest type, depending on water table, elevation, flooding frequency, and region. Common plants include spicebush, witch hazel, alder, buttonbush, elderberry, skunk cabbage, cinnamon fern, marsh marigold, sensitive fern, may apple, trout lilies, and cardinal flower in the northern and central regions; and arrowwood, blueberry, sweet pepperbush, leatherleaf, fetterbush, swamp azalea, chain fern, sphagnum moss, swamp pink, sundew, and starflower in southern New Jersey.

## What animals can I find in mixed lowland forest?

Animals found in these woods include bald eagle, red shouldered hawk, Acadian flycatcher, green heron, beaver, muskrat, wood duck, painted turtle, spotted turtle, and wood frog.



Bald Eagle

Art Goldenberg

# *Landowner Story*

## **Betty April: From Cranberries to Pines** *Upper Township, Cape May County*

The Morris April Brothers Eatmor Cranberries Division operated a cranberry growing, canning, and packing business that thrived for over 50 years. The remnants of the packing building still stand where cranberry sauce was made and canned on the second floor while packing and shipping bustled until 1982.

Today the packing house ruins stands amid a thriving, 202-acre managed pine forest with upland pine and oak and wetland pine/hardwood trees that stretch for thousands of acres. Belleplain State Forest and Peaslee Wildlife Management Area along with a few private residences flank April's property.

### ***79.5 acres even-aged mixed oak***

The oaks in this stand are of firewood quality. Over the next 10 years, small group-selection harvests totaling about 150 cords of oak will create additional age classes. In the next 20 to 40 years, the management will encourage a mixed species stand with some legacy older trees retained.

### ***12-acre white pine***

The tree quality is excellent and most are of sawlog size. The stand was thinned and defective and suppressed trees were removed to establish a stand of white pine.

April plans to harvest the white pine sawlog overstory and 125 cords of mature white oak to allow the stand to regenerate as a white pine/oak/pitch pine stand. The irregular shape of the harvest will also provide a unique early successional habitat to benefit wildlife.

### ***36-acre old field***

About half of this field has been replanted with pitch pine. Despite a severe tip moth infestation and ice storms, the pines are doing well. They average 18 to 20 feet tall and 8 inches in diameter at breast height (measured at 4.5 feet) and have been hand-thinned once. They will be pruned and prescribed burned to allow sunlight to reach the forest floor and promote regeneration of native plants and shrubs.

Over the next 10 to 40 years the planted pines will develop into a mature pitch pine stand with a native blueberry/oak understory. The other 18 acres of the old field have some natural pine and sweetgum regeneration.



### ***19-acre scrub/shrub wetland***

This stand's overstory features black gum, sweetgum, and red maple with sphagnum moss on the forest floor. It provides diverse habitats with the mix of trees, highbush blueberry, and greenbriar. Because of environmental sensitivities, no commercial tree harvest will occur during this 10-year plan period. A prescribed burn will improve habitat for both the tiny Cope's Grey and Pine Barrens tree frogs.

### ***18.5-acres pitch pine***

The overstory is primarily dominant or co-dominant sawtimber size pines with occasional red maple or sweetgum as an understory. Shrub understory varies from lowbush blueberry and spicebush. In the wetter areas highbush blueberry and greenbriar dominate. One part of this stand has a pond which offers potential breeding habitat for treefrogs, and another part of the stand will require small patch clearcuts which will add habitat diversity. This work will also remove a small southern pine beetle infestation. Scarification from logging activity will aid natural regeneration to insure a native forest type remains on these patches.

### ***19-acre young oak and pine***

This was originally part of the even-aged mixed oak stand but timber harvests of the early 1990s have changed the stand structure. Species composition is even-aged mixed oak, and stand regeneration has been very successful by both seed and coppice reproduction. Many seedling and saplings are 10 to 15 feet tall and will be hand-thinned. The large seed trees will be allowed to grow to provide hunting perches for raptors feeding in this young forest.

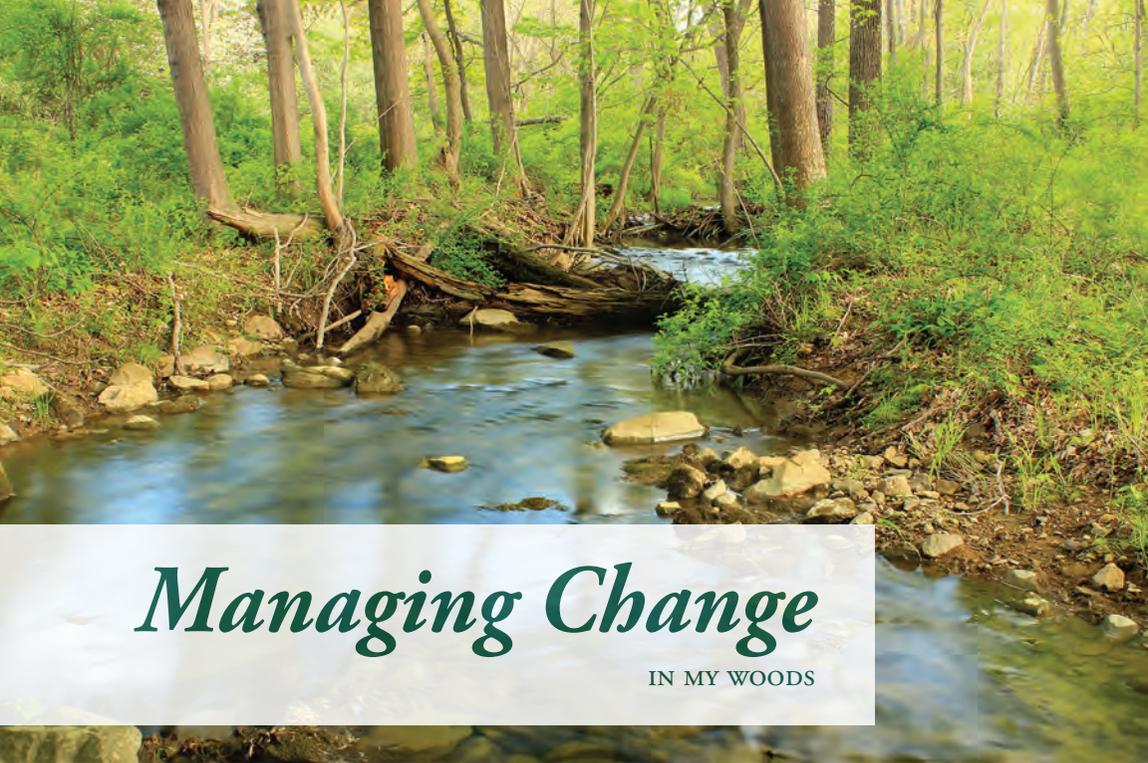
### ***18-acre Tarkiln Pond and scrub/shrub wetlands***

This area once formed the core of the cranberry bogs. Low level management is planned here. Wood duck boxes will be randomly placed and several large pines will be girdled to provide dead snag perches for raptors to hunt the pond.



Charlie Newlon





# *Managing Change*

IN MY WOODS

Nicholas A. Tonelli

A plant you have never noticed before and don't recognize is spreading along a trail; a centuries-old open-grown oak has young trees growing up between its broad spreading branches; the mature trees in your woods are of different species than the saplings; and different wildlife wander your forest as it has grown over the years. All of these indicate change in your woods.

That quickly-spreading new plant is most likely an invasive species. The old oak probably used to be surrounded by fields or pasture. The current mature trees now create conditions where other species of seedlings and saplings thrive. As trees mature and shade more of the ground below, plants that initially attracted certain wildlife species are no longer common.

The ability to notice and anticipate changes can help you make wise decisions about the future of your forested land. As a landowner, each decision you make can help the woods change in beneficial ways and avoid change where it is a problem. Remember, some parts of your woods are more influential than others, and managing the most influential parts can help you manage change.

## **Wildlife**

Whether for deer, turkey, or songbirds, many people purchase land to enjoy wildlife. Wildlife can both create and indicate change in your woods. Some animals, such as deer, can negatively affect your woods if they become too abundant. The presence or absence of certain wildlife species can indicate change in your woods, too. Rare or unique species do not usually live in degraded areas, so their presence may indicate that your woods are healthy.



## **Invasive species**

Invasive plants and animals are capable of multiplying rapidly and taking over your woods, negatively impacting desirable plants and animals. Invasive species are often from other parts of the world and have no natural enemies to control their spread.

## **Fire**

Fire has historically been a major force on New Jersey's landscape. It still shapes the pinelands of South Jersey, an ecosystem that has evolved with fire and is "fire-adapted." The oak-dominated, wildlife-rich hardwood forests we have today were established, in part, from periodic fires. In the absence of fire, non fire-resistant trees have flourished, changing the woods. Most dramatically, woods that used to be open are now dense with trees that are mostly non-oak species such as maple, birch and gum.

## **Succession**

Your woods are dynamic—constantly growing and changing over time. Because of these changes, regardless of how idealistic it may sound, you can't truly "preserve" a forest in a single stage. Forests go from treeless grassland or low-growing herbaceous, shrubby vegetation, to a "climax" forest 150 to 200 years or more later.

Different plant and animal species depend on each stage, so it's ideal to have a variety of forest ages to accommodate a diversity of species. For instance, turkey, box turtles, and owls all use open grasslands, fox and grouse require older, later mid-successional habitats with maturing trees and defined understory plants, while many bird species require mature late-successional forests.

Early successional stages of a forest, where the forest is regenerating after a storm or harvest, are also quite important for many plant and animal species. Due to the historical development of New Jersey's forests, there is a successional imbalance across the state's forests, with an abundance of middle successional stages with maturing and mature trees, fewer older growth forests, and a particular need for more early successional forests.

## **Tree harvest**

Harvesting trees causes change you can easily see. With planning, harvesting can create change that is predictable and beneficial and help bring your forest back to the open young forest that is rare and valuable in New Jersey. But without forethought or the insight of a professional forester, a harvest may cause changes that you did not anticipate and may not want. The way you manage your woods after a harvest builds the foundation for future harvests.

## Climate

The earth's climate is always changing. The speed and amount of change and its impacts are challenging to predict. Some changes take place slowly and may not be immediately obvious, but all are important because climate is an influential part that can change the rest of the system. Even changes in climate elsewhere in the world may ultimately have an effect on New Jersey's climate.

### How is the climate changing?

Over the past 100 years, temperatures have become slightly warmer. This likely had some effect on bird migrations, growing seasons, when flowers bloom in the spring, and ocean levels along the coast. It is expected that over the next 100 years our temperatures will continue to increase.

Each plant—including trees, shrubs, and wildflowers—has a regional range where it is capable of growing. Some trees can grow throughout the entire eastern United States, while others are found only in the north or only in the south. A warmer climate would mean that the northern species will have less and less area in which to live and the southern species will expand northward.

### FIELD EXERCISE: Keeping an eye on phenology



Laura Gooch

Prothonotary warbler



Dave Powell

Lupine

Phenology is the study of the timing of seasonal events such as when flowers bloom or birds migrate or breed. As the climate warms, some of these events now occur earlier than they did in the past. For example, flowers like columbine and lupine now bloom a week or two earlier than they did 75 years ago. Some migratory birds, such as prothonotary warblers, arrive earlier, too. Not all species respond the same way to a warming climate, which can cause problems. If, for example, a flower blooms before a pollinator is available to pollinate it, the flower may not produce seeds for the next generation. You can keep track of phenology on your land—write down dates events first occur in spring. Then compare your records from year to year for patterns of change. You can also contribute your records to National Phenology Network, [www.npnusa.org](http://www.npnusa.org), or Project BudBurst, [www.budburst.org](http://www.budburst.org).



On October 29, 2012, Superstorm Sandy caused severe flooding and downed millions of trees across the state.

Master Sgt. Mark Olsen, US Airforce

### **How will our woods adapt to changes in climate?**

Climate change produces winners and losers. In New Jersey's northern woods, sugar maple, birch, and hemlock would be the losers under a warmer climate, and would begin to disappear. Warmer and drier summers create longer droughts and more wildfires, making drought and fire-adapted plant communities and the oak, hickory and pine species associated with them, the winners.

Resident birds, such as chickadees and cardinals, may start nesting earlier, putting migratory songbirds at a disadvantage. A major concern is that our woods may not adapt quickly enough to respond to the change in climate. It is possible that tree species may not be able to shift north fast enough (*acorns or other heavy seeds are generally not transported long distances by animals*), so forests may have a difficult time adapting to changes if some of the more southern trees are not already locally present. Keeping track of changes happening on your land can give you valuable information that you can use in the future to help your woods adapt to a changing climate.

### **How does the climate affect my woods?**

It is important to realize that predictions are just that—predictions. No one knows for certain what climate change will mean for New Jersey or to what extent the climate will change, but some scientific models forecast that the trends will be toward:

- Wetter winters (*more rain*) and drier, hotter summers
- More frequent spring floods, summer droughts, forest fires, and damaging storms
- Change in tree species distribution that could change the forestry industry and wildlife populations
- Increase in disease and non-native insect population incidence

### **More Information:**

New Jersey Climate Adaptation Alliance: [njadapt.rutgers.edu/nj-climate-brochure/file](http://njadapt.rutgers.edu/nj-climate-brochure/file)

The American Forest Foundation: [www.forestfoundation.org/forests-and-climate-change](http://www.forestfoundation.org/forests-and-climate-change)



# *Invasive Species*

IN MY WOODS

A.M. Dougherty

Invasive species are generally non-native plants or animals that easily invade your woods and displace or out-compete more desirable native species. Over time, they significantly reduce the quality and integrity of your woods. For example, if you plant tree seedlings but they are unable to compete with invaders, what will that mean for the future of your woods?

