ROCHESTER PLATEAU AND BLUFFLANDS

WOODLANDS OF MINNESOTA

LANDOWNER

HANDBOOK

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

About the Woodlands of Minnesota Series

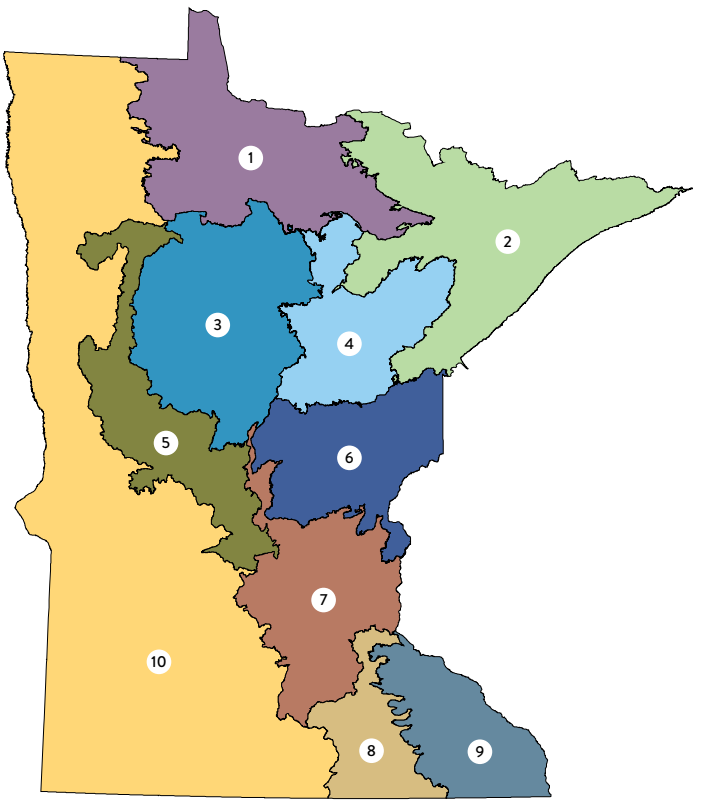
Woodlands of Minnesota is a series of handbooks for woodland owners in different areas of the state.

This handbook is for people who own woods in the Rochester Plateau and Blufflands ecological subsections, labeled as 9 on the map.

If you own woods in other parts of the state, see **mndnr.gov/woodlands** for handbooks designed for your area.

Areas Covered by Handbook Series

1. Agassiz Lowlands and Littlefork–Vermillion Uplands
2. Northern Superior Uplands
3. Chippewa Plains and Pine Moraines–Outwash Plains
4. St. Louis Moraines and Tamarack Lowlands
5. Hardwood Hills
6. Mille Lacs Uplands and Glacial Lake Superior Plains
7. Anoka Sand Plain, Big Woods, and St. Paul–Baldwin Plains and Moraines
8. Oak Savanna
9. Rochester Plateau and Blufflands
10. Tallgrass Aspen Parklands and Prairie Parkland



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Introduction

Nearly 191,000 private woodland owners in Minnesota collectively own more than 6 million acres (about one-third) of the state's total forest land. These are individuals, families, cooperatives, or small businesses who own woods for a wide range of reasons such as recreation, hunting, investment, or timber. You are a part of this landowner community.

Private woodlands provide important benefits such as clean air and water, scenic beauty, hunting, angling, birdwatching, and the raw materials to make paper and other wood products. Minnesota's landowners help enhance these benefits for themselves and others through active involvement in caring for the health of their woods. As a landowner in southeast Minnesota, many resources are available to help you take care of your woods. Whether you are looking for new ideas or just looking for a place to start, this handbook can help you accomplish your goals.

How to Use This Handbook

This handbook is both a reference and a workbook. It contains information on the past and present condition of land in this region, insight into some of the biggest challenges woodland owners face here, and tips for making and accomplishing goals for your woods. This handbook includes:

Landowner Spotlights—Meet a few of your southeast Minnesota neighbors! Their stories, experiences, and words of wisdom may inspire ideas for your own woods.

Woods Workbook—The workbook on pages 88-93 guides you through setting goals for your woods and how to get them done. A digital version can be found on **mndnr.gov/woodlands**

Vocabulary—The bold italic words are defined at the end of each section ("part").

