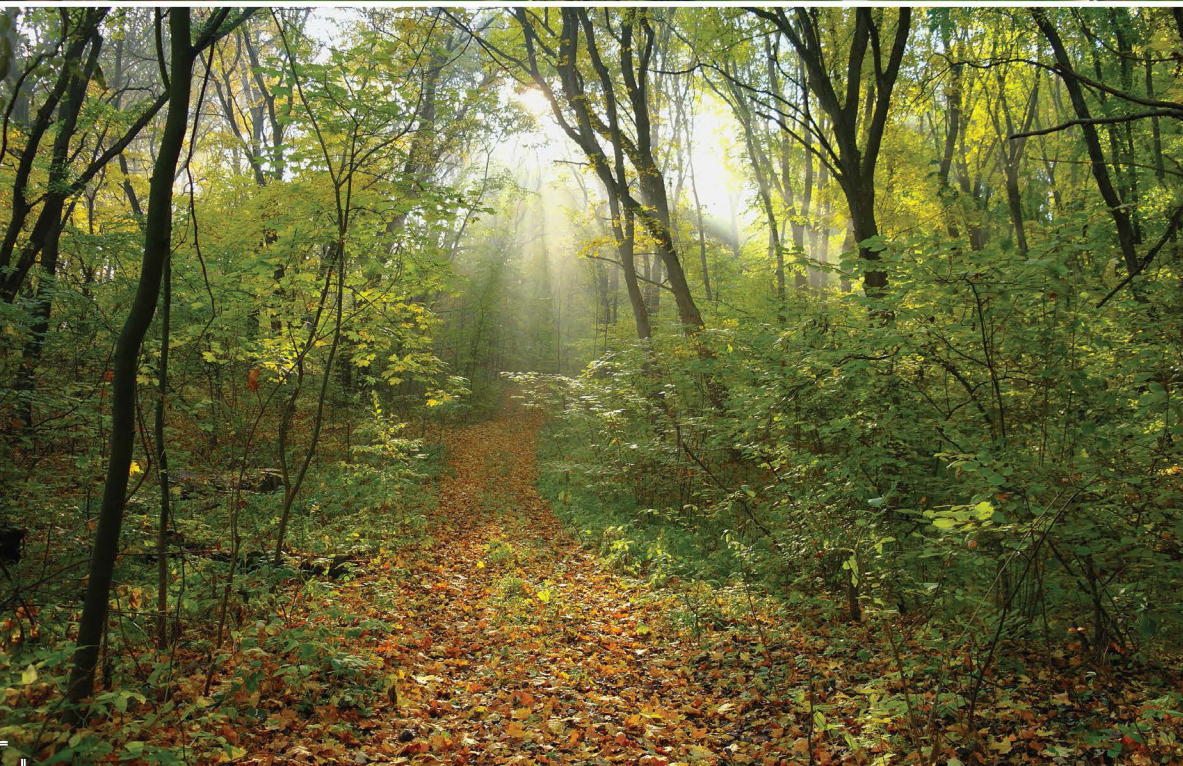


The Woods in Your Backyard

Learning to Create and Enhance
Natural Areas Around Your Home

2ND EDITION



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Foreword



by Doug Tallamy

There is no time to beat around the bush: we must rebuild the woodland network we have destroyed and responsibly manage the fragments that remain. We need to do this now—not tomorrow, not next year—because we so desperately need what woodlands give us. And private landowners are ideally positioned, both geographically and financially, to take the lead in this endeavor.

In the last two centuries, our nation's forests have been heavily exploited, first for lumber and fuel to build our nation and then by a more permanent elimination, as woodlands were cleared for development. We've learned a lot in the past century as the profession of forestry has matured, and many forests are now managed for multiple goods and services such as timber and wildlife diversity. The state of the life around us is now of greater concern.

Today, land use is increasingly shifting to developed areas: woodlands and fields that once provided timber, agricultural crops, and habitat are rapidly being lost to urban and suburban sprawl. The increasing rate at which we are losing our woodlands, their resident wildlife, and all of the ecological services they provide for us has made informed woodland management on private property more important than ever. Fortunately, we now know that woodland management need not be an “either/or” choice. You can manage the trees on your land for both wood products and biodiversity, if that is your goal—or simply to coax as much life, and thus ecosystem function and enjoyment,

from your property as possible, no matter the size of your ownership.

We need a new perspective about the role of our woodlands because the inextricable links between forest health, biodiversity, ecosystem function, and human wellbeing are not yet part of our national consciousness. Quite simply, it is woodlands that produce most of the

living things that constitute nature in the eastern United States, and it is this biodiversity that runs our ecosystems. Whether or not you enjoy the natural world, this is important to you because it is the diversity of the plants and animals around you that provides the life-giving services that support us all. It is biodiversity that produces the oxygen we breathe, cleans and stores our fresh water, sequesters carbon, builds and stabilizes topsoil, moderates severe weather, and protects our watersheds. It is biodiversity that shades us in the hot summer months and protects us

from bitter winds in the winter; and it is biodiversity that disperses seeds from parent plants, provides free pest control, and pollinates 80% of the plants on earth, including most of our crops.

Technology will never replace our reliance on these vital services, and so, for our own sake, we must be good stewards of the landscapes that produce them. Plants reign supreme among the life forms that provide ecosystem services, and native trees (those with which local animals have coevolved) provide more services than shrubs or herbaceous plants. In fact, trees are so important



Native birds, such as this black-capped chickadee, benefit from caterpillars that inhabit native trees.

The Woods in Your Backyard



This guide promotes the **stewardship** of small land parcels for the owner’s enjoyment and for improved environmental quality. If you have 1 to 10 acres of wooded or unmowed **natural areas** in the eastern United States, this guide is for you. It is also for you if you have a mowed lawn area you want to turn into **woodland**.

One of the most effective ways to improve water quality, air quality, wildlife **habitat**, and natural area health is to shift areas of lawn into unmowed natural areas or woodlands. Over a period of years, this will reduce the time you spend mowing lawn and allow more time to enjoy your family, property, and hobbies. This guide includes tips and techniques for converting lawn to unmowed natural areas and woodlands.

Additional materials, including activities, case studies, and a Resource List are included in the downloadable

guide called *The Woods in Your Backyard Workbook*, simply referred to as the Workbook herein. The Workbook, in Portable Document Format (PDF), is available through the Woodland Stewardship Education (WSE) program’s website. Go to the “The Woods in Your Backyard” page at [HTTP://EXTENSION.UMD.EDU/WOODLAND/WOODS-YOUR-BACKYARD](http://extension.umd.edu/woodland/woods-your-backyard), and click on “Beyond the Workshop” to find and download the Workbook. Throughout the guide, you will discover points to pause reading and complete

What are “woods in your backyard”?