Often invasive plants and animals spread rapidly because their natural predators don't live here. In other words, they are not playing by the rules that govern native species, and their sky-rocketing populations can significantly change your land.



Kelly Colgan-Azar

The parasitic brown-headed cowbird lays eggs in nests of other bird species—here a wood thrush takes care of a cowbird nestling at the expense of its own offspring.

## **Other invasives**

Although invasives are often non-native, sometimes native species can become overabundant and invasive too. White-tailed deer is an example of native mammal that may be locally abundant to the point of interfering with your woods. Invasives can also be pathogens such as dogwood anthracnose, or a bird such as the brown-headed cowbird.

## How do I know which invasives to look for?

Here, we provide summaries of two different types of invasives—plants and insects—that impact New Jersey woodlands. We profile three insects (*emerald ash borer*, *southern pine beetle*, and *gypsy moth*), a non-woody plant (*Japanese stiltgrass*), and a tree (*ailanthus*). Note that some invasive insects and diseases have a preference for one tree type, such as the emerald ash borer, which targets ash species. If you know which tree species you have, you'll know which invasives to keep an eye out for.

You might find that these profiled invasives aren't in your woods, but keep in mind that there are numerous other invasive species that could be in your woods. Also, there are likely to be new ones arriving in years to come—check the NJ Invasive Species Strike Team's invasive species map online or in the app to see a current list of invasives in your area.

### More Information:

Information, pictures, and control measures for invasive plants, animals, and pathogens: [www.invasive.org](http://www.invasive.org)

The NJ Invasive Species Strike Team, latest status on invasives and a smartphone app: [www.njisst.org](http://www.njisst.org) [www.njisst.org/NRCSGrant.htm](http://www.njisst.org/NRCSGrant.htm)

NJ Audubon Society's guide to controlling invasive species: [www.njaudubon.org/SectionConservation/StewardshipProgram.aspx](http://www.njaudubon.org/SectionConservation/StewardshipProgram.aspx)

### FIELD EXERCISE: An ounce of prevention

Monitor the health of your land. In early spring or late fall, walk your property (*on and off trails*) to look for invasive plants. Many invasive plants green up early in spring or hold their leaves late into fall. These can be great times to look for invasive plants on your property—they usually stand out. Invasives are often brought into new areas by people or wildlife, so make sure to check thoroughly along walking paths and animal trails for invasive plants.



Charlie Newton

## *Invasive Insect Profile: Emerald Ash Borer*



### **Why is it a problem?**

Emerald ash borer (*EAB*) is an invasive wood-boring beetle that kills ash trees by feeding on the tissues under the bark that transport water and nutrients for the tree. It will kill all types of ash trees of any size, age, or state of health. A tree that has been attacked by *EAB* can die within two to four years. It is estimated that this insect has killed more than 50 million ash trees in the U.S. and Canada. Recently, foresters found emerald ash borer also infests white fringe tree.

The metallic-green beetle is native to East Asia and was accidentally imported to the United States. It was found in New Jersey in 2014, and neighboring Pennsylvania and New York both verified infestations several years earlier. New Jersey foresters anticipate a significant impact.

### **How do I recognize it?**

First, identify your ash trees, then monitor for *EAB*. The symptoms of *EAB* are general, so it is important to look for several of the following signs and symptoms to determine if you have it in your woods.

### **Signs**

**UNDER THE BARK:** As larvae feed under the bark they wind back and forth creating S-shaped galleries that are packed with sawdust. Larvae are cream-colored, slightly flattened and have pincher-like appendages at the end of their body. Mature larvae reach 1½ inches in length and are found feeding beneath the bark.

**ON THE TRUNK:** As adults emerge from under the bark, they create a D-shaped emergence hole about 1/8 inch across.

**ADULTS:** Adult beetles are metallic green in color and are 3/8 to 1/2 inch in length and 1/16 inch wide. Adults are flat on the back and rounded on their underside.

### **Symptoms**

**TREE CROWN DIEBACK:** Larval feeding disrupts nutrient and water flow to the upper canopy, thus resulting in leaf loss and crown dieback, beginning at the top of the tree where *EAB* attacks first.



Rodney Campbell

Red Bellied Woodpecker  
woodpeckers are a sign of infestation



Erin Eve

Galleries under the bark



Chris-walts

Purple traps used to detect EAB

**UNUSUAL BRANCHING:** Stressed trees will attempt to grow new branches and leaves where they still can (*just below where the larvae are feeding*), which could be on the main stem of the tree.

**BARK SPLITS:** Callus tissue that develops around larval galleries causes vertical splits in the bark.

**WOODPECKER PRESENCE:** Woodpeckers feed on EAB larvae under the bark. Feeding is typically evident higher in the tree where EAB attacks first.

### How do I prevent it?

Don't move EAB infested wood—harvest firewood in the same area it will be used. EAB beetles, although capable fliers, often establish in a new area when people transport infested firewood from one location to another. If traveling, purchase firewood at your destination. If you have a high-value ash tree, you may choose to treat it with an insecticide to protect from EAB. Contact a tree professional for treatment options.

### More Information:

NJ Emerald Ash Borer Task Force:  
[www.emeraldashborer.nj.gov](http://www.emeraldashborer.nj.gov)



EAB attacks and kills ash species. In New Jersey green ash (pictured) and white ash are most common.

### WOODS WISDOM: Your shoes had better be clean!



Growing up, you may have heard your mother or father yell this to you as you ran into the house. Now, you need to yell it to friends, hunters, loggers, and hikers before they enter your woods. And if you have invasive plants in your woods, clean your boots off when you leave, too. Boots, tires, tools, equipment, and hooves all may carry invasive plant seeds from one place to another, spreading them in your woods and elsewhere.

# Invasive Insect Profile: Southern Pine Beetle



## Why is it a problem?

Southern pine beetle (SPB) creates galleries under the tree bark, girdling the tree. Although native to the U.S., populations of this insect have spread rapidly through much of southern New Jersey, and killed pine trees on thousands of acres. Once a tree is heavily infested, mortality is imminent.

## How do I recognize it?

This beetle attacks New Jersey's native pine species including pitch, shortleaf, loblolly, and Virginia. There are a few other native beetles that will also attack pine trees, but do not usually devastate an area like SPB. To differentiate this serious pest from its look-alikes, study the galleries under the bark—SPB galleries are S-shaped.

## Signs

**ON THE TRUNK:** The most obvious sign of infestation is the popcorn-like pitch tubes on the trunk. On closer inspection you may also see tiny holes in the bark where the beetles exited.

**UNDER THE BARK:** As larvae feed under the bark they wind back and forth creating S-shaped galleries that are packed with sawdust.

**ADULTS:** The beetles are a mere 1/8-inch long and quite difficult to spot.

**WOOD:** Beetles transmit blue stain fungus that appears as a blue-grey discoloration in the wood.

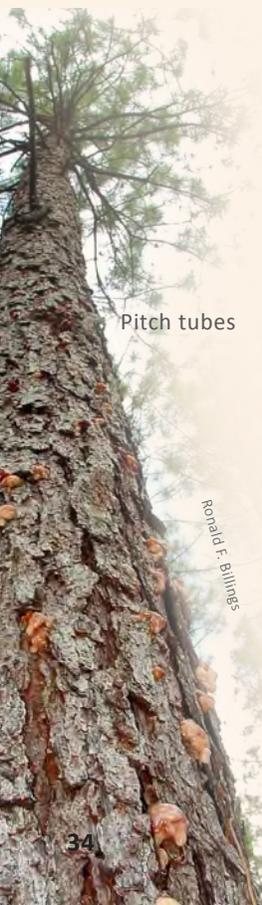
## Symptoms

### TREE CROWN DIEBACK:

The typically green crown of the tree will quickly turn yellow to red then brown.

### CHECKERED BEETLES:

These beetles feed on the smaller southern pine beetles. They are beneficial.





# INVADERS

## How do I prevent it?

You can reduce the risk of SPB infestations by actively managing your forest. Trees under stress become susceptible to the beetle while healthy, strong trees resist beetle attacks. Thinned forests are healthier and more beetle resistant. If you have a single high-value tree, you may want to hire a certified tree expert to spray or inject the tree with an insecticide.

## Treatments

If you suspect you have SPB, act quickly to prevent serious losses. Call a consulting forester or certified tree expert. To stop an infestation, foresters cut actively infested trees and a buffer of green uninfested trees. This stops the beetles from flying to new trees. Unfortunately, once a tree is heavily infested, it can die as quickly as one month from the initial attack.

## More Information:

NJ State Forestry Services southern pine beetle information:

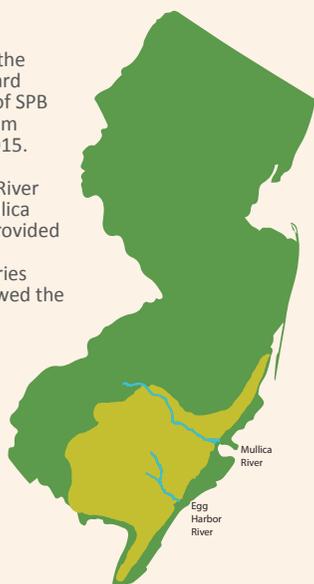
[www.southernpinebeetle.nj.gov](http://www.southernpinebeetle.nj.gov)

Ronald F. Billings



Exit holes on a shortleaf pine. These are approximately half the size of BB pellets and are usually clustered together. Exit holes indicate that the SPBs have matured and left the tree.

Map of the northward spread of SPB in NJ from 2002-2015. The Egg Harbor River and Mullica River provided natural boundaries that slowed the spread.



NJ State Forestry Services

An aerial view of a NJ forest with a southern pine beetle infestation.



# *Invasive Plant Profile: Japanese Stilt Grass*

## **Why is it a problem?**

Japanese stilt grass is very shade tolerant and often inhabits disturbed sites. Since grazing animals such as whitetail deer prefer to eat native species over Japanese stilt grass, the grass may quickly crowd out its competition.

## **How do I recognize it?**

This sprawling annual plant grows up to three feet high and commonly inhabits riparian areas. The leaves are 3 inches long, lance-shaped, and asymmetrical. It has a distinctive silvery stripe of hairs on the center of the top of the leaf.

## **Where does it grow?**

While Japanese stilt grass is shade tolerant and prefers closed canopy forests, it does establish in areas with more light such as ditches, forest edges, and fields.

## **How does it spread?**

The seed disperses in August and spreads by water or hitchhiking on animals, people, and equipment. The plant also spreads by rooting at nodes along the stem.

## **How do I control it?**

It is imperative that Japanese stilt grass is controlled before it can establish and expand. You can remove these plants by hand or mow them annually before they go to seed in August. Alternatively, contact your consulting forester for herbicide options to control stilt grass.



John Beetham

Stilt grass overtakes a forest opening

NJ State Forestry Services



INVADE!

## *Invasive Plant Profile:* *Ailanthus, Tree of Heaven*

### **Why is it a problem?**

This deciduous tree from China was introduced in 1784 near Philadelphia and has since become one of the most prevalent naturalized invasive trees in Northeastern America. Although this tree is shade-intolerant, it is quite adaptable and grows where other species will not. It also releases a toxin into the soil to discourage competitors.



Kerry Wixted

Ailanthus has a compound leaf

### **How do I recognize it?**

Ailanthus has smooth grey bark, a compound leaf, and the crushed leaves have a pungent smell like burnt peanut butter. It produces winged seeds somewhat like a maple tree, called samaras.

### **Where does it grow?**

Unlike other species, ailanthus can tolerate poor soils, rocky uneven surfaces, and droughts. It's often found in vacant lots, along roads, and on disturbed sites. In New Jersey, it is well established in the Watchung Mountains and Palisades.

### **How does it spread?**

A single tree can produce 325,000 seeds a year which are carried by wind and hitchhike on animals and people to a new area. But Ailanthus will rapidly sprout, regenerate, and multiply from its roots and even from cut stumps, which makes it quite difficult to eradicate once it has established in an area.

### **How do I control it?**

Pull ailanthus seedlings by hand before the taproot becomes established, but you must make sure to remove the entire plant, including the roots. Cutting alone will only encourage this tree to re-sprout vigorously. After cutting Ailanthus, immediately treat the stump with an herbicide. You can also spray the leaves with an herbicide. Contact a certified tree expert or consulting forester for more information on control methods.



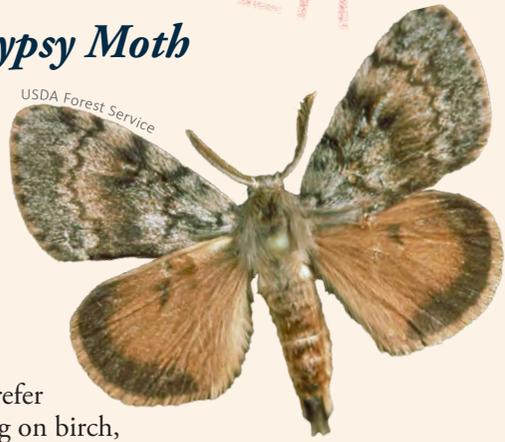
Amadej Tm Koczy

INVASIVE

# Invasive Insect Profile: Gypsy Moth

## Why is it a problem?

The larvae of the gypsy moth feed on the foliage of hundreds of plant species but often target oaks. When populations of the moth are high, trees may look bare in the summer.