Handbook Website—The handbook website contains additional resources, including contact information for your local natural resource professionals and ideas for woodland projects. **mndnr.gov/woodlands**

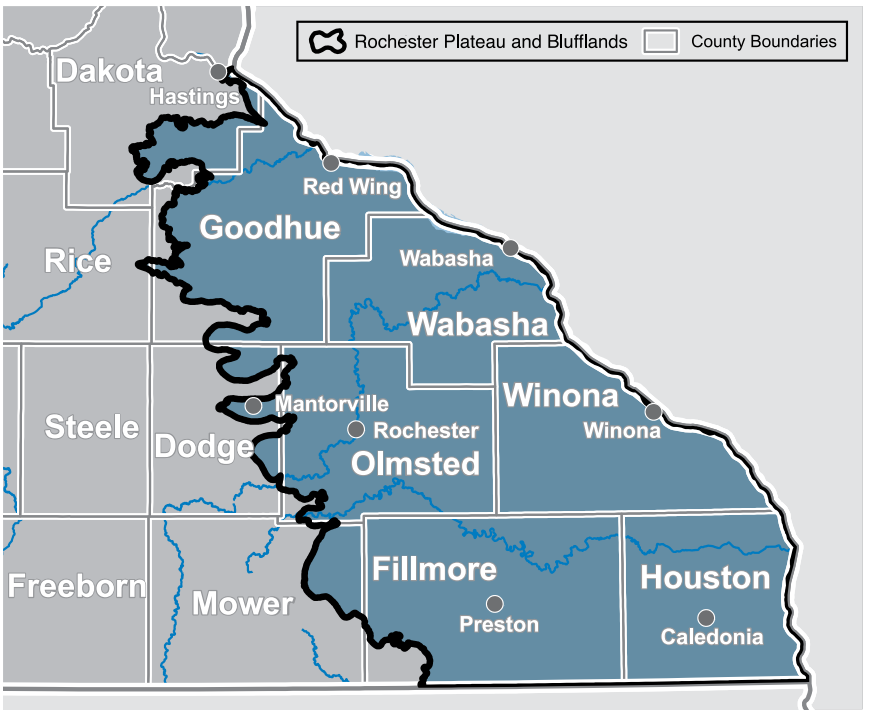
Land Covered in this Handbook

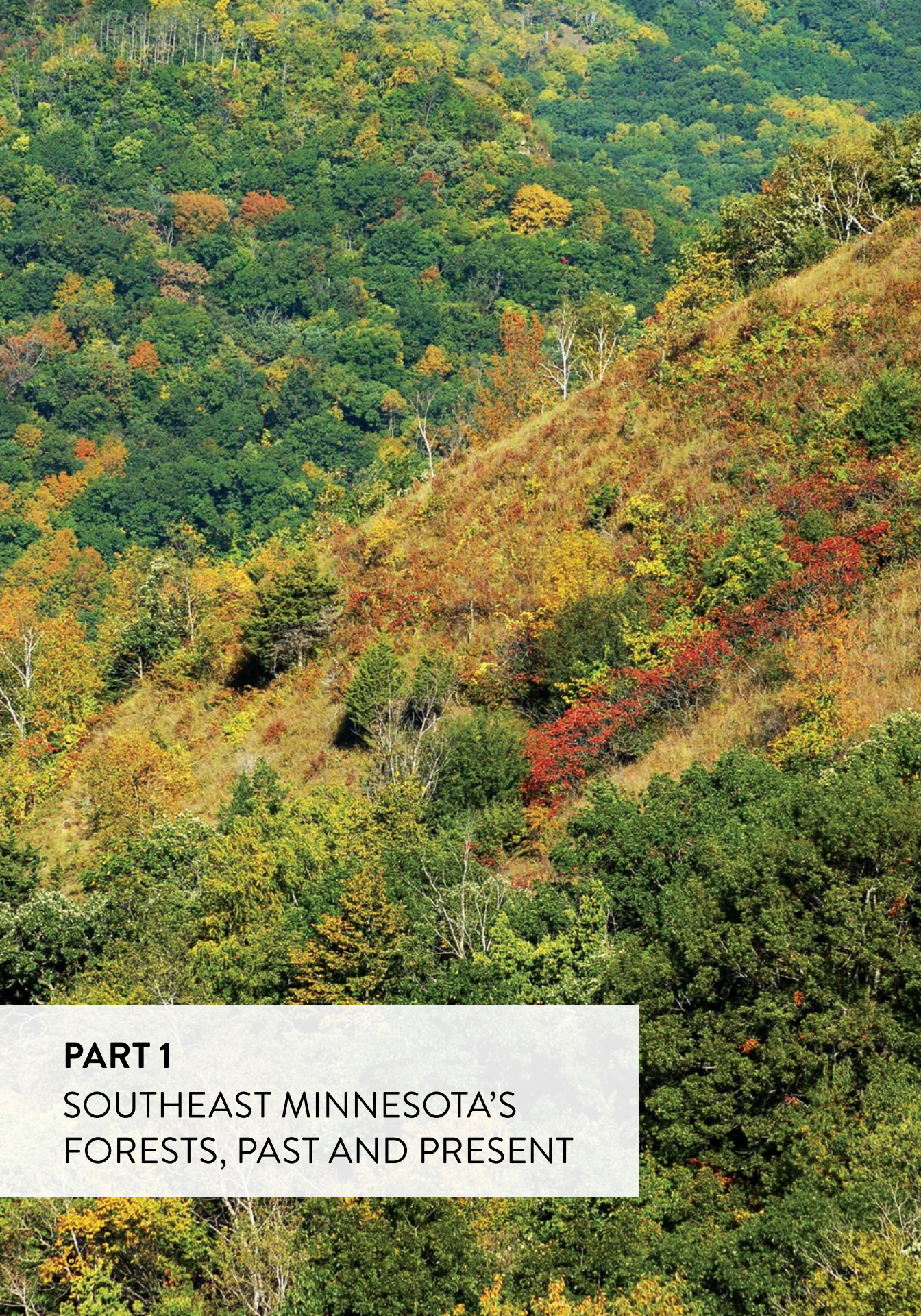
This handbook is specifically designed for those who own land in the area of southeast Minnesota known by ecologists as the Rochester Plateau and Blufflands. This region, also known as the Driftless Area, is quite different from the rest of the state because glaciers missed this area during the last ice age.