While most of us have a sense of what “woods” or “woodland” look like, we have found it useful to define the term early in this journey into “the woods in your backyard.” For the purposes of this guide, woodland is a natural area large enough to serve as a habitat and an **ecological system**. It has enough plant and animal diversity to contribute natural system functions to the environment. While planting two or three trees on your property has definite environmental benefits, it is important to recognize that those plantings will not create an ecological system. To maximize the benefits of your efforts in converting lawn to trees, it is best to plant as many trees in as large an area as possible. This creates a place or habitat where animals and plants grow and interact in a living system and where ecological processes work. These processes include building **soil**, facilitating water infiltration, and supporting animal and plant life cycles. In addition, these spaces contribute to cleaner air and water and will moderate local temperatures.



An alternative to the traditional grass lawn.

Note: Glossary terms are **bolded** the first time they are used.

an activity found in the Workbook. The WSE program is part of University of Maryland Extension.

Overview of *The Woods in Your Backyard*

By reading this guide, completing the activities, and reviewing the resources, you will achieve a better understanding of your land and develop a strategy to achieve your goals. This includes:

- understanding the benefits of managing your land
- mapping your property, assessing why you own it, and what you hope it will become
- understanding how your property functions in the larger landscape
- identifying habitat units on your property
- learning basics of tree identification, forestry, and habitat management
- assessing and improving your property's water resources, recreational possibilities, and aesthetic appeal
- choosing a few backyard projects to help meet your goals
- setting a timetable and marking your progress

Throughout the book, we will follow the case study of one family, the Nelsons, as they complete activities and realize how they can fulfill their land management goals. The Nelsons' answers to each activity are included in this guide and can be found online on the WSE website. Two additional abridged case studies, the Lees and the Rothmans, are included in the Workbook. We suggest you read through these early in this process and refer to them as needed for specific examples.

For More Information

By design, this guide complements existing research-based information on eastern United States woodland resource and wildlife management. The Resource List in the Workbook has some of this information. Your local cooperative extension office, **soil and water conservation district**, and state forest agency are great places to find more information about land-management topics of interest to you. Find the nearest office in the phonebook or search online.

If you complete all or most of the activities presented and still want to know more, check with your local cooperative extension office for information about forest landowner education programs in your state. Cooperative

extension partners with many organizations to offer more intensive training programs on many topics covered in this guide. Educational programs may be an evening, day-long, or weekend-long training. For more information on your state cooperative extension service, visit the US Department of Agriculture's resource at [HTTP://WWW.NIFA.USDA.GOV/PARTNERS-AND-EXTENSION-MAP](http://www.nifa.usda.gov/partners-and-extension-map). This will bring you to a map of the United States. Click on your state and information will appear below the map.

Dividing Property According to Use

In this guide, a property is divided into three categories according to intensity of use.

- The *intensive-use areas* include buildings, decks, patios, paved areas, driveways, roads, and gardens.
- *Intermediate-use areas* include lawns, orchards, Christmas tree plantations, pastures, and other semi-natural areas.
- *Natural areas* include wooded and/or shrubby areas, waterside areas, and other areas that are not regularly managed or maintained.

This guide focuses only on natural areas and intermediate-use areas where you want to stop mowing.



Natural areas can be developed and nurtured in many different types of landscapes.

Conversion of Lawn to Natural Area

Many of the practices and activities presented here address intermediate-use areas. In the majority of small-acreage properties, most intermediate-use area consists of expanses of lawn. If you tire of spending time and money mowing and caring for a lawn, consider converting some of this intermediate-use area into natural area. Benefits from reduced lawn mowing include:

- improved wildlife habitat through increased plant diversity
- decreased reliance on fertilizers and herbicides
- reduced oil and gas consumption
- reduced air and noise pollution
- saved money and time

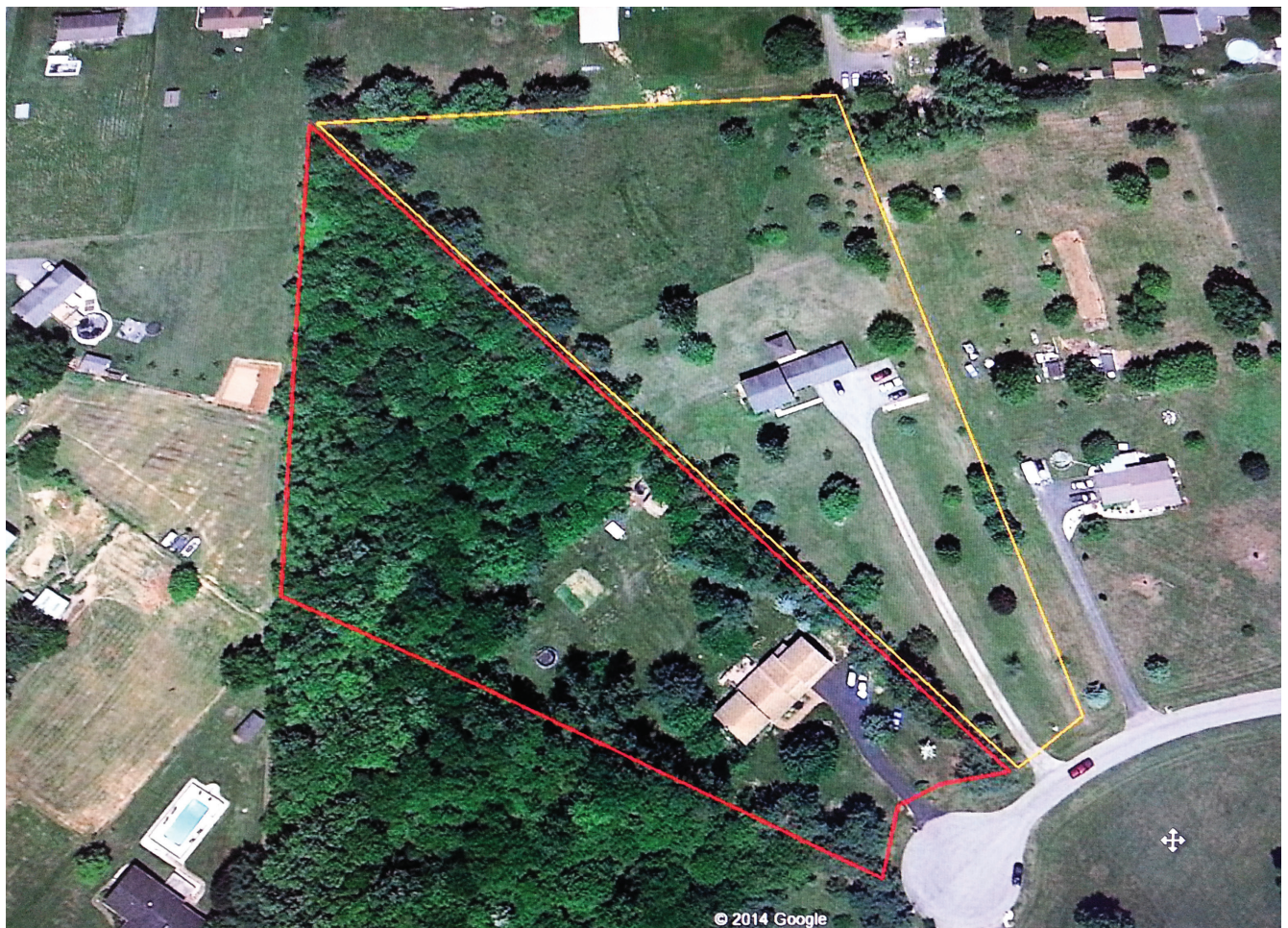
If you stop mowing grass, nature will slowly take its course and over a period of years gradually create a