## How do I recognize it?

The first caterpillars emerge in May. They prefer oak trees, but you may also see them feeding on birch, sweetgum, ash, willow, apple, other deciduous species, and occasionally pine, too. Note that tent caterpillar, often mistaken for gypsy moth, is less harmful, native, feeds on cherry trees, and can be identified by the stripe down the back and silky tents. Gypsy moth makes no tent.

## Signs

### ON TRUNK AND BRANCHES:

In August until the larvae emerge in May, you may see the buff-colored egg masses on tree trunks, but the moth will also deposit them on woodpiles, buildings, and rocks.



First introduced to the Northeast in 1869, this 1896 photo shows workers hand picking gypsy moth egg masses.



Gypsy moth defoliated Pinelands forest in summer

Chris Pesotki

Steven Katovich



Egg masses

Bob Dluzen



Tiny larvae

Minnesota DNR



Defoliating larva

Pennsylvania DCNR



Pupa

**LARVAE:** Beginning in late April, tiny ¼ inch larvae emerge and grow up to 1 ½ inches by late June. Newly-hatched larvae are black and appear hairy. Older larvae will also appear hairy and have five pairs of raised blue spots and six pairs of red spots along their back.

**PUPAE:** In late June, the larvae pupate by spinning a dark shell-like cocoon, emerging two to three weeks later as adults. You will find the pupae in bark crevices.

**ADULTS:** In July, the moths emerge. Females are white and flightless with thin antennae, males are brown with feather-like antennae.

### Symptoms

**DEFOLIATION:** A tree infested with gypsy moth will have few or no leaves. The tree may re-leaf but may die after multiple consecutive years of defoliation.

### Treatments

During fall until early spring, locate and scrape off egg masses and then soak them in soapy water. Each egg mass contains 500 to 1000 eggs. After larvae hatch, band trees with burlap to catch them as they climb up and down the trunk. Bands must be checked daily to remove and destroy caterpillars.

Insecticides containing the bacteria BT (*Bacillus thuringiensis*) are effective on larvae from late April to late May. BT does not affect late-stage caterpillars or adult moths. For other insecticide treatment options, contact your consulting forester.

### More Information:

NJ Department of Agriculture's gypsy moth program: [www.nj.gov/agriculture/divisions/pil/prog/gypsymoth.html](http://www.nj.gov/agriculture/divisions/pil/prog/gypsymoth.html)

# Landowner Story

## The Dunnes: Forest Stewardship at Woodsedge in All Seasons *Belvidere Township, Warren County*

Charlie Newlon



Shearing Christmas trees

There is plenty to keep Tim and Mim Dunne and their daughters, Lisa and Andrea, busy on their 75-acre Woodsedge Tree Farm all year round. The 75-acre farm is divided into 17 acres of crop land, 1+ acre homestead, and 57 acres of “non-appurtenant woodland.” The Dunnes worked closely with their forest consultant to craft a 10-year Forest Stewardship Plan in 1999; and then updated the plan through 2018. Every other year they prescribe burn to reduce fuels and to rejuvenate a grassland habitat for birds and small mammals in cooperation with a USDA Environmental Quality Incentives program.

### *The Dunne’s Objectives*

- Manage in accordance with Farmland Assessment for reduced property taxes
- Implement forest management practices to enhance forest health and productivity
- Improve and maintain wildlife habitat for a variety of species

### *Woodsedge Products*

Six acres of Woodsedge is a “choose and cut” Christmas tree operation. The entire family built deer fence enclosures and planted the seedling trees in two crop fields during the 2004 planting season. They provide and sell:

- Douglas fir
- Canaan fir
- Blue spruce
- Wreaths
- Wooden ornaments & bowls
- Pumpkins and squash
- Specialty lumber
- Beeswax soaps
- Raw honey

Charlie Newlon



## Woodsedge Forest Stands

### *12 acres of oak-hickory on gently sloping land*

Tree types            oak, hickory, walnut, spicebush

Average DBH\*    14 to 16 inches

The Forest Stand Improvement (FSI) thinning in this stand encourages wildlife habitat by favoring trees with hard nuts and creates slash for brush piles. Trees downed in Superstorm Sandy provide wood for firewood, stock for bowl turning, and lumber for varied projects including bird boxes, a barn, furniture, and craft projects.

### *Six mostly level acres between active crop fields*

Tree types            black cherry, black oak, red cedar, black walnut,  
hackberry, sassafras

Average DBH       11 to 12 inches

With the exception of black walnut, most of this stand is cordwood, about nine cords per acre. The Dunnes plan to kill and remove the invasive multiflora rose and vines and plant desirable species such as black walnut, red oak, and white oak close together to shade out competing vegetation.

### *36 acres of forest wetland*

Tree types            red maple, swamp white oak, pin oak, slippery  
elm, white ash, red cedar, hickory

Average DBH       11 to 12 inches

Largest—36-inch swamp white oak

The vernal ponds provide a special habitat for a variety of salamanders and other critters who survive because predatory fish cannot live in these ponds which dry out in the summer. The Dunnes performed FSI thinning throughout the stand, concentrating on pole-sized timber 5-inch to 11-inch DBH. They also regenerated big-toothed aspen to increase the potential of ruffed grouse habitat.

Working with National Resources Conservation Service, they restored 15 acres of forested wetlands.

The Dunnes are the winners of the 2013 George Pierson Forest Steward of the Year Award. Learn more at: [www.woodsedgetreefarm.com](http://www.woodsedgetreefarm.com).



Charlie Newlon

\*DBH - Standard measurement of a tree's diameter, usually taken at 4 1/2 feet above the ground.



# *Prescribed Fire*

A HOT TOPIC

NJ State Forestry Services

Historically, New Jersey woodlands, especially the Pinelands of South Jersey, and the plants and animals that live in them, were strongly influenced by fire. In order for fire to continue to shape our land today, prescribed fire must take the place of historic wildfires.

Prescribed fire is the intentional application of fire under specific conditions to safely accomplish planned land management objectives including:

**Reduce Wildfire Hazard**—When trained technicians perform a burn under controlled conditions, it removes the build up of leaf litter and other flammable materials on the forest floor. With this excess fuel taken out of the equation, firefighters can more easily take control of a wildfire during the height of “fire season” in early spring and fall.

**Restore Fire-dependant Natural Communities**—Fire is a natural and necessary component of some plant communities such as the pinelands. Periodic fire is beneficial for the regeneration of the trees and wildflowers in these natural communities.

**Maintain or Improve Wildlife Habitat**—Fire can improve habitat for wildlife through increasing plant production (*both quantity of growth and seed production*), availability of browse (*forcing top-killed shrubs to re-sprout*), and creating the specific habitats needed by unique wildlife. For example, red-headed woodpeckers nest in cavities of dead trees and forage in open woods that can be maintained by fire.



NJ State Forestry Services

**Control Competition**—Fire can reduce the encroachment of undesirable shrubs and trees into fire-adapted ecosystems. Fire may only top-kill the shrub or tree, which means it will re-sprout, but top-killing prevents it from competing with shorter wildflowers. Periodic fire may be all that is necessary to keep undesirable plants from encroaching on and possibly taking over certain woodland types.

**Prepare Site**—Fire can be an excellent method for removing built-up thatch or vegetative debris on a planting site and clearing it for seeding or mechanical replanting.

## How is prescribed fire behavior predictable?

Fire behaves in predictable ways based on criteria that can be assessed before and during a prescribed fire. Fire behavior is influenced by conditions of the material being burned—the fuel. Is the fuel type light (*e.g., grass*) or heavy (*e.g., dead logs*)? How much moisture is the material holding? What quantity of fuel is there? A pile of dead logs, for example, can create an intense fire that will likely damage nearby trees. Temperature, relative humidity, and wind also greatly influence how fire behaves. Fire burns hotter and faster with increases in temperature. Relative humidity (*RH*) is the amount of moisture in the air relative to the amount of moisture the air can hold. At a low *RH*, fuels get very dry, making them more easily ignited.

Wind direction and speed are critically important in knowing where the fire will go and how fast it will spread. The shape of the land (*topography*) and the direction a slope faces (*aspect*) are also key to fire behavior. Fire moves uphill rapidly and downhill slowly. If the hill is south-facing, fuels are likely to be drier from exposure to the sun and prevailing south and west winds, making them burn hotter and faster.



Based on an assessment of all these conditions which affect fire behavior and air quality, fire managers determine how to conduct the burn, and prescribe the most desirable weather conditions for a given burn unit. Prescribed fires typically have weather prescriptions for moderate temperatures, relative humidities, and wind speeds. Extremes in weather either will not accomplish your land management objectives or be very dangerous. The assessment of the unit is recorded in the burn plan and the fire manager makes sure all conditions are met on the day of the burn.

## How is a prescribed fire controlled?

A burn plan insures you accomplish your goals and objectives safely. The burn plan contains all of the information the fire manager needs to know about the burn unit: the landowner's goal and objectives, the locations and types of burn breaks, fuel types, desired weather conditions, crew and equipment requirements, hazards, neighbor and emergency contacts, permits, contingencies, and the plan for conducting the fire.

A fire manager will invariably begin a prescribed fire at the farthest spot downwind (*with a west wind, the fire would be started in the spot farthest east*). Then, based on knowledge of the topography, fuels, and weather conditions, the manager will use three types of fire to start, control, and complete the prescribed fire: back fire, flank fire, and head fire.

**BACK FIRE** is a line of fire perpendicular to the wind direction, backing into the wind. Because it is forced to move into the wind, backing fires have relatively short flame lengths (*distance from the base of the flame to the tip*) and slow rates of spread. A fire manager will almost always begin a prescribed burn with a backing fire.

Backing fires burn fuels for a longer duration and at higher temperatures at the ground surface than the other two types of fire. Although the flames



may not be as large, they are no less effective and in some cases more effective in achieving your objectives. For example, in order to top-kill an unwanted shrub, you need to get the entire circumference of the shrub stem up to 145°F—not even as hot as boiling water. Top-killing shrubs is most effective with a slow backing fire in areas where there are combustible grasses or leaves touching the stems.

**FLANK FIRE** is a line of fire that is parallel to the wind direction. The duration, amount of fuel consumed, and temperature achieved are in between those experienced with backing and head fire. This fire is used by the fire manager to move around a burn unit and into the direction of the wind.

**HEAD FIRE** is a line of fire that moves with the wind direction. Because it is being pushed by the wind, head fire spreads quickly and has long flame lengths, making it the most dangerous type of fire. In a basic prescribed burn, head fire is lit only after backing and flanking fire have been used to secure the edges of the burn unit. Then, when the three types of fires meet in the middle of the unit, the fire burns itself out.

Burn breaks around the entire burn unit help to contain the fire by creating a break in burnable fuel along all edges. A typical burn break can be a road, river, agricultural field, burned line, a leaf-blown or raked path, or other non-burnable surface. Breaks are installed prior to the burn and should be at least five feet wide.



Trevor Raynor

Back fire



Charlie Newlon

Pinelands forest regeneration two years after prescribed burn

## How do I conduct a prescribed fire on my property?

Conducting a prescribed fire requires training and experience. It is necessary to secure a permit from New Jersey State Forestry Services.

Private landowners are able to conduct prescribed fires on their own land after obtaining any necessary permits. It is also recommended to contact your homeowner's insurance policy holder about burning on your property.

However, your right is also your responsibility. If your prescribed fire escapes and starts a wildfire, you may be responsible for all suppression costs, and can also be held accountable for any injury or loss of property incurred as a result. It is highly recommended that you work with a professional or someone with prior experience.

### More Information:

Apply for a prescribed burning permit from State Forestry Service's Forest Fire Service. The agency also offers technical advice to applicants. [www.njwildfire.org](http://www.njwildfire.org)

Fire weather: [www.state.nj.us/depl/parksandforests/fire/](http://www.state.nj.us/depl/parksandforests/fire/)

Fire Effects Information System (FEIS) USDA Forest Service has information on the effects of fire on plants and animals: [www.feis-crs.org/beta/](http://www.feis-crs.org/beta/)

### WOODS WISDOM:

#### Light and variable is terrible

If wind has such a strong effect on fire, wouldn't it be best to burn under very light or calm winds?

No, and here is why. In a prescribed fire, consistent wind speed and direction make the fire predictable for an experienced fire manager.

If the winds are calm or light and variable direction, the fire movement is harder to control and becomes dangerous. These conditions risk your safety, personal property, and forest resources.



SHEDDING LIGHT ON

# *Wildlife*

John Beetham

For many landowners, frequent encounters with deer, turkeys, squirrels, and chipmunks and chance encounters with unique wildlife such as foxes, turtles, and salamanders are what they enjoy most about their land. Little or no management is necessary to maintain encounters with more common wildlife like deer and turkey. In fact, it's possible that when these common wildlife species are in great abundance they can change other parts of a property. For example, planted seedlings in a field are easy targets for deer browse. But for more unique wildlife with specific habitat requirements, your land can become more attractive if managed in certain ways. Many wildlife species depend on food and cover provided by native plants in the understory of the forest, such as grasses, wildflowers, and shrubs. These understory plants often only need sunlight to thrive. When it comes to managing your woods, more sunlight equals more wildlife. While it is true that some animals prefer dense woods, there is little doubt that woods full of sunlight have a greater number and variety of wildlife species.

## **What do animals need?**

Food, water, shelter, and a place to breed are the basic needs of all wildlife. Each of these needs must be met either on or near your property for an animal to make its home there. Although these requirements seem basic, different species have different requirements that can vary greatly from one

species to another. Some birds, like the cerulean warbler, require large tracts of woods for breeding; others, like the bobwhite quail, can use smaller areas of open woods; species like ruffed grouse have quite specific cover needs. Understanding what animals are looking for can help determine the management decisions necessary to encourage them to live on your land.