These subsections span all or parts of Dakota, Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Wabasha, Washington, and Winona counties.

- **Dakota County:** 19%, or 69,881 of 374,981 total acres, is located in these subsections and makes up 3% of the subsections.
- **Dodge County:** 18%, or 50,344 of 281,164 total acres, is located in these subsections and makes up 2% of the subsections.
- **Fillmore County:** 94%, or 516,737 of 551,460 total acres, is located in these subsections and makes up 20% of the subsections.
- **Goodhue County:** 85%, or 425,525 of 499,093 total acres, is located in these subsections and makes up 16% of the subsections.
- **Houston County:** 100% of 363,942 acres are located in these subsections and makes up 14% of the subsections.
- **Mower County:** 12%, or 54,333 of 455,010 total acres, is located in these subsections and makes up 2% of the subsections.
- **Olmsted County:** 96%, or 403,775 of 418,743 total acres, is located in these subsections and makes up 15% of the subsections.
- **Rice County:** Less than 1%, or 1,113 of 329,914 total acres, is located in these subsections and makes up 0% of the subsections.
- **Wabasha County:** 100% of 3541,374 acres are located in these subsections and makes up 13% of the subsections.
- **Washington County:** Less than 1%, or 95 of 270,980 total acres, is located in these subsections and makes up 0% of the subsections.
- **Winona County:** 100% of 410,324 acres are located in these subsections and makes up 15% of the subsections.

ROCHESTER PLATEAU AND BLUFFLANDS





PART 1
SOUTHEAST MINNESOTA'S FORESTS, PAST AND PRESENT

Chapter 1: The Forest Landscape Around You

If you peered out of an airplane window as it passed over your woods in the summer, you might be hard-pressed to pick out your own trees from the patchy sea of green below. Your property is one piece of a much larger landscape. A ***landscape*** consists of all land uses (forest, wetland, agriculture, urban) and ownerships (public, private, tribal) within a defined area that can cover millions of acres. Taking a good look at the forests in your surrounding landscape can teach you a lot about what you might expect to find in your own woods.

Describing Your Landscape

If someone asked you where your property is located, how would you answer? Often people use political boundaries to define their area such as "Wabasha County" or "east of Rochester." Sometimes they use nearby natural features as reference points such as "in the Cannon River valley." Based on the soils, climate, water, and plants in this region, ecologists call the western part of this area the ***Rochester Plateau*** subsection and the eastern part of this area the ***Blufflands*** subsection. But before we get into current classifications, let's take a trip back in time.