Lawn mowing can be time consuming and lawns have little wildlife habitat value.

young woodland. If you prefer to take a more active approach, give your future woodland a jumpstart by planting trees. Either way, this guide can help.

Before we get started, read the short tale, *The Turtle and the Tree*, that follows.



These 3-acre lots were developed at the same time. The property on the right has intermediate use areas that can be converted to natural areas.

Ecological Principles



When German zoologist Ernst Haeckel coined the word ecology in 1873, he explained it as the relation of the animal to its environment. Ecology comes from the Greek word *oikos*, which means “home” or “household.” In this way, “ecology” can mean “the study of a home.” What would this mean in your own home? In most homes, it would include the study of unending interactions between people as they grow, mature, and change from year to year. Consider, for example, a home with parents and both teenagers and toddlers. Imagine the dynamic relationship changes as the teenagers grow to adulthood and the toddlers become teenagers.

The ecology of our natural world is similar. The flora and fauna growing and living on the land might represent family members in the home. The soil is the floor and the sky is the roof. The ecology of these organisms within their environment follows predictable patterns or principles, such as the relationship of various soil properties to **succession**, woodland, water, and wildlife.

The key to understanding and applying ecological principles is to grasp the concept that native flora and fauna function in “systems.” Consider your body. It is a system of organs, fluids, electricity, structure, and more that together are you. When we look at a field or woodland, we are actually seeing a system of living organisms and their environment, with the health of each depending on the other. Within this larger system are several sub-systems, such as squirrels, oak trees, and acorn weevils that interact dynamically with each providing food for the other.

The Nelsons’ Stewardship Journal June 17th

I remember learning about ecology in grade school, and how plants and animals are tied together in the environment. Mr. Sterrett also talked about how people can influence the ecology. We’re learning more about that now on our land. We’ve had a chance to look closely at our property this year and we see how the principles of ecology and succession and forestry work together.

I think we have pretty good habitat for some animals I hadn’t expected. Jeffrey found a frog along the stream bank and of course wanted to show it to Annie. She was more interested in playing with acorns. Jeffrey asked Tim where frogs live and we realized we didn’t know much about them aside from the stories we see about threatened amphibians. So that’s more motivation for improving the riparian buffer.

Learning more about these principles led us to decide that we’re definitely going to keep a couple of the snags I first thought should be cut down. But there seems to be more invasive plants this year than last year. Or maybe we’re better at identifying them now. Either way, it’s going to take some work.

— Ellen

perspective, soil depth is how much downward space is available for root growth and water retention. Most of our Eastern soils, at some depth, have a natural barrier of either rock or compacted clay that restricts root penetration. Drainage refers to how well and to what depth the soil lets water infiltrate. Water passes readily through sandy soil, but high clay content soil does not drain well. Plants do best on deep, well-drained soil comprised of nearly equal parts of sand, silt, and clay. Some plants, such as cattails, cypress, and sweetgum, tolerate poorly drained soils while other plants, such as chestnut oak and mountain laurel, tolerate shallow soils.

Succession, which is described later in this chapter, describes how plants compete for resources. Soils dictate how plants compete. In all soils, especially dry shallow soils, plants compete for moisture and nutrients. On mountain ridge tops where soils are often dry and shallow, some plants, like chestnut oak, have a competitive advantage. Where moisture is plentiful but drainage is poor,