## Dead trees are great habitat

Standing dead trees, or snags, are valuable to wildlife as bird perches, nesting cavities, and places to forage for food underneath loose, rotting bark. Many birds and mammals and a few species of reptiles and amphibians use snags as breeding sites. Dead trees left during a harvest or after a storm provide one habitat while standing, and another after they have fallen and begin to decay.



Marcel Holyoak

Saw whet owl nestlings in a dead tree

Red-headed woodpeckers nest in cavities of dead branches or snags in pine and oak-pine woodlands, while bluebirds will nest in single, scattered snags in old fields and more open areas. Tufted titmice, chickadees and various other woodpecker species use cavities in woods. Barred owls utilize large dead trees, while downy woodpeckers use smaller dead trees and branches.

A wide variety of fallen trees and limbs provide cover, food and growing sites for a diversity of organisms. Small mammals depend on these decaying trees for finding insects to eat and for shelter. Amphibians, such as wood frogs, four-toed salamanders, and red-backed salamanders, use the cool, moist spots under logs as shelter and forage areas. Some warblers, such as the hooded warbler, take advantage of the insects that live in the wood. Dead trees can provide firewood, and many woodland owners feel the need to clean up and remove fallen trees and branches; but leaving them behind can be a big help to wildlife.

Monarch on milkweed, the only plant the threatened butterfly species will lay its eggs.

Henry T. McLin





**Favorite foods** Many species of trees and shrubs produce nuts or berries, often referred to as mast, which have high levels of fat, protein and carbohydrates that give resident and migrating wildlife the energy they need for raising young, hibernation or long-distance travel. The mast available from year to year varies, affecting wildlife populations. A bumper crop of mast due to ideal rainfall at critical times, especially as the trees and shrubs are flowering, will often lead to abundant small mammal populations, which in turn benefit the forest carnivores that prey on small mammals. During winter, some sources of mast remain available to forest wildlife on trees and shrubs, under snow or stored in caches.

**Woods edges** Edges are the places where two dissimilar pieces of land meet—the intersection between field and woods, pond, and woods or field and pond. Some species, like house wrens, robins, brown-headed cowbirds, and cardinals, prefer to live in edges.

**Interior Woods** Wood thrushes, scarlet tanagers, and many warblers and vireos prefer interior of the 300 meters from the edge. They need large patches of woods (*hundreds of acres in size*) to thrive. When they

## Common types of mast:

**Oak acorns, hickory nuts, beech nuts and walnuts**—used by white-tailed deer, wild turkeys, black bear, woodpeckers, wood ducks, blue jays, squirrels, and chipmunks

**Maple and ash seeds**—used by small mammals and many bird species such as evening grosbeaks

**Wild grape**—(*NJ has several native species, including fox grape*) used by numerous bird and mammal species

**Late summer soft mast**—(*cherry, dogwoods, and elderberry*) important for many birds and mammals preparing for migration and winter

**Fall and winter soft mast**—(*persimmon, crabapple, hawthorn, nanny-berry, winterberry*) most important for winter-active wildlife such as cedar waxwings



John Brandauer Fox Grape



Anita Gould

Eastern bluebird

are forced to occupy smaller patches, which is common in New Jersey, they encounter problems. Their nests are more likely to be raided by raccoons or to have additional eggs dropped in the nest by brown-headed cowbirds.

It's best not to create additional edges in a large tract of woods where forest-interior species might be making their home. However in smaller tracts, it is less of a concern since there are fewer species. It's best to let the size of the property, the habitats already present, and the management goals determine the amount and placement of edge.

## Other types of habitat

Besides dense, brushy, or open forests, other parts of your property may also offer food, cover, or water for wildlife. Pasture, cropland, old fields, wet depressions, and creek bottoms can all provide beneficial habitat for wildlife. For example, turkeys need more than just woods. They also need open areas or croplands within their home range.

NJ State Forestry Services

Bluebird box (with predator baffle) at the forest edge





Beneficial plants to have in your woodlands include (from top left) Shagbark Hickory (Jessica Hickman), Elderberry (Bob Peterson), Black Cherry tree (Anita Gould), Bluestem grass (USFWS Mountain-Prairie), New England Aster (Keith Robinson) and Goldenrod (Liz West).

Permanent sources of water are extremely valuable for many species of wildlife. If you are managing for specific wildlife, knowing their water needs is critical for planning. For example, turkeys require one permanent source of water per 160 acres of land; deer need one permanent source per 640 acres; while bobwhite quail get most of their water through the food they eat, so creating a source for them is not necessary.

When managing for wildlife, it is also helpful to have an idea of the habitat types on adjacent properties and neighboring landowners' management activities. The combined opportunities for food, cover, water, and breeding sites offered by your property, as well as your neighbors', directly influences wildlife diversity and management goals and activities.

### **How do I manage my woods for wildlife?**

It is important to work with a forester or wildlife or natural resource management professional to determine the best wildlife management options for your property. With a permanent water source nearby, your woods can provide the basic needs for many species of wildlife if it has a ground cover of native grasses, forbs, legumes, and shrubs. Grasses, wildflowers, and shrubs provide food by producing seeds and attracting insects, and provide excellent cover for many wildlife species. Native grasses and wildflowers include bluestems and forbs, and goldenrods and clovers, respectively. A diversity of shrubs and trees benefits many species of wildlife by providing cover and mast. Blackberry, dogwood, hickory, and oak are all important mast-producers.

The diversity of plant species in the understory and on the ground of your woodlot is determined by many things, but the amount of sunlight reaching the forest floor is the most important. Manipulating the vegetation of your woods by harvesting, thinning, or prescribed burning can increase the light reaching the ground and help manage for plant diversity, tree growth, and wildlife in your woods. Your consulting forester can advise you on the optimal tree density in your woods to meet your wildlife and timber management objectives.



Dawn Huczek

Eastern chipmunk



Mark Moschell

Red-bellied woodpecker

## More Information:

The New Jersey Division of Fish & Wildlife's guide to managing for wildlife: [www.state.nj.us/deplfgw/managing\\_for\\_wildlife\\_guide.htm](http://www.state.nj.us/deplfgw/managing_for_wildlife_guide.htm)

Hunter education study guide and workbook: [www.nj.gov/deplfgw/pdf/hunted/manual-workbook.pdf](http://www.nj.gov/deplfgw/pdf/hunted/manual-workbook.pdf)

Penn State Extension's habitat management information: [extension.psu.edu/natural-resources/wildlife/habitat-management](http://extension.psu.edu/natural-resources/wildlife/habitat-management)

National Wildlife Federation's wildlife habitat information: [www.nwf.org/How-to-Help/Garden-for-Wildlife.aspx](http://www.nwf.org/How-to-Help/Garden-for-Wildlife.aspx)

NJ Audubon's world of backyard habitats: [www.njaudubon.org/SectionBackyardHabitat/Welcome.aspx](http://www.njaudubon.org/SectionBackyardHabitat/Welcome.aspx)



# *Tending My Trees*

CREATING A SUSTAINABLE AND HEALTHY FOREST

EliSagor

Woods after a shelterwood harvest

New Jersey landowners most often own or purchase their woods for recreation, privacy, and enjoyment of wildlife. Cutting trees or harvesting timber is rarely a primary objective. As landowners are often environmentally conscious, “logging,” might conjure up images of land-use change or habitat destruction that we often see with development. But the cutting of trees we talk about in this chapter refers to methods that are used only to improve the forest, not take away from it.

So as you get to know your woods and make plans for its future with your forester, you might just decide that cutting or harvesting some trees will help you meet other goals such as more or better wildlife habitat, wildfire protection, and insect and disease protection, which also creates a healthier, more vigorous woods overall. With proper planning, attention, and tending all of our woods and forests are sustainable and renewable.

## **HOW BIG IS AN ACRE?**

An acre is a common measure of land area. As a square, an acre would measure 208 feet on each side equal to 43,560 square feet—equal to roughly 75 percent of a football field (including the end zones).

## **Harvesting trees to create wildlife habitat**

Presently in New Jersey, there are few young forests—the USDA Forest Service reports that 77 percent of the forests in our state are 41 to 100 years old. When you cut a stand of trees on your property and allow it to re-grow, you’ll be providing important habitat that is a rare commodity for a variety of wildlife species in our state.



‘Habitat’ for wildlife species includes all of the requirements for a species to survive and thrive. Young forests not only provide shelter where animals live, but they also produce food such as grasses, legumes, berries and fruits, and low-lying tree and shrub buds. These foods are not as abundant or may not be present at all in older forest types.

Some wildlife species are in sharp decline because they rely on these disappearing young forests. For instance, the endangered golden winged warbler inhabits forests that are 5-15 years old—young stands that are regenerating after a storm or tree harvest. In fact, the planned removal or cutting and harvesting of trees can benefit quite a variety of tree, plant and wildlife species.

### **Harvesting and regeneration methods that benefit trees and wildlife**

Oak is an important species for timber and for wildlife, so growing or regenerating oak may be a goal or objective for owning your woods. Since the seedlings and saplings of oak, as well as associated species such as hickory and tulip poplar, need light to grow, these trees species are regenerated through cutting methods that more uniformly increase light on the ground: small-scale clearcut, seed-tree harvest, and shelterwood harvest.

Before your mind races to the extreme, clearcut does not mean removing all vegetation. A small-scale clearcut of perhaps two to three acres in your woods removes the trees, allowing enough light for oak seedlings and saplings to grow successfully. Using this method of harvest, you have also just created two to three acres of young forest habitat that is attractive for many species of wildlife.

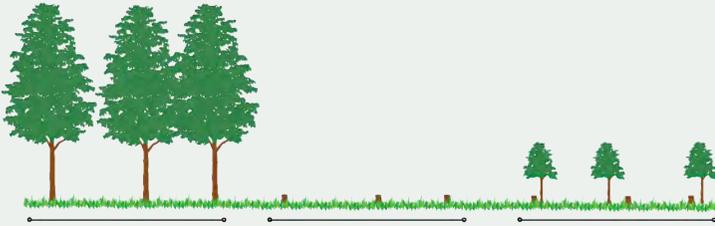
Other methods that might seem less dramatic may also be able to accomplish your goals. The seed-tree and shelterwood harvest methods can also regenerate



Jean-Guy Dallaire

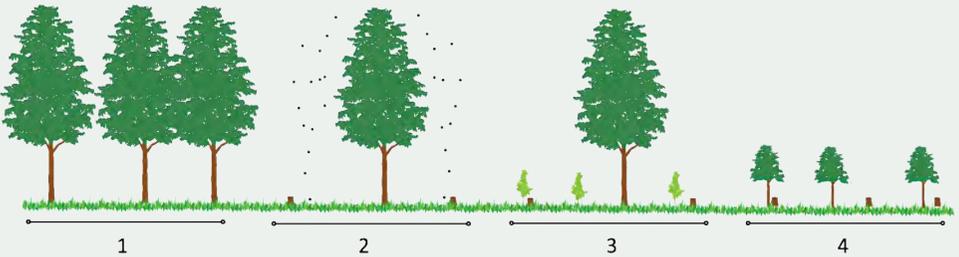
Ruffed grouse in early successional habitat

### SMALL-SCALE CLEARCUT



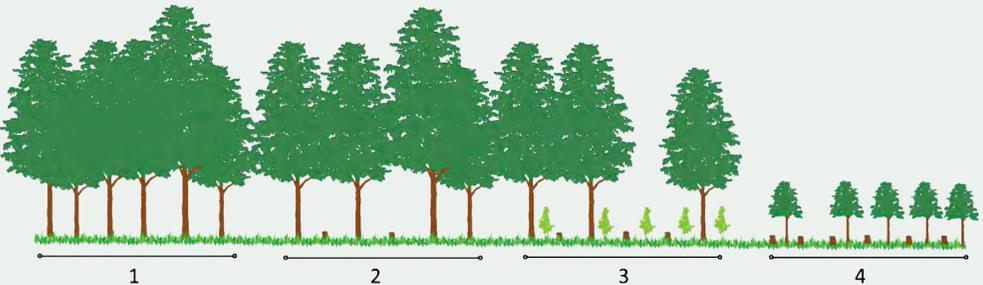
While clearcut may sound extreme, the resulting forest does have a very important role in creating a healthy and diverse forest. A small-scale clearcut removes all trees and woody vegetation greater than 2 inches in diameter in a given area. Trees are then regenerated from existing seed or seedlings, stump sprouts, root-suckering, direct seeding, or replanting. Stump sprouts are new growth that comes from the stump of a cut tree. Older trees are less dependable for producing stump sprouts than younger trees, so this method will generally work better with 75-year-old trees than with 125-year-old trees.

### SEED-TREE HARVEST



A seed-tree harvest is similar to a clearcut except that some of the seed-producing trees are left standing in the cut area. Typically, three to 10 seed-producing trees are left per acre to provide seeds which become the next generation of trees. The seed-producing trees that are left will not cast enough shade to inhibit new seedlings from growing.

### SHELTERWOOD HARVEST



The shelterwood method involves the selective removal of some big trees and most or all of the smaller trees, to provide a seed source and make room for regeneration. Selective harvest of some big trees creates enough openings in the canopy to allow some light to reach the ground to establish seedlings.



NJ State Forestry Services

Foresters check a shelterwood harvest after one year of regrowth. This stand was created specifically for songbird habitat such as the endangered golden-winged warbler.

oak and create young forests for wildlife. A second selective harvest may be used as part of these methods to capture the remaining value of oak and other mature species that were left standing, or the trees could be left to enhance the beauty and “uneven age” look of the woods.