From the air, you can see that your woods are part of a larger landscape.

Historic Land Cover and Current Land Use

The area covered in this handbook encompasses approximately 2.6 million acres, which consists of rugged bluffs and valleys. Although originally a ***plateau*** underlain by rather flat sedimentary rock, in the past 10,000 years streams and tributaries have eroded the landscape on their way to the Mississippi River. The remains of the plateau are most evident along the western part of the area and least evident near the Mississippi River. Unique and diverse flora and fauna live in the abundant rock outcroppings. This area of Minnesota is nearly absent of glacial deposits, and has deep, narrow valleys with cool, fast-flowing streams. Finally, the underlying, porous limestone allows water to percolate swiftly underground creating numerous caves, sinkholes, and underground streams—all features common in ***karst*** topography.

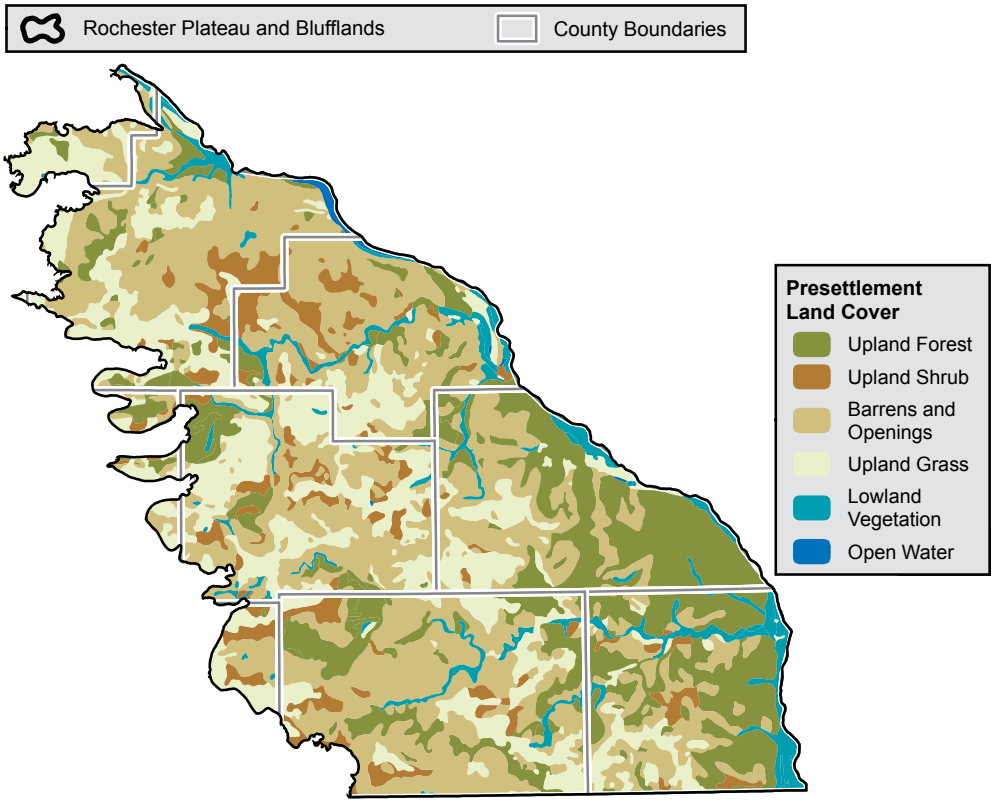
Before European settlement, slope, aspect, flooding, and influenced vegetation. Most of the area is covered by deposits of soil formed by ***loess*** or ***alluvium***. Prairies occupied the flat, fire-prone remnants of the plateau in the west. Woody vegetation developed on steep slopes in areas cut by rivers and protected from wildfires. Dry prairies formed at the tops of southwest-facing bluffs with oak woodland developing downslope, especially on northward- and eastward-slopes. ***Mesic*** (mesic means between wet and dry) forests prevailed on north- and east-facing slopes, usually dominated by oak on the upper parts, with basswood and then sugar maple increasing downhill. Wet-mesic forests of basswood, sugar maple, black maple, elm, bur oak, black ash, and walnut were present on level, silty valley bottoms on terrain divided by flowing water. Sandy valley bottoms supported dry prairies, black oak woodlands, and rarely, jack pine savannas and woodlands. The bottomlands of broad valleys such as that of the Mississippi River were covered with floodplain forests of silver maple and river birch. Forests of silver maple, elm, green ash, hackberry, cottonwood, basswood, and swamp white oak thrived on higher river terraces.