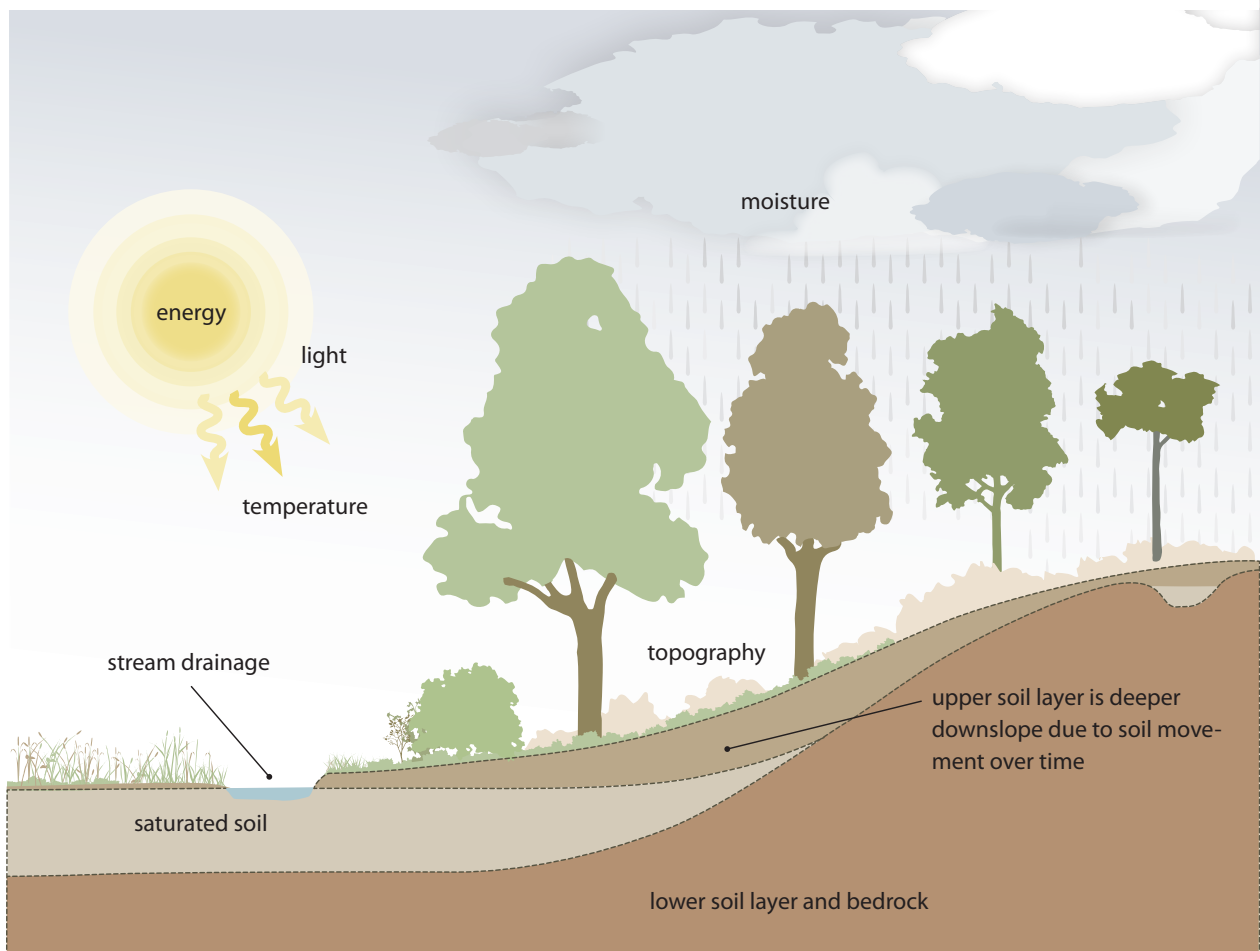
Forest Types and Indicator Species

By taking a closer look at the vegetation you can learn something about the relative soil fertility. Some plants, called **indicator species**, are very site-specific. They only grow well on deep, well drained, cool, moist, and undisturbed soils. The mix of trees and shrubs on your land are indicators of your particular forest type.

To determine your forest type, consult the Society of American Foresters' map of forest types at [HTTP://ENCYCLOPEDIAOFFORESTRY.ORG/INDEX.PHP/FOREST_TYPES_OF_NORTH_AMERICA](http://encyclopediaofforestry.org/index.php/Forest_Types_of_North_America)

Once you know your forest type, you can research indicator species for your region.

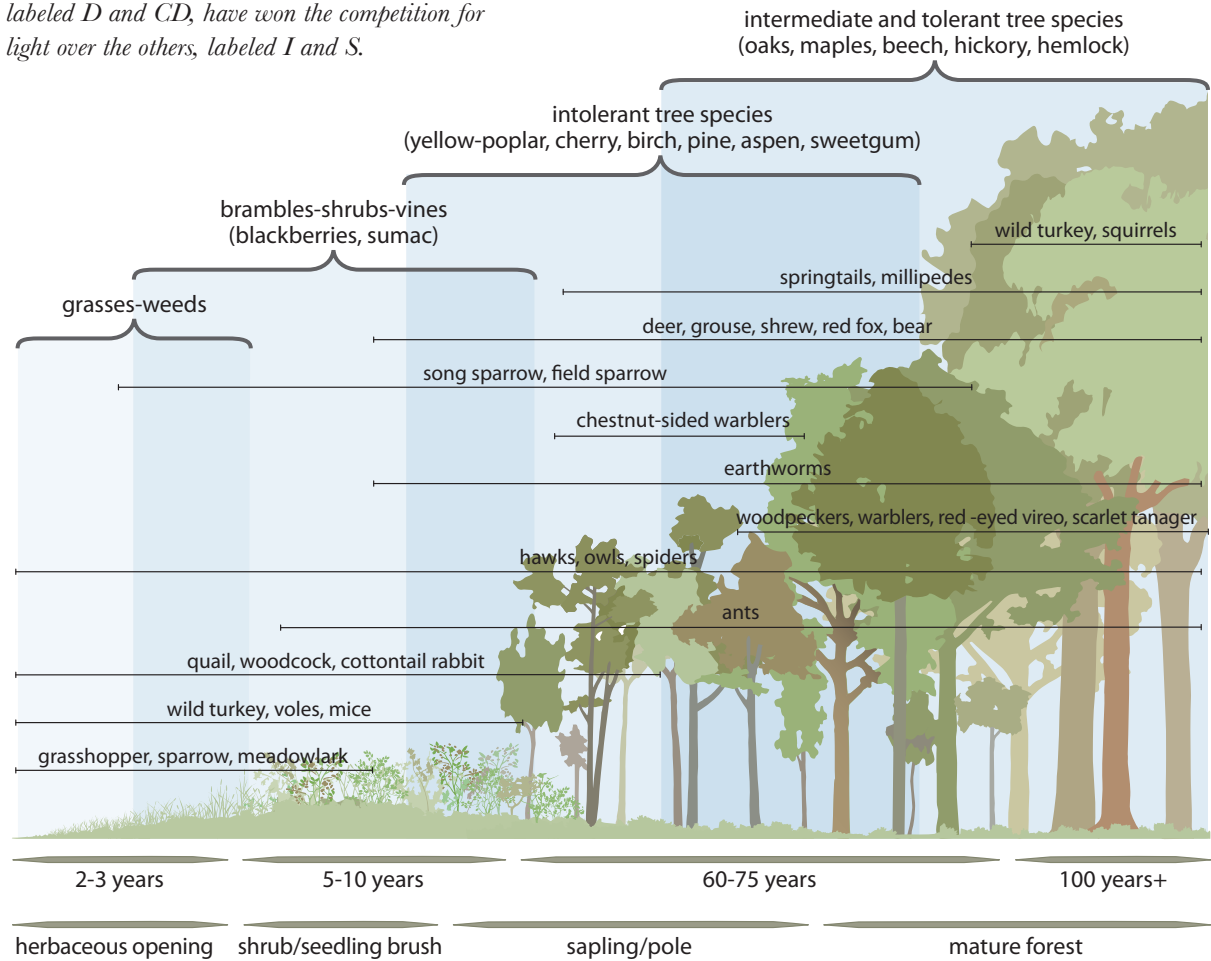
such as a swamp, the best competitors are **herbaceous** plants, trees, and shrubs tolerant of poorly drained soils, such as bald cypress or black willow.