However, since oak seedlings will tolerate more shade than oak saplings, a selective removal of most of the big oaks and other mature trees may be necessary 10 to 15 years after the initial harvest for the next generation of oaks to grow to maturity. This new generation is a healthy, vigorously growing young woods.

### Regenerating tomorrow’s trees

There are several regeneration methods, each connected with specific types of woods and carried out to establish new trees. Natural regeneration includes root suckering, stump sprouting, or natural seeding to grow new trees after a harvest. If you are unsure you will get the type or quantity of natural regeneration you want, you may need to consider artificial regeneration, which is either sowing seeds or planting seedlings.

The trees you harvest today have a tremendous influence on your woods tomorrow and on future harvests. It is possible that years, decades, or maybe a century may separate the harvests of today and tomorrow. No matter how much time separates them, the two harvests are connected. Harvesting quality trees both today and tomorrow requires regenerating quality trees during today’s harvest.

### Regenerated trees have needs

Trees have different light requirements. You may have noticed sassafras trees on the edges of fields—it is because they need lots of light to start growing. There are many species that are just the opposite, preferring dense shade. Sugar (*hard*) maple, basswood, hemlock, and white pine seedlings grow best under a canopy of mature trees.

#### WOODS WISDOM:

After a harvest, it is tempting to pocket the profit. But if you use 10 percent of the harvest income to establish a new stand of trees, it will pay off in the long run. Prescribed fire, periodic thinning, and seedling costs are also worth the money to get your harvest of tomorrow off on the right foot.

There are also trees that fall in the middle between the two extremes. All the oaks, hickories, ashes, and elms can tolerate some shade, but still need quite a bit of light to establish. They do not do well when they are in dense woods. In the case of oaks, the seedlings are more tolerant of shade than saplings and maturing trees. Selecting a harvest method that allows more light to reach the ground can help grow new oak trees successfully.

## Talking to your forester

Plan the future of your woods before starting any forestry work. Have a lengthy discussion with your forester aimed at answering two questions: “*What will my woods look like?*” and “*How is it going to get there?*” These questions should always be addressed in a management plan and harvest prescriptions for your woods.

Some harvesting methods should elicit red flags such as harvests that take all of the valuable trees out of your woods today, and do not consider the future of the forest. An experienced forester looking out for the health and future of your woods would never recommend the following harvest methods:

- Diameter limit cutting (sometimes called selective harvest)—cutting all trees over a certain diameter without regard for impact on stand structure, tree quality, species composition, or tree regeneration leaves you a degraded forest with unpredictable harvests for tomorrow.
- Economic clearcutting—cutting every tree of economic value without regard for the site or tree regeneration leaves little to harvest tomorrow.
- High grading (*selective logging*)—cutting only the largest, most valuable trees in a stand and leaving low-value and poor-quality trees. This is not the same as single-tree selection, which evaluates the removal of each tree based on its economic value versus the value of taking an adjacent tree or its value to the woods. Single-tree selection is a thorough process of weighing many factors, while high-grading looks at the only monetary value of the tree and nothing else.



Charlie Newlon



Charlie Newlon



NJ State Forestry Services

## Should I be doing anything between the harvests of today and tomorrow?

Taking care of trees between harvests to favor health, vigor, and composition is called tending. It is not always necessary and can sound like a lot of work, but tending is an investment in the woods for a payoff later. Tending can include pruning, releasing selected trees (*removing competition around them*), invasive species control, and intermediate or improvement thinning harvests that will improve stand composition, structure, growth, quality, health, and wildlife habitat while providing income. Depending on the species of trees in your woods, thin your trees to help better withstand insect attacks or wildfire damage. There are often cost-share programs to help you with the cost of these tending activities.

### More Information:

For a consulting forester to develop a management plan, see the DEP-approved list of Consulting Foresters: [www.state.nj.us/dep/parksandforests/forest/ACF.pdf](http://www.state.nj.us/dep/parksandforests/forest/ACF.pdf)

For tree care, find a Certified Tree Expert: [www.njtreeexperts.org](http://www.njtreeexperts.org)

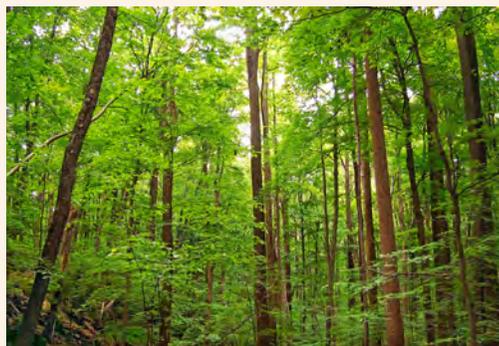
For more landowner programs and resources: [www.myhealthywoods.nj.gov](http://www.myhealthywoods.nj.gov)

### WOODS WISDOM: No action is still action

*I haven't done anything, how can my woods be changing?*

The largest trees in your woods most likely established with ample sunlight. Because conditions in your woods have gotten “darker,” that is, older and entering the later successional stages, the seedlings in your woods right now, grow with less sunlight. If it is shady, you

are almost certain to have shade-tolerant species establishing as seedlings and saplings. Oak seedlings need sunlight to establish. In other words, if you have big oak trees, it is likely that you don't see many oak seedlings and saplings, unless there is plenty of light hitting the ground. So, in the case of “no action,” mature oaks will eventually be replaced by maple and other shade-tolerant trees.



Nicholas Tonelli

Second-growth deciduous forest, Johnsonburg Swamp Preserve, Warren County. Much of this forest, now fairly mature, was once farmland.



# *Other Products*

FROM MY WOODS

NJ State Forestry Services

Often when we think of products to harvest from our forest, we immediately think “wood.” Building materials, paper, and firewood are indeed valuable products, but so many other products grow in, on, and around trees. If you take the time to identify them, you may notice that you already have many non-wood products in your forest to harvest.

If the prospect of growing a certain forest product intrigues you, but it doesn’t already grow on your land, it’s still possible that your land can support it with a little help. And in some cases, products can be grown and harvested as short as within a year’s time.

## *Maple syrup*

Maple syrup might be the pride of Canada and a chief export of our northern neighbor Vermont, but New Jersey’s vast forests also have the capability of producing this sweet treat. If you live in the northern hardwoods forest type found in the northwest and northern part of the state, you may already have sizable maple trees on your property. Although sugar maple is the preferred species for making syrup, any maple tree will suffice—even those red maples abundantly found in the mixed lowland forest type.



NJ State Forestry Services



T. Davis Sydnor

## PROCESS

You can tap maple trees over 10 inches in diameter during “sugaring season” starting in early February. At this time of the year, the sweet maple sap flows just beneath the bark as the tree wakes up for the spring. The sap you collect will look like water, and for good reason—it’s usually about 98 percent water, 2 percent sugar. That’s where the boiling comes in. You boil the sap until it gets to be about 67 percent sugar. The water is removed as water vapor, leaving just the sweet goodness coveted by pancake lovers everywhere. Making maple syrup is a lot of work, but it’s a fun activity that can involve the whole family.

## SUPPLIES NEEDED

- Drill with bit
- Spile and hook
- Evaporation method
- Maple over 10 inches
- Bucket
- Bottles

## OPTIONAL SUPPLIES

- Hydrometer
- Grading kit
- Candy thermometer

## TIMING

Tap trees as early as February—when the nights are below freezing and the days above freezing. During this time you might also see icicles, a sign of sugaring weather. The season generally lasts three to four weeks, followed by spring.

## YIELDS

Sap flow rates depend on both the tree and the weather. Multiple taps in a single large tree may even yield different amounts of sap. Sap to syrup is a 40:1 ratio. This means if you collect 10 gallons of sap, you can boil it down to 1 quart of syrup.

## MORE INFORMATION

Making Maple Syrup Video on the maple sugaring process by Lakes Country Living: [www.youtube.com/watch?v=DKqC02WxMNo](http://www.youtube.com/watch?v=DKqC02WxMNo)

Maple Syrup Production for the Beginner: PDF by Cornell Cooperative Extension - [http://maple.dnr.cornell.edu/pubs/maple\\_syrup\\_production.pdf](http://maple.dnr.cornell.edu/pubs/maple_syrup_production.pdf)



Charlie Newlon

Maple Syrup

## *Shiitake mushrooms*

Shiitakes offer a full bodied, aromatic flavor and a rich source of vitamin B, niacin, vitamin D, and protein. For added benefit to your forest, cut undesirable trees for mushroom logs and the surrounding desirable tree species that remain will thrive from more growing space.

### **PROCESS**

Cut logs into three to five-foot sections. Drill 5/16-inch diameter holes in the logs 6-8 inches apart and inoculate the logs with mushroom spawn, and cover with a wax plug. Place logs in a well-drained and shaded area of the forest. It can take one year for the fungus to colonize the log. To induce fruiting, soak the logs in water for 24 hours. Mushrooms will be ready to pick in four to seven days after soaking.

### **SUPPLIES NEEDED**

- 3-8-inch diameter logs of white, red, or pin oak, sugar maple, or ironwood
- Drill and 5/16-inch drill bit
- Spawn
- Plugs

### **TIMING**

An initial inoculation will produce fruit for several years. Logs will produce from April through October.

### **YIELDS**

Each log can produce 30-50 mushrooms per fruiting cycle and can be induced to fruit four to five times per season.

### **OTHER MUSHROOM TYPES**

Wild mushrooms are chanterelle, morel, (*black and yellow*) matsutake, and boletus. *Caution:* wild mushrooms should only be harvested if you are absolutely sure you identify them correctly. Cultivated mushrooms include shiitake, chanterelle, oyster, and enoki. You should be sure you can correctly identify these, as well.

### **MORE INFORMATION**

How to Grow Shiitake Mushrooms by Organic Gardening - [www.organicgardening.com/learn-and-grow/how-to-grow-shiitake-mushrooms](http://www.organicgardening.com/learn-and-grow/how-to-grow-shiitake-mushrooms)

Growing Shiitake Mushrooms in an Agroforestry Practice by University of Missouri Center for Agroforestry - [www.centerforagroforestry.org/pubs/mushguide.pdf](http://www.centerforagroforestry.org/pubs/mushguide.pdf)



Emma Cooper

Growing shiitake mushrooms

# Beekeeping

Did you know that the honeybee is the New Jersey state insect? With all these thriving plants in this garden state of ours, no wonder we love bees. Place a hive in your forest and you'll reap all the wonderful benefits of bees—it's more than just honey.



Don Hankins

## PRECAUTIONARY CONSIDERATIONS

- Bee allergies for yourself or family members
- Proximity of hives to neighbors
- Insurance
- Municipal ordinances

## SUPPLIES

- Hive
- Smoker
- Protective clothing
- Bees
- Nectar source
- Extractor equipment

Once you have the logistics worked out, you can put together your hive and carefully place your bees inside. Harvest the honey when a shallow frame contains 80 percent or more of sealed, capped honey. There is a lot to learn about the nuances of beekeeping, so it's best to take a beekeeping course. Minimally check out a beekeeping book from the library or talk to an experienced beekeeper.

## TIMING

You'll need to commit to a few hours of hive work per summer month, and about an hour of work during the other months. Honey is harvested in the summer.

## YIELDS

In the first year, a new colony needs a full season to build up a large enough population to gather a surplus of honey. After that, you can expect each hive to produce about 30 pounds of honey. But keep in mind you can also harvest other products including wax, royal jelly, propolis, and bee pollen. These products are highly sought after for their medicinal and health benefits.

## MORE INFORMATION

Rutgers Cooperative Extension beekeeping courses—Beyond the Basics Practical Hive Management Tools for Beekeepers and Bee-ginner's Beekeeping Workshop: [www.cpe.rutgers.edu/programs/beekeeping.html](http://www.cpe.rutgers.edu/programs/beekeeping.html)

Farmer's Almanac Beekeeping 101:  
[www.almanac.com/home-pets-family/beekeeping-blog](http://www.almanac.com/home-pets-family/beekeeping-blog)

## Foraging

**Berries** such as blueberries, mulberries, wild strawberries, blackberries, and raspberries are native to New Jersey's forests. They are delicious right off the plant or can be used in desserts or jams. You can find them in the spring and summer. If you don't have berries growing naturally, you can establish plants today and harvest fruit from them just two to three years from now.

**Nuts** such as hickory, walnut, butternut, and pecan can be harvested in the fall.

**Persimmons**, 1-1.5-inch pale orange berries, also ripen in the fall but aren't palatable until the first frost.

**Pawpaws**, an oblong 6-12-inch fruit that is said to taste like a cross between a mango and a banana, ripen in September when they are somewhat soft and turn brown.

### MORE INFORMATION

Nut Growing in the Northeast by Cornell University:  
[www.gardening.cornell.edu/fruit/pdfs/nutpub.pdf](http://www.gardening.cornell.edu/fruit/pdfs/nutpub.pdf)

Mother Earth News, Foraging for Edible Wild Plants:  
[www.motherearthnews.com/organic-gardening/edible-wild-plants.aspx](http://www.motherearthnews.com/organic-gardening/edible-wild-plants.aspx)

Lisa Clarke



Mulberries



Walnut



Blackberry



Hickory



Blueberry



Pecan



Persimmon



Raspberry



Pawpaw



Wild Strawberry

## *Medicinal Plants*

Our ancestors have long used natural remedies—many of which grow right in the forest.

### **Arrowroot** *Maranta arundinaceae*

Harvest: Tubers in late fall, just before first frost

Use: Nutritious and easily digested food starch for infants and elderly patients with bowel complaints

### **Bayberry** *Myrica pensylvanica*

Harvest: Leaves year round

Use: A tea treats fevers and used as a wash for inflamed skin.