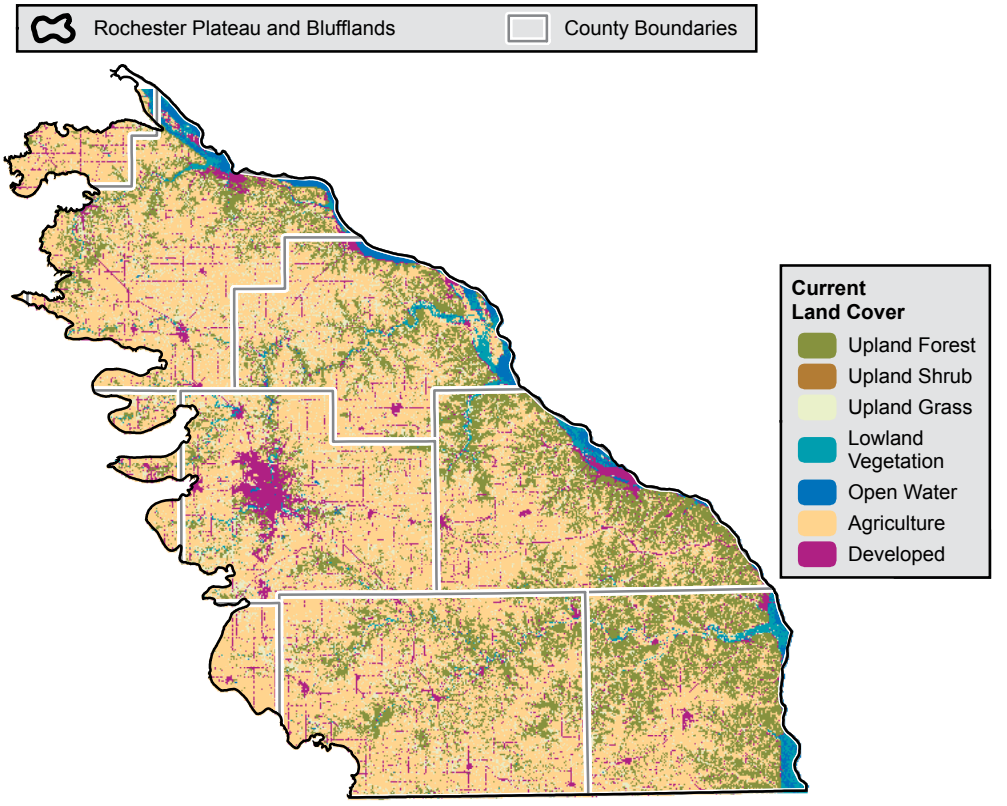
Southeast Minnesota receives more inches of precipitation than in other parts of the state. Total annual precipitation ranges from 29 inches in the west to 34 inches in the southeast. Of this, 11 to 16 inches falls during the growing season, which lasts for approximately 136 to 156 days.

This landscape has changed in recent times. Agriculture is a major land use important to the local economy today. While 55 percent (approximately 1.5 million acres) are used for pasture or growing crops, 22 percent is forested, mostly in small, fragmented patches on steep side slopes of terraces in the Blufflands subsection. The steep slopes and karst topography make this area particularly susceptible to soil erosion and groundwater contamination by nitrates and phosphates resulting from agricultural activities.

With picturesque valleys, mature deciduous forests, numerous coldwater trout streams, trails, parks, and campgrounds, this region attracts numerous anglers and recreationists.