Climate, soil, available water, elevation, and nutrients all affect how well a tree grows. If a tree species' minimum requirements are not met, that species may not even occur on the site.



In this even-aged forest, the more dominant trees, labeled D and CD, have won the competition for light over the others, labeled I and S.



Forest succession, in its simplest form, is a progression of plant communities that begins with the shade-intolerant plants occupying an area and ends with the most shade-tolerant plants occupying the area. Different wildlife populations rely on certain successional stages.



Looking up into a crowded canopy.



Looking up into an uncrowded canopy.

given situation, some trees will grow taller than their neighbors. When trees begin to get crowded and their growth rate declines, thinning to create more space around selected trees can accelerate the natural process of forest development. Choose to keep trees that have already shown their competitive edge because they are bigger, have thicker trunks, and have a better shape. Give them more space by cutting the trees around them (see *Thinning* on page 79).

Gardens serve as an example of thinning in action. More seeds are planted than can thrive in an area. Later, the weaker plants are pulled out to obtain proper spacing and at the same time weeds are removed. This reallocates resources to the remaining plants.

In a stand of trees with trunk diameters greater than 6 inches DBH, proper thinning creates space on 2 to 3 sides of the tree crown we are favoring. The bigger the tree, the more space it should have around it. After thinning, the growth rate of the remaining trees increases and their vigor improves. Consider using trees cut in this process for firewood or to create brush piles for wildlife.

Activity 5, *Assess Competition Among Trees*, will help you determine if thinning is a good idea in your habitat



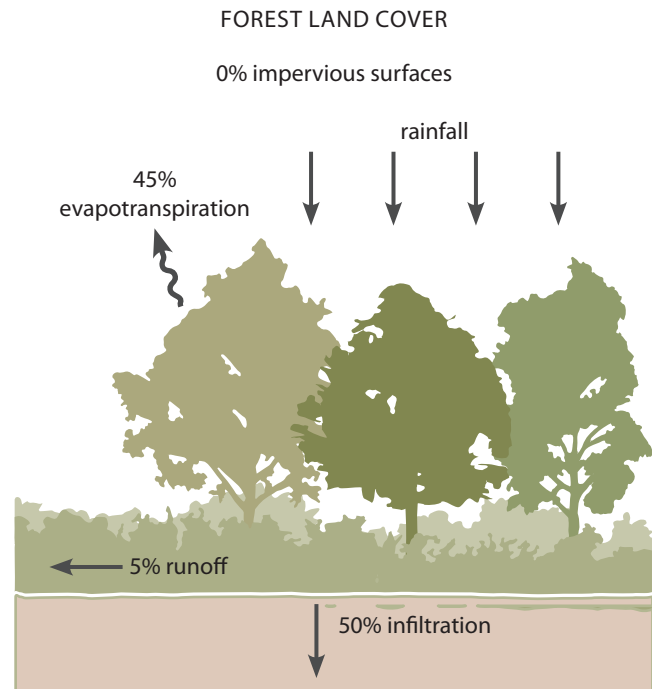
A hole in the canopy lets sunlight reach the forest floor.

WATER RESOURCES AND YOUR NATURAL AREA

Did you know your land is part of a watershed? Although it may not be immediately obvious, your land drains precipitation to a common water feature, such as a **spring**, stream, river, lake, or estuary. After precipitation reaches the land, it travels to waterways either through the soil as **groundwater** or across the surface as **runoff**. The way in which water leaves your land impacts the quality of aquatic ecosystems as well as drinking water sources.

Woodlands are excellent at controlling water quality and quantity in streams and rivers. There is very little surface runoff in forested landscapes, which is why woodlands typically produce the cleanest water available. After a rain event, trees hold large amounts of water on their leaves, branches, and stems that evaporate back to the atmosphere. The canopy and litter layer in woodlands help to dissipate the erosive energy of falling rain and protect forest soil.

Forest soils are naturally porous due to their high organic composition, the abundance of plant roots, and animal and microbial activities. This allows more precipitation to permeate the soil faster to be either used by trees and other plants through transpiration or to become

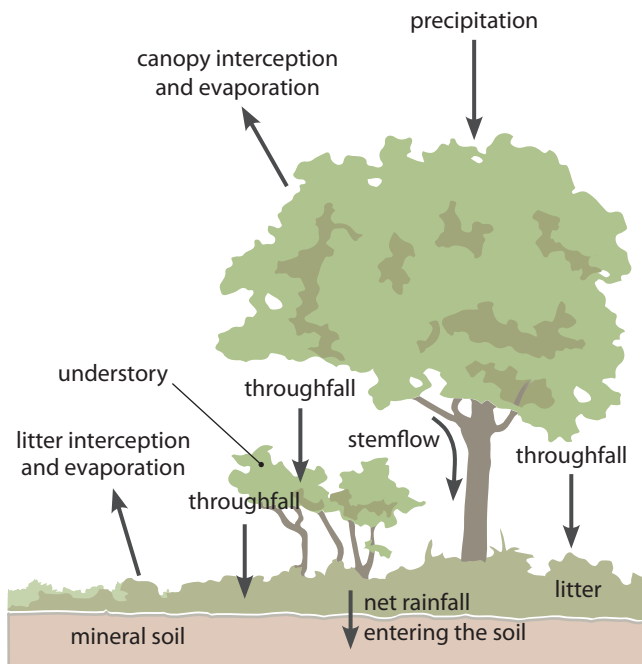


Forest-land cover helps maintain water quality and quantity by minimizing runoff.

part of the ground water moving slowly through the soil. By the time ground water re-emerges in our streams and rivers, it has been modified by the woodlands, creating a consistent and stable water resource.

The conversion of forests to other land uses affects the quality and quantity of the water entering our tributaries by altering the way it drains from the land. Tree loss significantly reduces the amount of water evaporated and transpired back to the atmosphere. Soil porosity is often degraded through compaction by activities in intermediate use areas, such as walking or lawn maintenance. Porosity is also degraded when land is converted to intensive use areas by the installation of hard surfaces with buildings and driveways, leading to increased surface flow across your land. This causes soil erosion and delivers contaminants from the land, such as fertilizers, pesticides, toxic chemicals and animal waste, to waterways. High volumes of surface runoff scour stream beds and banks, increase the number of flooding events, and degrade or remove in-stream habitat. Normal flow in these streams is reduced due to a decrease in ground water recharge.