### **Birch** *Betula spp.*

Harvest: Twigs in the spring and summer

Use: Chew on twigs for the anti-inflammatory oil. Twigs steeped as a tea equals half an aspirin

### **Cohosh** *Cimicifuga racemosa*

Harvest: Rootstock in the fall after the fruit has formed

Use: Menopausal symptoms, tinnitus, and high blood pressure. The fresh flowers have a strong odor and are effective insect repellents

### **Magnolia** *Magnolia spp.*

Harvest: Bark in fall

Use: Decoction reduces fevers, strengthens stomach function and improves digestion, and relieves pain of inflammation. It is also known to help weight loss, anxiety, and nicotine withdrawal

### **New Jersey tea** *Ceanothus americanus*

Harvest: Roots in early spring

Use: Tea for various chest problems, including bronchitis, nervous asthma, and whooping cough. A gargle for inflammation of the throat, fever, and irritations of the mouth. Also mildly hypotensive and lowers blood pressure



Dow Gardens Archive

Bayberry



Paul Wray

Paper birch



John Ruter

New Jersey tea

Chris Evans



Water lily

**Sweet goldenrod** *Solidago odora*

Harvest: Leaves anytime, flowers late summer to fall

Use: Chew flowers for sore throats, and use externally for sprains and stings. Create an infusion from leaves for stomach problems

**Sweetgum** *Liquidambar styraciflua*

Harvest: Leaves as they persist, bark year round

Use: Tea made from leaves to wash wounds, balsam from sweet gum bark is an astringent

**Water lily** *Nymphaea odorata*

Harvest: Root in the fall

Use: Infusion, used as a gargle in ulcers of mouth and throat. Leaves and roots used to soothe skin conditions such as boils and inflamed skin

**Yarrow** (Achilles heel) *Achillea millefolium*

Harvest: Tender leaves in spring, flowers late spring to early summer

Use: Chew fresh leaves for a toothache. Yarrow stops bleeding and is an antiseptic, anti-inflammatory, and slightly anesthetic

Howard F. Schwartz



Sweet goldenrod

Chris Evans



Sweetgum

David Cappaert



Yarrow

**MORE INFORMATION**

Native Plant Society of New Jersey: [www.npsnj.org](http://www.npsnj.org)

***Baskets, Bowls, & Crafts***

If you're the type that likes to use things found in nature as decorations, you have to look no farther than your forest for materials. Craft a one of a kind basket from pine needles, strips of oak, or birch bark. Carve burls into bowls. Burls are one of the best sources of beautiful wavy, swirled, or feathered wood grain. Gather boughs and conifer cones for Christmas wreaths and grape vines for wreaths.

**MORE INFORMATION**

Pine Needle Basket, Instruction  
Pine Needle Group: [www.pineneedlegroup.com/instruction.html](http://www.pineneedlegroup.com/instruction.html)



Pine needle basket



Peter Shanks

Bowl carved out of a burl



David Cappaert



# Planning...

DO I NEED TO:

M Image Photography

In almost every phase of life we have goals, whether we have stated them or not. Planning helps you evaluate your goals and map out how to achieve them. Writing a plan for the future of your woods is not that different than preparing for retirement or scheduling renovations to your house. Having a written plan for your woods can help you think about your long-term goals, make decisions about large financial investments, prioritize the actions you are going to take, and communicate your vision to future generations.

## How do I get started?

A land management plan records the relationship between you and your land. The plan should follow these three steps:

### **1. Understand the potential of your land to grow certain types of woods or natural plant communities.**

**EXAMPLE:** A south-facing slope is generally hotter and drier and less productive than a cooler, more moist north-facing slope. The south-facing slope is able to support various oak and pine species; the more productive north-facing slope has potential to grow high-quality red oak, sugar maple, and other hardwoods.



***Important note:** Typically, a consulting forester will divide a parcel of land into uniform stands of trees. Each stand should be more or less uniform in its potential. The next two steps can then either be applied generally for your land or for each stand.*

**2. Determine your expectations, based on the potential of each stand. Do you expect to produce timber, provide habitat for certain wildlife, and/or maintain recreational opportunities?**

**3. Write the goals and objectives for each stand that will help you achieve your personal expectations based on the potential of your land or woods. Underneath goals and objectives, tasks and timelines can further organize your planning.**

## **How do I work through the steps of a management plan?**

First, to understand the potential of your land, survey and collect current and historic information on your property. You may want to classify soil types, which will tell you the types of woods or plant communities that have the potential to thrive on your land. Or you can look at old aerial photographs to see the change on your land over time—there may have been an abandoned field that has been taken over by succession. You could also make lists of songbirds, wildflowers, and invasive species that you see on your property.

Next, define your expectations for your land based on your findings. Think about how you would like your land to look in the future—five, 25, or even 50 years from now. The more background and information you have on your land before you begin this step, the more realistic your expectations are likely to be—and you might see new opportunities that you wouldn't have thought of before. Consider the costs in time or money for your expectations and sources of cost-share that could support your work.

Now it's time to write. Make a list of the goals and objectives that reflect why you own your woods and define your expectations and the potential of your woods. Your goal statements should broadly summarize your vision for your land. The goals can apply to either your woods as a whole or to one stand of trees. Goals also serve as a guide to where you want to end up. Underneath each goal, you can list objectives. These will be more specific actions that you need to take to reach your goals. There may be one, two, or many objectives under a single goal. You may want to add specific tasks and timelines to each objective to make sure your highest priorities are addressed first, and so that you don't get overwhelmed with trying to do everything at once.



Jon Carlucci

## Who can help me?

While taking into consideration all the characteristics and history of your land and your ownership objectives, consider contacting a consulting forester. A consulting forester can write a management plan for your woods based on your goals and objections. New Jersey State Forestry Services maintains an approved list of consulting foresters. Select a consulting forester just as you would select a lawyer, an architect or an engineer. Work with your consulting forester to write your plan. Additionally, New Jersey State Forestry Services offers cost-share programs that can help you develop a plan with a forester at lower cost to you.

## More Information:

To get started, you can find a management plan template at:  
[www.aldoleopold.org/WoodlandSchool/resources.shtml](http://www.aldoleopold.org/WoodlandSchool/resources.shtml)

New Jersey Consulting Forester List:  
[www.state.nj.us/dep/parksandforests/forest/ACF.pdf](http://www.state.nj.us/dep/parksandforests/forest/ACF.pdf)

Society of American Foresters List: [www.safnet.org/certifiedforester/findcertifiedforester.cfm](http://www.safnet.org/certifiedforester/findcertifiedforester.cfm)

### FIELD EXERCISE: Making maps of your property

The Web Soil Survey provides a web-based mapmaking tool to help private landowners understand their land. This mapmaking interface allows you to see the soil types on your land and provides interpretations to show the potential for various land management activities on these soil types. WSS can be accessed at [websoilsurvey.nrcs.usda.gov](http://websoilsurvey.nrcs.usda.gov) and is operated by the USDA Natural Resources Conservation Service (NRCS).

If you are new to mapmaking software, you might appreciate a guide for making your map in WSS. See [www.aldoleopold.org/WoodlandSchool/resources.shtml](http://www.aldoleopold.org/WoodlandSchool/resources.shtml) to download a guide from the Aldo Leopold Foundation. A consulting forester could also assist with mapmaking.



## Robert Johnson's Land Management Plan\*

**Potential of the land.** Mr. Johnson owns 50 acres of mixed hardwoods. A consulting forester divided Mr. Johnson's woods into three stands.

**Stand #1.** A 25-acre dry, rocky ridge top and steep slope is dominated primarily by young, maturing chestnut and black oak, with a few red oak and hickory.

**Stand #2.** The 10 acres at the bottom of the slope, just inside the property boundary, include a small stream. It is a young, regenerating, riparian woods composed predominately of ash, maple, birch, and hornbeam with a few red oak and tulip poplar.

**Stand #3.** The 15 acres connecting stands 1 and 2 is more gently-sloped, almost rolling, with deeper, more nutrient-rich, moist but well-drained soils, dominated by red oak, birch and maple. The red oaks are older, but the birch are still competing with them and the maples are beginning to more strongly compete with the oaks for space. It will be at least 20 years before the red oak are suitable for harvest. It is possible to maintain quality red oak on this site, but it will require effort to remove competing species and establish more oak.

**Goal.** Manage stand #3 to produce valuable red oak timber.

**Objective 1.** Conduct a firewood harvest that removes competing birch and maple from the maturing red oak.

**Tasks.** Meet with forester to discuss the firewood harvest, find a logger, create a log landing site, and control birch and maple re-sprouting with herbicide to benefit the red oak.

**Objective 2.** In larger openings created during the firewood harvest, monitor for red oak regeneration, determine white-tail deer pressure, plant red oak seedlings.

**Tasks.** Determine the need for protecting oak regeneration and/or planted seedlings from deer, buy seedlings and hand-plant in April or May after harvest.

**Objective 3.** In 20 years, consider harvesting mature red oak.

\*There are management planning options available to Mr. Johnson. He should discuss New Jersey's forest stewardship programs with his consulting forester friend and consider having him prepare a written, ten-year plan for his woodlot.

## Martha Halle's Land Management Plan\*

**Potential of the land.** The 36-acre farm consists of five acres in field crops, 14 acres in Christmas tree plantation and 11 acres of woods. The agricultural and horticultural activities will continue. A consulting forester walked the woodlot with Ms. Halle, took an inventory, and helped her determine objectives and prescriptions to meet her goals.

Forty years ago under a previous owner the woodlot was farmed, but then was allowed to regenerate to forest. The woodlot topography, soils and species are uniform: reasonably flat; loamy sand with a seasonally high water table; and a young, maturing hardwood woodlot composed primarily of sweetgum and red maple, approximately 35-40 years old. The understory is dominated by several native shrub species and non-native invasive species, especially multiflora rose.

**Goal.** Maintain the woodlot as a haven for native plant and animal diversity and for natural aesthetics.

**Objective 1.** Promote native plant diversity by eradicating and/or controlling non-native, invasive plant species.

**Tasks.** Contact consulting forester and/or county extension agent for recommendations to eradicate multiflora rose, garlic mustard and stilt grass. Annually monitor for these and other invasives.

**Objective 2.** Maintain vigorous growth of over-story species for shelter, breeding and food habitat for birds and other wildlife species.

**Tasks.** In five to ten years, if non-native invasive plant species are under control, thin the woodlot to both favor the highest value, most vigorous trees and encourage native plant diversity in the understory and on the ground. Retain or create two to three dead standing trees per acre; leave eight to 10 or more fallen trees per acre; and utilize any remaining for firewood for the farm.

**Objective 3.** Convert two acres to Atlantic white cedar to increase native species diversity and aesthetics.

**Tasks.** Approximately two acres on the eastern end of the woodlot are wetter throughout more of the year than the rest of the woodlot, and the trees are slightly smaller, less dense and perhaps slightly younger. Convert this section of the woodlot to Atlantic white cedar (AWC) by removing all of the hardwood stems 2 inches in diameter and larger for firewood. Treat the stumps with herbicide to control sprouting, and plant with AWC seedlings. Fence for 10 years to prevent deer browse. Monitor and control competing hardwood vegetation and invasive plant species annually.

\*There are management planning options available to Mrs. Halle. She should discuss New Jersey's forest stewardship programs with her consulting forester and consider having the forester prepare a written, ten-year plan for her woodlot.





# *Thinking Long-Term*

WHAT ARE MY OPPORTUNITIES?

Nicholas A. Tonelli

Great-grandpa's deer-hunting rifle; the handmade baby blanket; a pin honoring service—all are pieces of someone's life that are handed down through families along with their stories. They are the tangible bits that make the stories come to life. Land can be one of those pieces, rich with great stories.

As our landscape rapidly changes, more and more landowners sense that their land, and the stories that go with it, may be lost. Because land continues to exist long after we are gone, many are seeking ways to legally protect their property in the long term. Estate planning and conservation easements are great ways to protect property in the long term. Land trusts can also help you explore options to make sure your land becomes your legacy.

## **How do I keep my “woods as woods” after I’m gone?**

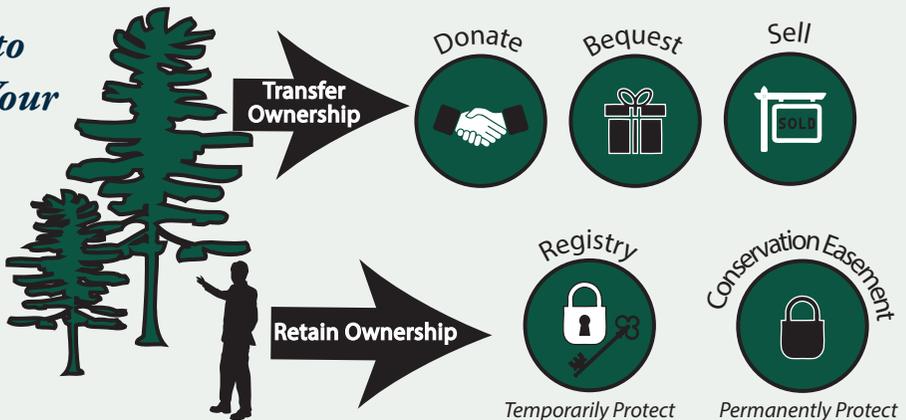
**Estate Planning**—The process of anticipating and arranging for the transfer of a person's assets while that person is still alive and able to do so is estate planning. Strategic and timely planning can minimize expenses and taxes associated with passing a property and other assets along to heirs. It also fulfills the wishes of the landowner to protect the property from development and keep the woods as a “working forest.” It requires working with a lawyer who specializes in estate planning, wills, and trusts. Estate planning ensures that your future goals and vision for your woods are realized.