LAND COVER: PAST AND PRESENT



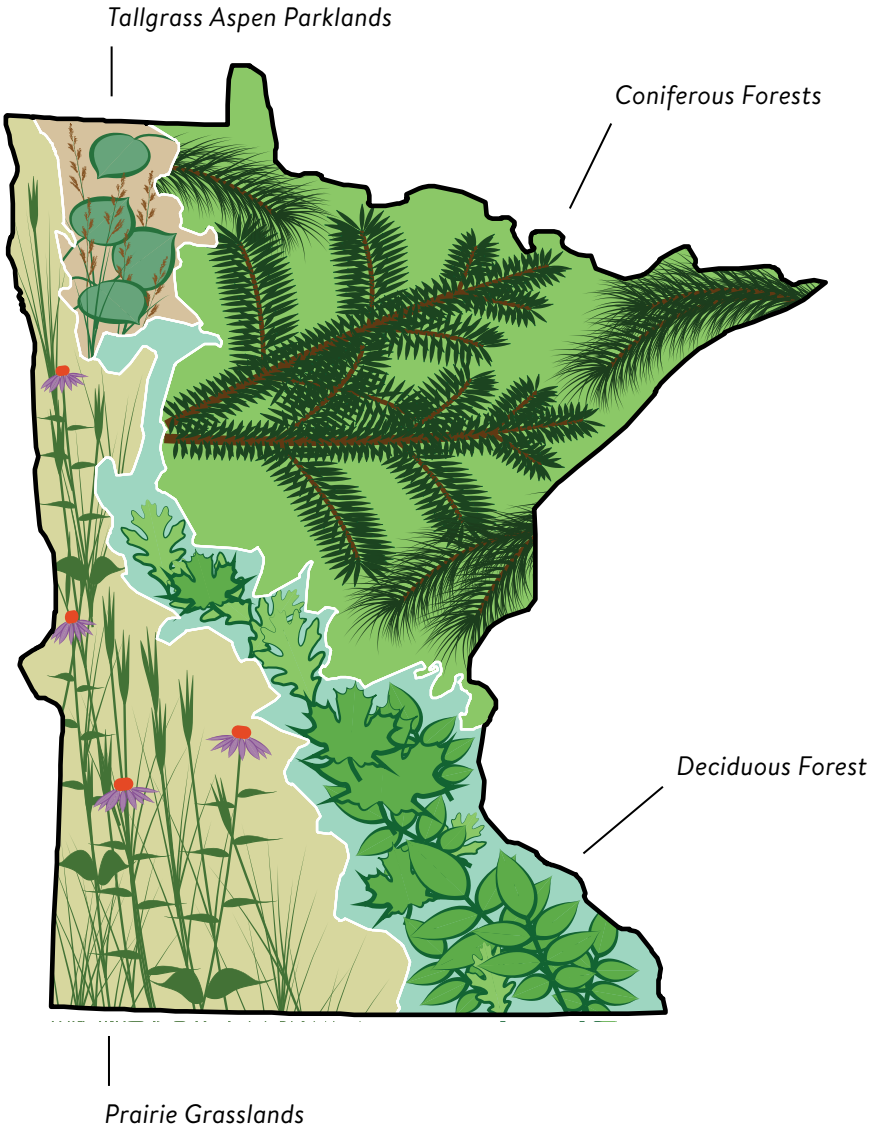


How We Classify Forests Today

Minnesota is located at a great North American transition zone. Here grassland, deciduous (hardwood) forest, and coniferous forest converge and intermingle. As such, tree-covered landscapes can vary greatly. For example, sparsely wooded oak savannas are common in south-central Minnesota. Mixed grass and aspen parklands dominate the northwest. Bluffs blanketed by deciduous trees cover southeast Minnesota. Dense forests filled with pine, spruce, fir, aspen, and birch characterize the northeast. Finally, mixes of these landscapes can be found throughout the central parts of the state.

While there are several systems in use today that define Minnesota's landscapes, this handbook refers to the ***Ecological Classification System***.

MINNESOTA BIOMES



Ecological Classification System

Ecologists created the Ecological Classification System (ECS) to help people who manage the state's natural resources (trees, wildlife, waters, etc.) identify patterns in the landscape to better understand the land's potential. The system divides the landscape into progressively smaller areas based on similarities and differences according to climate, geology, natural features, and the types of vegetation present.

The levels of the ECS hierarchy are nested within each other, similar to townships within counties and counties within states. The highest of the four ECS levels used in Minnesota is ***province*** (level 1), followed by ***section*** (level 2), ***subsection*** (level 3), and ***land-type association*** (level 4). Note that these ecological boundaries extend across state lines. For instance, the ***Eastern Broadleaf Forest Province*** encompasses central and southeastern Minnesota and parts of Iowa, Wisconsin, Michigan, Ohio, New York, Illinois, Indiana, Kentucky, Tennessee, Missouri, and Arkansas.

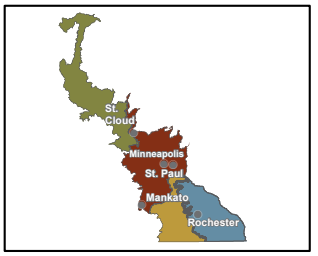
This handbook focuses on the two ecological subsections: Rochester Plateau and Blufflands, which both contain a combination of deciduous forest and prairie.