Reducing surface runoff and increasing infiltration protects your land from erosion and reduces the amount



Typical pathways for forest rainfall. Some precipitation never reaches the ground because it is intercepted by vegetation and other surfaces.

versity, so wildlife food sources tend to abound there. The taller vegetation in a soft edge provides for safe passage and concealment. Promoting soft edges is an effective way of encouraging early and mid-successional wildlife species such as deer, turkey, quail, rabbits, and foxes.

Mast trees produce edible fruits, seeds, or nuts (Table 5, next page). It is critical to encourage native **mast trees** that nourish native insects for the birds and animals in your natural area. Native trees include oaks, hickories, beech, persimmon, serviceberry, blackgum, American holly, hawthorn, and dogwood, among others. They are an essential part of many species' habitat requirements. Hard mast consists of nuts of all types. Soft mast includes berries, **catkins**, and other fruits. Catkins are drooping, petal-less flowers of trees such as poplars, walnuts, and birches. Mast from native trees is eaten by native insects that provide an essential protein source for native wildlife. Nonnatives do not provide the same benefits. If you have no or few mast trees in your natural area, consider planting some native trees to attract more wildlife. In most cases, mast trees are already present, but face so much competition that their canopy cannot expand and



Berries provide soft mast.

produce mast. Thinning the forest to remove crowding or overtopping tree crowns will allow the crown of a mast tree to expand. See *Thinning* on page 79 for more information. See Appendix B beginning on page 96 for more information about the value of various tree species as wildlife food.

Openings in the forest canopy introduce new kinds of plants by allowing more sunlight to reach the forest floor. Grasses and forbs will thrive in an opening for several years and slowly be replaced by shrubs and small trees. Animals that benefit from an opening include deer, ruffed grouse, turkeys, hawks, foxes, and rabbits. Species that depend entirely on woodlands, such as woodpeckers, will move to other areas. Creating an opening can be especially valuable to wildlife if there is a lot of relatively unbroken mature forest around your property.

Rock cliffs, outcrops, and piles often provide cover for snakes, raccoons, chipmunks, cliff swallows, and bats.

Snags are dead standing trees. As long as **snags** do not pose a danger to property or to people using the land, it is best to leave a few standing. Remove trees hanging over a trail or poised to fall on a structure. Leave 2 to 3 snags per acre that are greater than 7 inches DBH for wildlife benefit. For example, insects found in dead and decaying wood are an important food source for many species. In addition, many animals nest inside hollow cavities in snags.

If you do not currently have snags but would like to attract wildlife species that use them, see *Girdling* on page 76. Animals that use snags include owls, squirrels, woodpeckers, raccoons, foxes, bats, and bears. Because snags



Catkins, such as on this white birch, provide an important source of soft mast for wildlife.

Inventory Your Property



The word “inventory” is both a noun and a verb. You can inventory your personal possessions, and those possessions are also an inventory. Many families have experience creating inventories for a variety of purposes, such as when packing belongings before moving, when applying for or updating insurance policies, or when assessing clothing or supplies needs before back-to-school sales.

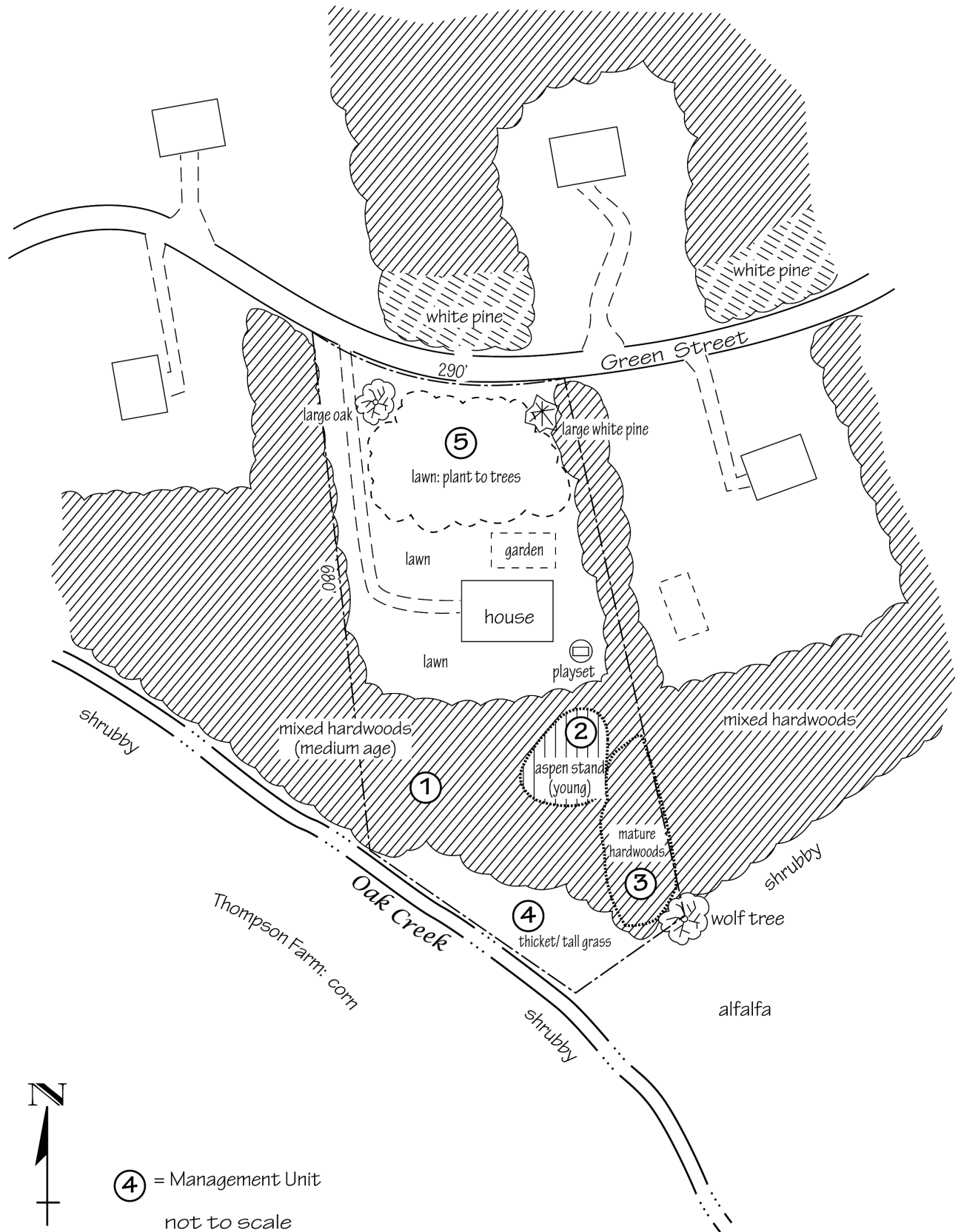
In this chapter, we use the term in both forms as we share a variety of tools for creating an inventory of your natural area and for understanding how it fits into the larger landscape around you. In addition, you will learn ways to use the natural area’s inventory to your benefit by sharing it with others.