**Conservation easements**—A conservation easement is a voluntary legal agreement that permanently restricts the way land can be used. It does so by separating some of the rights of land ownership—for example, the rights to develop, subdivide, or mine—from the rest of the rights of ownership. Those separated rights are effectively extinguished by being transferred to a non-profit land trust or a public agency committed to conservation. Easements should be structured to allow forestry practices. If the land trust you select will not agree to an easement allowing forest management, find another that does recognize the value of preserving working forests.

“Purchase of development rights” is often used in farmland protection programs, such as New Jersey’s Farmland Preservation Program, and can be considered an easement. New Jersey’s Farmland Preservation Program focuses on farms, but if your woods are part of a “working farm,” you may want to consider the program to preserve your farm and woods. If interested, contact your county’s planning office.

Each easement is crafted to reflect the landowner’s individual needs and wishes for the land. Landowners retain the rights to own and sell eased property, but the easement restrictions will always be attached to the land title, remaining with the property forever. New Jersey’s Farmland Preservation Program purchases the development rights directly from the landowner creating an easement preventing future development of the property. Most conservation easements are donated to a land trust, and the donation can give the landowner significant tax advantages. In some cases, easements are sold to land trusts or agencies, sometimes as bargain sales.

*Options to  
Protect Your  
Property*





**Land Trusts**—A land trust is a non-profit organization directly involved in the permanent protection of land and its resources for public benefit. They offer local citizens a way to preserve areas that are important to the community and give individuals options for protecting their property. Land trusts may accept donations of land, buy land, or help to establish legal restrictions limiting development or undesirable uses.

**Registry**—If you are concerned with protecting the natural values of your land but are not ready to permanently protect it, you may want to consider registry. By registering your land with a land trust you make a commitment to protect the natural elements, features, and characteristics of your property. You also agree to notify the local land trust before you plan to sell or transfer the property, but the protection will not be effective beyond your ownership.

**Donate**—If you are ready to transfer ownership of your land, but want to make sure it stays protected, you may consider donating it to a land trust. Caring about the land is one of the most compelling reasons to donate land to a land trust, but you may also choose to do so because you have highly appreciated property that would generate large capital gains taxes if sold, you have substantial real estate holdings and you want to reduce your tax burdens, or your land has become too great a responsibility and you want to be certain it is managed and cared for by a group that appreciates its value.

**Bequest**—A bequest transfers ownership of property or an easement to a land trust through your will. This is a great choice if financial compensation is not a necessity and you want to maintain the current use of your land. A bequest may also be a good solution if your land has significant conservation value but there is no one to inherit it or the likely heirs cannot or will not protect it.

**Sell**—While most land trusts have limited funds for purchasing and managing land, it may be possible for them to fundraise in order to buy a particularly important piece of land. A bargain sale may be negotiated if you need some compensation for your property or easement, but you can afford to sell to a land trust at a price below what you could receive on the open market. The difference between the maximum “fair market value” and the actual sale price is considered a donation to the land trust and is tax deductible for you.



## Tax advantages of conveying land to a land trust:

**Income Tax Benefits**—If you make a gift of land or a conservation easement to a public agency or a land trust, you may be able to deduct the fair market value of that donation on your income taxes.

**Estate/Inheritance Tax Benefits**—The state of New Jersey taxes inheritances, as does the federal government if the value of the estate equals or exceeds a predetermined amount. As a result, heirs to large tracts of open space, farms, natural areas, or timberland may potentially face substantial estate taxes. Estate tax is levied on a property’s “highest and best use”—usually the amount a developer or speculator would pay. The resulting tax burden can be so large that the heirs must sell all or part of the property to pay the taxes. A conservation easement can reduce estate taxes because the donation of the easement reduces the economic value of the property.

**Property Tax Benefits**—Local real estate property tax assessments are based on a property’s full-market value, which takes into account the property’s development potential. If a conservation easement reduces or removes this potential, the assessment and, accordingly, the amount of real property taxes, may be reduced.

## NJDEP Green Acres Program

The Green Acres Program may potentially offer another alternative for landowners contemplating protecting their property in the future. The Green Acres Program buys property from woodland owners to preserve environmentally sensitive open space, water resources, and other natural and historic resources. Protected lands become part of the statewide system of parks, forests, wildlife management areas, and preserves. Visit [www.nj.gov/dep/greenacres/](http://www.nj.gov/dep/greenacres/) to learn more.

### More Information:

“The Handbook of Landowner Options, A Guide to Land Protection in New Jersey” by The Nature Conservancy of New Jersey and The New Jersey Natural Lands Trust: [www.mss3.libraries.rutgers.edu/dlr/showfed.php?pid=rutgers-lib:17900](http://www.mss3.libraries.rutgers.edu/dlr/showfed.php?pid=rutgers-lib:17900)

“Preserving the Family Woods: tools to help guide transfer to the next generation of landowners “ by US FS Northeastern Area State and Private Forestry: <http://na.fs.fed.us/pubs/detail.cfm?id=5879>



Charlie Newlon

# *Financial Support*

FOR ACTION

There are resources available to you as a private landowner to assist or compensate you in learning, planning, and executing practices mentioned in this handbook. You do not have to go it alone. New Jersey State Forestry Services, Rutgers Cooperative Extension, and your consulting forester all can provide you with technical and financial assistance.

## **NJ Forest Stewardship Program**

**PURPOSE:** Among the many benefits of participation in this program are the availability of both technical and financial management assistance; environmentally responsible management of New Jersey's forest resources; active involvement in forest management; public recognition as a steward of the land; and the personal satisfaction of managing forest resources for present and future generations.

**DESCRIPTION:** Through cost sharing, landowners are refunded up to 75 percent of the cost for a new or revised forest stewardship management plan needed to meet the criteria necessary to participate in the state's Forest Stewardship Program.

**PRACTICES:** Landowner must follow practices required by an approved forest management plan written by a consulting forester.

**ELIGIBILITY:** Landowner must have a minimum of five forested acres.

**CONTRACT:** Landowners are asked to maintain cost-shared funded practices for 10 years. In addition, it is agreed that the 10-year forest stewardship management plan be implemented to the best of the landowner's ability.

**CONTACT:** Regional NJ State Forestry Services Office (see handbook partners)

## NJ Farmland Assessment Program

**PURPOSE:** The Farmland Assessment Act of 1964, amended in 1986, allows woodland owners to develop and implement a state-approved forest management plan to qualify for reduced property taxation.

**DESCRIPTION:** Woodland owners can be eligible for reduced property taxes if they follow a state-approved forestry plan.

**PRACTICES:** Woodland management plan development, reforestation, timber stand improvement, fish and wildlife habitat enhancement, fire hazard reduction, invasive species control, watershed protection, and wetland restoration all may be eligible.

**ELIGIBILITY:** For woodland the land must have been actively devoted to forestry, agricultural or horticultural use for the two successive years immediately preceding the tax year for which farmland assessment is requested. The area must be at least five acres in size. Annual gross sales of forestry products—in addition to any payments received under a soil conservation program—must average at least \$500 plus an additional \$.50 per woodland acre for each acre over five, or there must be clear evidence of anticipated yearly gross sales and such payments amounting to at least your minimum gross sales requirement.

**CONTACT:** County Tax Assessor

## Forest Legacy Program

**PURPOSE:** Forest Legacy Program identifies and protects environmentally important private forestland threatened by conversion to non-forest.

**INCENTIVES:** A private forest landowner may negotiate the sale of selected interests in their forestland, or the sale of their forestlands, to the U.S. Forest Service. Preferably, the federal government would purchase a private forest landowner's conservation easement. The land would then remain in the possession of the private landowner.

**ELIGIBILITY:** Land must be in a designated Forest Legacy Area.

**CONTACT:** USDA Forest Service - [www.fs.fed.us/spf/coop/programs/loa/flp.shtml](http://www.fs.fed.us/spf/coop/programs/loa/flp.shtml)



Charlie Newton



Charlie Newlon

13 acre black walnut plantation

## Environmental Quality Incentives Program (EQIP)

**PURPOSE:** To provide financial and technical assistance to landowners to implement management practices on their lands.

**PRACTICES:** Many practices are eligible for cost sharing, including forest management plans, brush removal, and more. Visit

the website below for the most recent list of approved practices.

**ELIGIBILITY:** All private land in production is eligible, including cropland, pastureland and nonindustrial private forest with a forest management plan. Funds are directed to projects that offer the greatest environmental benefits. For woods to qualify for EQIP it must be large enough to be managed as a production unit (*a five-acre woodlot is typically not large enough*), and participants are subject to the Adjusted Gross Income limits of the Farm Bill.

**CONTRACT:** One- to 10-year contracts. Producers may be eligible for flat rate payments based on average costs of the practices.

**CONTACT USDA/NRCS:** [www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/](http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/)

NJ State Forestry Services

Thinned pinelands stand



# Landowner Story

## The Wengel's Stewardship Forest with a Curious History Montgomery Township, Somerset County



Douglas and Patricia Wengel have lived in their 39-acre Stewardship Forest on the southeastern slope of Sourland Mountain since their home was built in 1971. Much has been written about the history of the mountain since Roger Parke purchased the land. At the foot of the mountain in 1697, including the mountain's role as an outpost in the Revolutionary War.



It has been jokingly referred to as more of a mound than a mountain, but it is a truly unique forested rocky area 17 miles long and four miles wide. By the late 1700s almost every stream on the mountain was harnessed as a source of water to power mills. Most of the mills ground grain grown from nearby fields below. Rock Brook, which runs close below the Wengel's outside deck, once powered several small grist mills and a flax seed-oil mill. These mills ceased operation by 1910. Only a few foundations remain.



The Wengel's home and forest lie about a quarter-mile below where the Sentney Gristmill on Hollow Road flourished in the late 1700s. The terrain is not steep, but does have many flat stones throughout with one steeper ridge running east to west. Wengel's Stewardship Forest has been under formal

forest management since 1970 when what is now NJ State Forestry Services wrote a management plan and advised them for the next 35 years. Activities during that time included 10 acres of forest stand improvement; a 15-acre timber harvest in 1981 that yielded 66,000 board feet of sawtimber, and an income of \$8,000; and a selective harvest in 1997-98 on 25 acres that yielded 64,000 board feet and \$17,000 of income. Slash was salvaged for firewood.

In 2005 the Wengels hired a consulting forester to write a new ten-year forest stewardship plan for three distinct forest stands.

### **Features of current Forest Stewardship Plan**

- Remove cull timber
- Weed out competing trees in the smaller diameter classes
- Generally permit the forest to mature
- Harvest firewood as needed
- Monitor the area for non-native plants and remove them as necessary
- Leave some standing dead trees for wildlife
- Toward the end of the current 10-year plan review the stands for a possible timber sale

The Wengels added some cultural history to their property as well as to Sourland lore when they found two encrusted copper coins inside the stone foundation ruins of the flax seed oil mill in their forest. When the coins were cleaned by ultra sound, they saw that they were minted in 1787. They also found remains of a prohibition-era still and learned that federal agents reportedly raided it several times, dismantled the still and took the tubing to a junk dealer. Close behind each raid, the moonshiners got the parts back from the dealer, and each time apparently quickly fired-up their business.

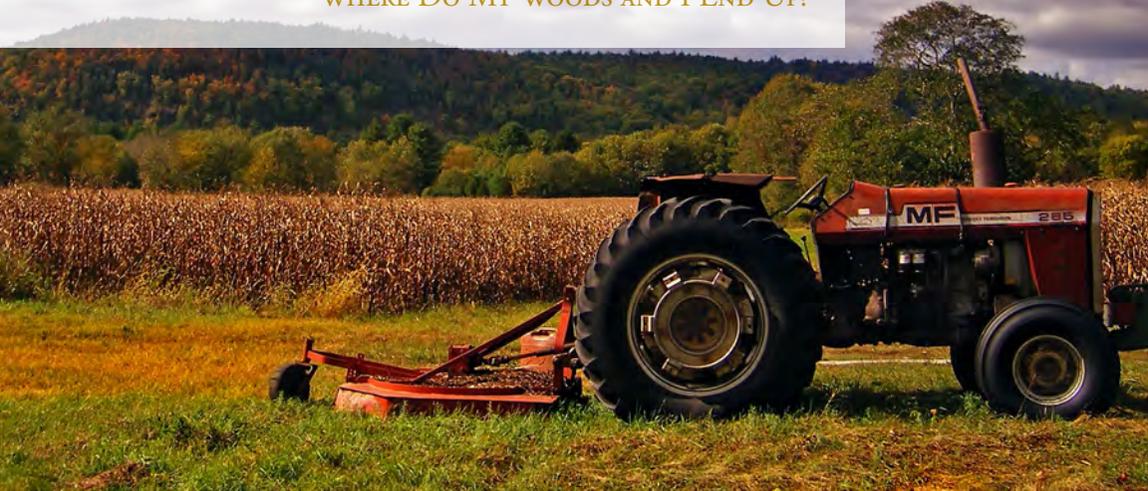
These “finds” in the forest and the Wengels long-term stewardship management are bright spots on a mountain with a rich historical past.



Charlie Newlon

# Afterword

WHERE DO MY WOODS AND I END UP?