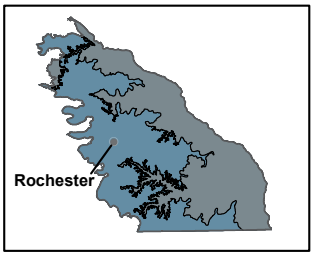
A map listing all 26 subsections within Minnesota can be found on page 87.

ECOLOGICAL CLASSIFICATION SYSTEM HIERARCHY

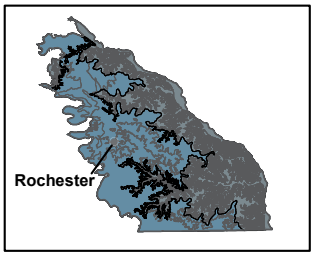
Level 1: Minnesota Provinces

Level 2: Sections in the Eastern Broadleaf Province





Level 3: Rochester Plateau and Blufflands Subsections



Level 4: Land-Type Associations in the Rochester Plateau and Blufflands Subsections

Native Plant Communities

At an even smaller level, ecologists classify land into ***native plant communities*** based on native vegetation, landforms, and other local conditions such as amount of rainfall and soil richness. This system is used to describe patterns on the landscape more precisely.

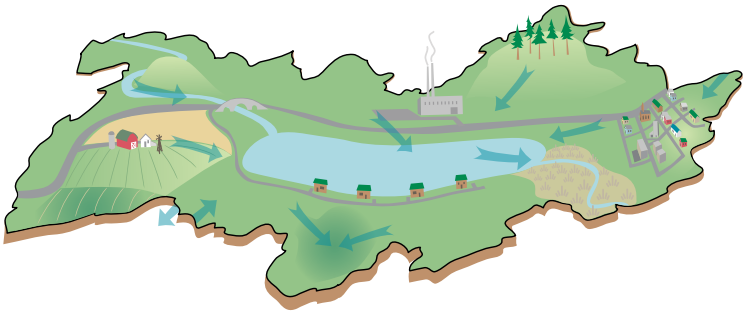
The native plant community system describes an area's specific land types or ***ecosystems***. A single community might cover a large area, or exist in scattered pockets. Sometimes very different native plant communities exist near each other. For example, trees and plants growing along a river may vary widely from those growing several hundred feet uphill. Native plant communities are also a useful tool for telling the story of your land's history. Forests are constantly changing under the influence of time between disturbances and other factors. The trees and other plants that emerge 20 years after a fire or windstorm will differ from those growing in the same area hundreds of years later. While both subsections (Rochester Plateau and Blufflands) contain many similar communities, you can also notice variations as you move from north to south or east to west within the region.

The names of forested native plant communities reflect their general location within the state (northern, central, or southern), the moisture or nutrient content of their soils (wet, dry, rich, poor), and the dominant trees that make up the ***canopy***. Examples of forested communities that you might find in southeastern Minnesota include Southern Dry-Mesic Pine-Oak Woodland, Southern Wet-Mesic Hardwood Forest, or Southern Floodplain Forest. The DNR considers 9 out of 18 forested communities found in this area to be "imperiled," meaning they are rare or threatened within Minnesota. The remaining forested communities are considered common. It is especially important to protect these imperiled communities from conversion to other land uses. Several local types of forested native plant communities are highlighted in Chapter 5.