Likely the inventories demonstrated in this chapter will not be familiar to you. Unlike a household inventory for a homeowner’s insurance policy, where it is important to know the quantity of each insured item, natural resource inventories are more abstract. They do not require hard-and-fast numbers. Instead, we encourage you to take a “big picture” look at the environment of your natural area and its surroundings. Think of this as less like taking an inventory of people in your community but more like an assessment of the various neighborhoods. With this in mind, let us start by looking at your place in the overall landscape.

The Nelsons’ Stewardship Journal September 8th

I got talking with Ben and Margaret Stanfield the other day. They own the property to the east of us, but the south end of their property line runs against one of the Thompson Farm fields – the one that’s in alfalfa this year. They asked about our success in getting rid of the tree-of-heaven, because they’ve found some on their property as well. They also wondered if they could cross our property to get to Oak Creek. Their son and grandson are coming to visit, and would like to go fishing. That got us thinking about working together to build a trail that would make it easier for them to reach the creek. It’s too late now to think about building it this year, but after the leaves have fallen, Ben and I can take a closer look at the area where a trail could go. I just want to make sure we can do it without creating erosion problems.

— Tim



The Nelsons' map with their neighbors' properties included.

Step 3 - Simple or Compound

The third distinction is whether the leaf is simple or compound. A simple leaf attaches directly to the twig next to the bud with a single blade. A compound leaf has multiple blades or leaflets, each of which attaches to a stem or rachis, which then attaches to the twig. The stem does not have a bud where the leaflets attach, rather, the bud is on the twig.

Step 4 - Leaf Shape and Edge

Look next at the leaf shape. Is it round, heart-shaped, oblong, or something else? And what about its edge? Is it smooth, toothed, or lobed?

In Activity 12 you will use these steps to identify the most common trees and shrubs in your natural area. You will need a tree guide. See the Resource List in the Workbook for suggestions.

Complete Activity 12, *Get to Know Your Trees*, from the Workbook. Find Worksheet A started in Activity 3.



Smooth leaf: Common pawpaw.



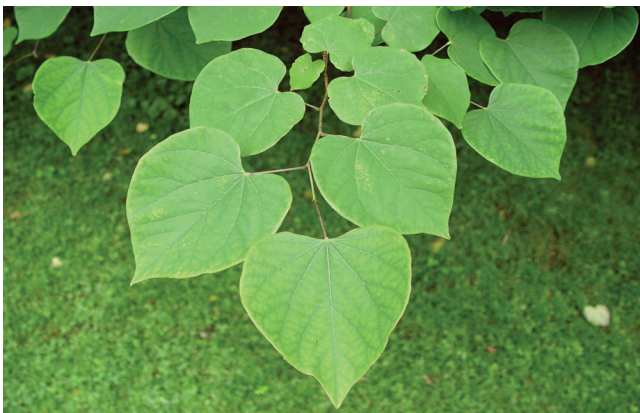
Toothed leaf: Quaking aspen.



Compound leaf: Black walnut.



Lobed leaf: White oak.



Simple leaf: Eastern redbud.

Add information about trees and shrubs in each habitat area to columns four and five.

The Nelsons' completed Activity 12 is on the following page.

Now it is time to think about some of potential uses of your natural area. In the next section, you will learn how different parts of your property can provide recreation or relaxation.

How To Plant a Tree



- 1) Use a shovel or planting bar (shown here) to make a hole for your seedling.
- 2) Remove a shovel full of dirt and insert the seedling so that the roots will be just below ground and against the side walls of the hole.
- 3) Refill the hole with dirt on all sides of the seedling.
- 4) Gently tamp down the soil with your foot.
- 5) When you're finished planting a seedling, the roots should feel firmly anchored when you pull on the stem.



lings. You often see such shelters in riparian and field plantings. Seedlings grow up and out of the tree shelters in a few years, depending on the species. Wait at least two years after branches fully emerge from the shelter before removing it or wait until the tree grows large enough to break the shelter. Some trees grown in shelters may require staking until their trunks strengthen after the shelter is removed. It is critical to maintain shelters to ensure they do not injure the seedling. Straighten shelters and check stakes annually. See the Resource List in the Workbook for information about where to purchase tree shelters and how to use them.

What maintenance will the site need? Until the trees emerge from the tree shelters, mow between rows several times each growing season to improve access and, if it is important to you, to improve the site's appearance. For

a few years, to kill grass and keep weeds down, you may spray herbicide around the shelters or reapply mulch if you manually removed the sod. This helps ensure seedlings get adequate water and nutrients, which is especially important when converting lawn areas. After a few years, when the trees are established, occasional mowing will improve appearance and will be less necessary as the tree crowns begin to close in. Patrol the site regularly and spot treat or remove exotic invasive herbaceous and woody plants. See pages 34 and 35 for photos of invasive species.

What about shrubs and smaller plants? Mixing trees, shrubs, grasses, and herbaceous plants will attract the greatest variety of wildlife. Shrubs provide fast-growing cover and produce seeds (food) for small animals and birds more quickly than many trees. Eventually, trees will



Girdling a tree will slowly kill it, creating a snag

serves as important wildlife habitat for insect feeders and cavity- and den-dwelling animals and birds. About three-dozen bird species and almost two-dozen mammal species in the eastern United States use snags at some time during their life cycles. Be aware, that girdled trees may become a hazard. Regularly assess snags and dead trees on your property. Girdled trees and standing snags should not be near trails or other areas people frequent.