Nicholas A. Tonelli

The relationship between people and land is complex. From the beginning, the possible directions are almost limitless. Neighbors will often follow different paths, yet both are equally capable of developing a mutually beneficial relationship with their land. The relationship changes as people buy and sell land, woods get “darker,” older, later successional stages, or “lighter,” younger, earlier successional stages, harvests come and go, invasive species appear, generations change, and wildlife populations go up and down.

The relationship needs grounding in a perspective that, regardless of direction or change, allows it to be successful. But with all these possible directions and changes, how do you know if you are moving in the right direction? How do you define success? Land is healthy when all of its parts—common, unique, influential, and less influential—operate like the car in the example we started with, in “excellent running condition.”

*Land-health is the capacity for self-renewal in the soils, waters, plants and animals that collectively comprise the land.*

Aldo Leopold, “Conservation in Whole or Part?” (1944)



In your relationship with your land, your care can provide some of the things your land needs to be healthy:

- If the *wildlife* you enjoy—unique and common—depend on your woods for food, shelter, and breeding, you should find ways to meet their needs somewhere on the landscape.
- If *invasive species* are capable of out-competing native wildflowers and tree seedlings, then control is needed.
- If *fire* sustained unique fire-dependent plants and animals in the past, then prescribed fire is needed, today and in the future.
- If future *harvests* in your woods depend on regeneration of new trees, then a thoughtful harvest and regeneration plan ensures quality trees for tomorrow.
- If *climate change* will affect New Jersey in the decades to come, then helping your woods adapt to the anticipated changes is needed.

If land is healthy, it can provide nearly everything you and your family need and want—food, fiber, recreation, wildlife, and beauty. Sustaining healthy land guarantees these benefits will be around for future generations. Increasingly, the performance of healthy land depends on our care.

We hope this handbook has encouraged you to think about your relationship to your land and to take steps, maybe your first, toward managing your land. If so, start simply and don't go it alone. Get a forester or other resource professional to walk your land with you. See what funding might be available to assist you in reaching your goals and objectives. There is plenty of information available on almost any topic of interest to you. Most of all, give your relationship with your land the time and patience it needs to develop into one that is mutually beneficial and lasting.



# Handbook Partners:

*Put Them to Work For You!*

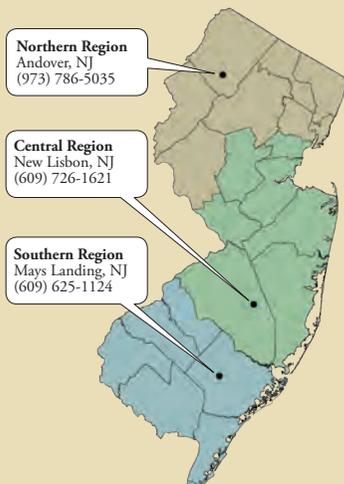
## New Jersey State Forestry Services

New Jersey State Forestry Services, under the Department of Environmental Protection, protects, sustains, and manages trees and forests across the state.

We're out in forests every day to ensure that our grandchildren's grandchildren know and enjoy the beauty of walking among towering trees. Contact your regional office.



## Regional Offices



## Programs

- Farmland Assessment
- Forest Health Protection
- Forest Stewardship Program
- Invasive Species
- Landowner Education
- Tree Professional Directory
- Tree Seedlings
- Wildfire Protection

[www.forestry.nj.gov](http://www.forestry.nj.gov)  
[www.facebook.com/newjerseyforests](https://www.facebook.com/newjerseyforests)  
State Forestry Services Mail Code 501-04  
PO Box 420, Trenton, NJ 08625  
(609) 984-3853



## New Jersey Forestry Association

The New Jersey Forestry Association is a non-profit organization that promotes forestry and forest management on public and privately owned woodlands. NJFA serves as a forum and to make recommendations for improving forest management problems and to protect property and landowner's rights. Contact NJFA to learn more or to become a member.

[www.njforestry.org](http://www.njforestry.org)      [www.facebook.com/new-jersey-forestry-association](https://www.facebook.com/new-jersey-forestry-association)  
New Jersey Forestry Association 23 Main Street, Califon, NJ 07830 (908) 832-2400

## Rutgers Cooperative Extension

Rutgers New Jersey Agricultural Experiment Station Cooperative Extension presents science-based educational programs to enhance the quality of life for residents and brings the wealth of knowledge of the state university to local communities. Contact your county office for programs near you.



## Services

Soil testing	<a href="http://njaes.rutgers.edu/soiltestinglab/">njaes.rutgers.edu/soiltestinglab/</a>
Gardener helpline	<a href="http://njaes.rutgers.edu/mastergardeners/helplines.asp">njaes.rutgers.edu/mastergardeners/helplines.asp</a>
Plant Diagnostic Lab	<a href="http://njaes.rutgers.edu/plantdiagnosticlab/">njaes.rutgers.edu/plantdiagnosticlab/</a>

## County agent offices

Atlantic County	<a href="http://rutgers-atlantic.org">rutgers-atlantic.org</a>
Bergen County	<a href="http://bergen.njaes.rutgers.edu">bergen.njaes.rutgers.edu</a>
Burlington County	<a href="http://co.burlington.nj.us/184/Extension-Services">co.burlington.nj.us/184/Extension-Services</a>
Camden County	<a href="http://camden.njaes.rutgers.edu">camden.njaes.rutgers.edu</a>
Cape May County	<a href="http://njaes.rutgers.edu/county">njaes.rutgers.edu/county</a>
Cumberland County	<a href="http://cumberland.njaes.rutgers.edu">cumberland.njaes.rutgers.edu</a>
Essex County	<a href="http://essex.njaes.rutgers.edu">essex.njaes.rutgers.edu</a>
Gloucester County	<a href="http://gloucester.njaes.rutgers.edu">gloucester.njaes.rutgers.edu</a>
Hudson County	<a href="http://hudson.njaes.rutgers.edu">hudson.njaes.rutgers.edu</a>
Hunterdon County	<a href="http://www.co.hunterdon.nj.us/rutgers.htm">www.co.hunterdon.nj.us/rutgers.htm</a>
Mercer County	<a href="http://mercerc.njaes.rutgers.edu">mercerc.njaes.rutgers.edu</a>
Middlesex County	<a href="http://njaes.rutgers.edu/county">njaes.rutgers.edu/county</a>
Monmouth County	<a href="http://monmouth.njaes.rutgers.edu">monmouth.njaes.rutgers.edu</a>
Morris County	<a href="http://morris.njaes.rutgers.edu">morris.njaes.rutgers.edu</a>
Ocean County	<a href="http://ocean.njaes.rutgers.edu">ocean.njaes.rutgers.edu</a>
Passaic County	<a href="http://passaic.njaes.rutgers.edu">passaic.njaes.rutgers.edu</a>
Salem County	<a href="http://salem.njaes.rutgers.edu">salem.njaes.rutgers.edu</a>
Somerset County	<a href="http://somenset.njaes.rutgers.edu">somenset.njaes.rutgers.edu</a>
Sussex County	<a href="http://sussex.njaes.rutgers.edu">sussex.njaes.rutgers.edu</a>
Union County	<a href="http://ucnj.org/rce/">ucnj.org/rce/</a>
Warren County	<a href="http://warren.njaes.rutgers.edu">warren.njaes.rutgers.edu</a>

# Forestry Programs for Landowners\*

## Backyard Forestry in 90 Minutes

Date	Location	Description
Monthly, Second Thursday 7:00 p.m. – 8:30 p.m.	Forest Resource Education Center Jackson, NJ	Monthly programs for New Jersey landowners and homeowners on forestry topics from pruning to maple sugaring. Free.  www.njforestry.org/mybackyard (908) 832-2400

## NJ Woodland Stewards

Yearly, third weekend in October	Lindwood-MacDonald YMCA Camp near Stokes State Forest or Lighthouse Center for Natural Resource Education in Waretown, NJ	This three-day overnight educational and outreach program trains those who love and speak for the woods. Participants are immersed in latest forest and wildlife stewardship principles during hands-on activities and lessons by experts in environmental science. \$75, includes meals and accommodations. 30 hours of volunteer service required.  www.njwsprogram.org info@njwsprogram.org
----------------------------------	---	--

## Master Gardener

Varies, contact your county Rutgers Cooperative Extension Office	Varies, contact your county Rutgers Cooperative Extension Office	Master Gardeners are volunteers committed to providing gardening and horticultural information and services to their community. \$250, 60 hours of training. 60 hours of volunteer service required.  http://njaes.rutgers.edu/mastergardeners/
--	--	---

## Pinelands Short Course

Yearly, March	Stockton College, Galloway, NJ	The Pinelands Short Course includes sessions on wildlife, plants, land-use, and history and culture focusing on the region known as the New Jersey pinelands. \$40  (609) 894-7300, ext. 125
---------------	--------------------------------	--

## Tree Farm Day

Yearly, first Friday in June	Varies, always a site of exceptional forest management	Tour projects by experts in resource management; attend talks on forestry, and wildlife management practices. Outstanding Tree Farm of the Year and Forest Stewardship Landowner of the Year award winners announced. \$15  www.treefarmssystem.org/new-jersey
------------------------------	--	--

## Fall Forestry Festival

Yearly, First Saturday in October 10 a.m. – 3 p.m.	Forest Resource Education Center Jackson, NJ	Held since 1989, the Fall Forestry Festival features programs, hikes, and activities centered on environmental themes. Enjoy family friendly hayrides, nature crafts, and hands-on demonstrations. FREE  www.forestrycenter.nj.gov (732) 928-2360
--	--	---

## Wild Outdoor Expo

Yearly, second weekend in September	Colliers Mills Wildlife Management Area, Jackson, NJ	The Expo helps people connect with the natural world by providing a unique blend of conservation information, education and hands-on opportunities to learn outdoor skills and activities. Numerous environmental and conservation exhibits, demonstrations and seminars are planned for the weekend. Visitors can learn about, and try, a wide array of activities including fishing, hiking, shooting sports, kayaking, camping skills, rock climbing, wildlife watching and much more.
-------------------------------------	--	---

## ACKNOWLEDGEMENTS

Our special thanks to content contributors and reviewers of the handbook: Buddy Huffaker, Jeannine Richards, Christina Skasa, and Stan Temple, Aldo Leopold Foundation; Drue DeBerry and Emilie Cooper, American Forest Foundation. **New Jersey contributors and reviewers:** Lynn Fleming, Bob Cartica, Bill Edwards, Jon Klischies, Martin Rapp, Rosa Yoo, Alissa Gregory, Don Swaysland, NJ State Forestry Services; Barbara and Charlie Newlon, Mim Dunne, New Jersey Forestry Association; George Zimmerman, Stockton University; Eric Olsen, The Nature Conservancy; Steve Kalleser, Doug Tavella, consulting foresters; Steven Brandes, New Jersey Department of the Treasury; and Betty April, Tim Dunne, Douglas and Patricia Wengel, and Nina and Jonathan White, New Jersey forest landowners.

### NEW JERSEY FOREST QUICK FACTS

- New Jersey is 42 percent forested
- Forests are the greatest land use in New Jersey
- 62 percent of forests in New Jersey are privately owned
- Roughly 70 percent of the Highlands region is forested
- The New Jersey Pinelands covers over one million acres
- New Jersey's forests provide habitat for a diversity of wildlife including 327 migrant and resident birds, 90 mammals, 44 reptiles, and 35 amphibians

### NEW JERSEY STATE SPECIES

<b>Tree</b>	Northern red oak	( <i>Quercus rubra</i> )
<b>Memorial tree</b>	Flowering dogwood	( <i>Cornus florida</i> )
<b>Bird</b>	American goldfinch	( <i>Spinus tristis</i> )
<b>Insect</b>	Honey bee	( <i>Apis mellifera</i> )
<b>Flower</b>	Common violet	( <i>Viola sororia</i> )
<b>Animal</b>	Horse	( <i>Equus ferus</i> )
<b>Fruit</b>	Blueberry	( <i>Vaccinium corymbosum</i> )

### FOREST AND TREE BENEFITS

- One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen—enough to meet the annual needs of 18 people
- During a heavy rain, a healthy forest can absorb as much as 20,000 gallons of water in an hour
- A row of conifer trees planted on the north and northwest sides of a home create a wall against cold winter winds—saving up to 30 percent on heating costs



# RUTGERS

New Jersey Agricultural  
Experiment Station

## NEW JERSEY STATE FORESTRY SERVICES

501 East State Street  
Mail Code 501-4 PO Box 420  
Trenton, NJ 08625-0420

Phone: 609.292.2520

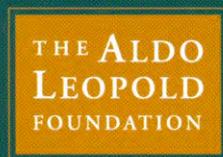
[www.forestry.nj.gov](http://www.forestry.nj.gov)

## RUTGERS COOPERATIVE EXTENSION

88 Lipman Drive  
New Brunswick, NJ  
08901-8525

Phone: 848.932.8993

[njaes.rutgers.edu](http://njaes.rutgers.edu)



## ALDO LEOPOLD FOUNDATION

PO Box 77  
Baraboo, WI  
53913

Phone: 608.355.0279

Fax: 608.356.7309

[mail@aldoleopold.org](mailto:mail@aldoleopold.org)

[www.aldoleopold.org](http://www.aldoleopold.org)



## AMERICAN FOREST FOUNDATION

1111 Nineteenth Street NW  
Suite 780  
Washington, DC 20036

Phone: 202.463.2462

Fax: 202.463.2461

[info@forestfoundation.org](mailto:info@forestfoundation.org)

[www.forestfoundation.org](http://www.forestfoundation.org)

© 2015

Printed on 10% recycled content

[www.myhealthywoods.nj.gov](http://www.myhealthywoods.nj.gov)