To girdle a tree, use an axe, hatchet, or chainsaw to cut a groove to interrupt sap flow. The groove must completely encircle the trunk and penetrate into the wood at least 1/2 inch on small trees, and two to three times that much on larger trees. The width of the notch varies with the size of the tree. On small-diameter trees, 1 or 2 inches is probably sufficient. For trees greater than 18 inches in diameter, the girdle should be 6 to 8 inches wide. Girdled trees do not always die quickly. Sometimes they continue to grow some leaves for several years.

Grapevines

Grapevines provide important wildlife mast. If your interest is encouraging wildlife to come on into your natural area, it is best to leave some grapevines. However, grapevines can severely damage forest tree crowns and canopies. A good compromise is to cut vines that extend into the crowns of trees you want to keep. Where the vines extend into poor quality trees, consider felling those trees in small groups. This brings the vines down to the forest floor where they provide cover as well as food. It takes care to do this, but with planning and forethought it is possible to do so safely. Once the trees are down, cut all vines extending into the adjacent canopy to keep them from running across the top of the forest. When vines are cut near the ground and under a forest canopy they

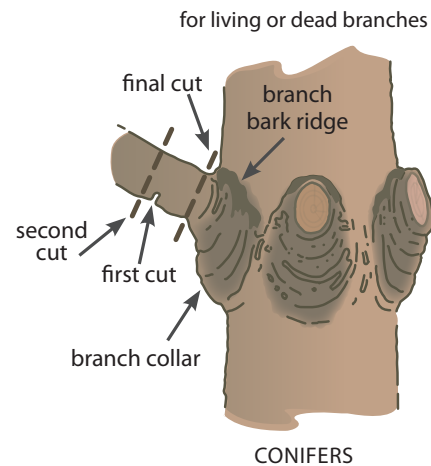
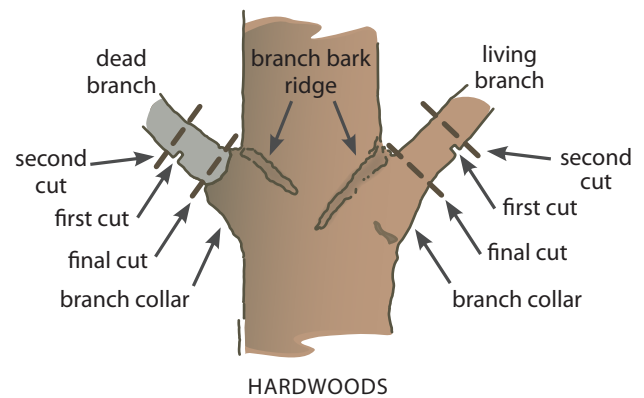
eventually die in the low light levels and the severed vines dry and fall out of the trees. In open areas, such as old fields or areas with widely spaced trees, consider applying herbicide to the vine stumps.

Mast trees

Mast trees are important sources of wildlife food. Literally, mast means forest food. Mast trees attract deer, squirrels, chipmunks, turkeys, wood ducks, songbirds and other animals. Mast trees are especially useful to wildlife in suburban neighborhoods where food sources may be scarce. See *Planting Trees and Shrubs* starting on page 69 for plant selection and planting advice. Leave fallen fruits and nuts on the ground for wildlife. Appendix B on page 96 describes the food value of various tree species.

Pruning

Pruning involves removing the lower tree branches. This often happens naturally, especially with forest-grown deciduous trees. Some species, especially coniferous trees like



Proper pruning results in healthier trees.

white pine and hemlock, benefit from pruning because it removes knot-forming branches and crooks that reduce future timber quality. Pruning also reduces the risk of wildfire damage, as a low-burning fire will not easily reach into a pruned conifer forest's canopy. However, when the lower branches of conifers are not pruned, they provide wildlife cover. So, the extent of pruning depends on your management objectives. Knowing how to prune correctly is an important skill and will prove useful when developing trails, creating vistas, or creating small openings.

Stem, stump, or basal herbicide applications

Stem, stump, or basal herbicide applications concentrate the chemical to the individual tree or stump of interest and thereby minimizes its overall use and exposure in the surrounding environment. These methods can be easily carried out by most landowners for control of invasive vines and trees, especially those that propagate by root sprouting. It is also used for crop tree release and for generally influencing the species composition of the woods. These techniques are most effective when done in late summer and fall when the plants are moving sugars produced by the leaves to their roots. **Basal application** and **stem injection application** are most effective on trees up to 6 inches in diameter.



Basal application uses a mixture of herbicide and oil to coat the lower 12 to 15 inches of a stem. It can be applied and effective any time of year.



Hack 'n squirt herbicide application along with stump and basal treatments are very effective in reducing root sprouting. Proper safety equipment is essential when applying herbicides.



Stump treatment involves spraying herbicide on the outer phloem layer that transports nutrients to the roots. It can be used on stumps of all sizes.

Stem injection application, commonly called “**hack 'n squirt**,” is a method that involves making a cut with a sharp ax and spraying a solution of 50% herbicide and 50% water into the slit. **Stump application** requires using the same herbicide mixture and applying it immediately to the outer inch of a newly cut stump. Basal application involves spraying the herbicide mixed with an oil carrier to the bottom 12 to 15 inches of the tree trunk. The advantage of this method is that it can be effective any time of the year.

The herbicides most commonly used for stem injection and stump treatment are glyphosate (commonly marketed as the product Roundup®) and triclopyr (commonly marketed as the product Garlon 3A®). These are water-based formulations. For basal application, triclopyr (Garlon 4®) is mixed with oil specifically designed

assistance as well. Review your plans with these experts and consider their feedback as you finalize your plans.

Activity 16 includes a table to help prioritize projects and add project descriptions, tentative schedules, cost estimates, and other information. Complete Activity 16, *Project Schedule and Details*, from the Workbook.

The Nelsons' answers to Activity 16 can be seen on pages 86 and 87.

Before beginning any projects, assess the current conditions where you plan to work and note them in



When in doubt, consult a professional.

your stewardship journal. These observations can take several forms. You can describe them in writing or use photographs or sketches. You could make a video that includes family members and others that helped develop your strategy. When you review the description of areas before changes were made, it will remind you of where you started and how much you have accomplished.

It is also important to document your progress. The next section provides ideas for tracking your accomplishments.



1927

Photos taken from the same point every twenty years on the Allegheny National Forest in Pennsylvania. The forest recovers from disturbance more quickly than we might expect. The series illustrates the process of succession.



1947



1968



1988

The Woods in Your Backyard
was developed with cooperation
from these organizations.