Know Your Plants

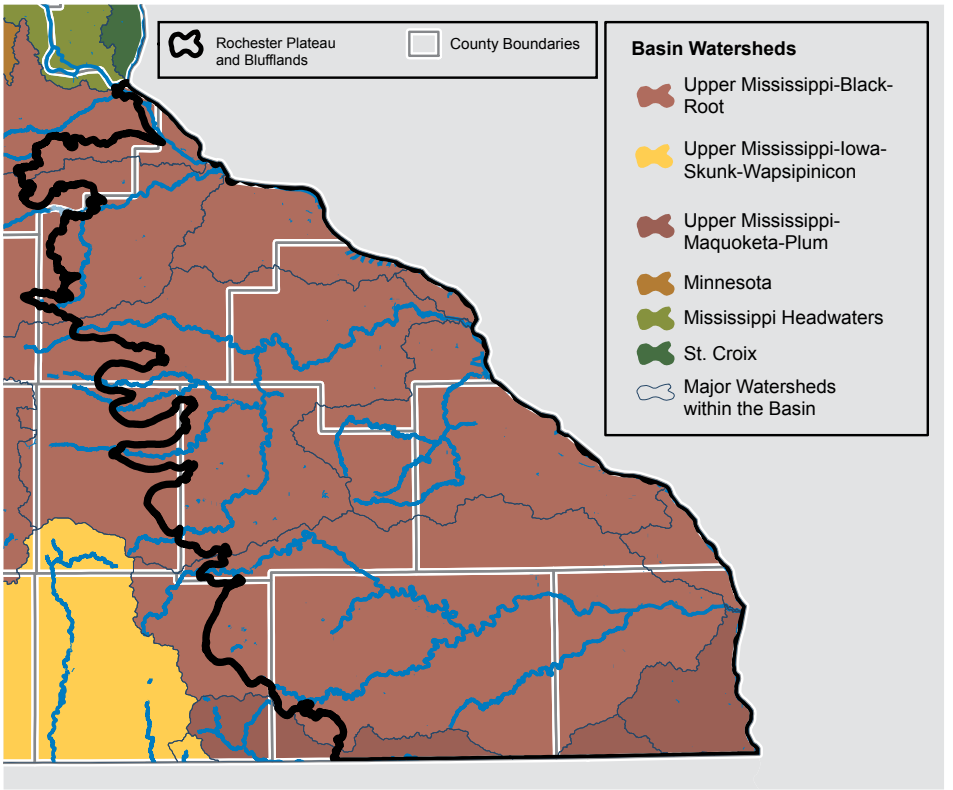
Knowing the native plant communities on your property can help you better understand your land's potential. For example, the presence of certain plants growing on the ground can reveal clues about the soil and climate. This can help you plan which tree species are best suited for your woods, predict where you might find nontimber forest products (such as morels, ginseng, and maples to tap), and which wildlife species might be present. To learn more, visit ***mndnr.gov/woodlands***

Discover Your Watershed!



A ***watershed*** is the total area of land surrounding a body of water (such as a lake, river, or stream) that drains water into that body. Watersheds can be small or large. Small watersheds surrounding creeks and streams join to create larger watersheds surrounding major rivers. Ultimately, water in southeast Minnesota flows into the Mississippi River via the Root, Whitewater, Zumbro, and Cannon rivers and numerous tributaries. The actions you take on your land will affect the quality of water that flows into the Gulf of Mexico by way of the Mississippi River. To learn more, visit **mndnr.gov/woodlands**

SOUTHEASTERN MINNESOTA WATERSHEDS



Leonard's skipper is a species in greatest conservation need in southeastern Minnesota.

Challenges in the Southeast Minnesota

Many changes in the last few hundred years have brought challenges to forests in southeast Minnesota. Here are examples of the biggest challenges we all must consider when making decisions about caring for and using the woodlands in this region.

Habitat Loss

Southeast Minnesota is home to a multitude of wildlife species, including some that are rare, declining, or threatened. The DNR refers to these as ***species in greatest conservation need***. About 350 species are given this classification in Minnesota. Examples in your area include timber rattlesnake, blue-winged warbler, Leonard's skipper, woodland vole, pickerel frog, Ozark minnow, and Blanding's turtle.

The greatest threat to these species is ***habitat*** loss or degradation, which affects approximately 82 percent of the species of greatest conservation need within these subsections. Historically, the major cause of habitat loss and degradation in this region has been the widespread conversion of forests, wetlands, savannas, and prairies for agricultural use and residential development. In recent years this land conversion has slowed, and now the main threats are degradation caused by invasive species, fire suppression, over grazing, and erosion due to poor land use practices. The region's rivers and streams have been negatively impacted by pollution from nutrients, increased sedimentation, and changes to flow patterns caused by increased precipitation.

HABITAT SPOTLIGHT

Floodplain Forests

Floodplain forests occur in areas along major rivers that seasonally flood their banks. Typically dominated by silver maple, black willow, and cottonwood, these forests provide important habitat for many wildlife species and serve as a major migratory corridor in your region. A number of rare bird species depend on this habitat for feeding and nesting such as prothonotary warblers, cerulean warblers, and red-shouldered hawks. Large areas of floodplain forests in southern Minnesota have been lost to urbanization and conversion to agriculture. Now these forests, which once formed continuous bands of habitat along the major rivers in southeastern Minnesota, persist as broken chains of forest ***patches***. Damning creates an additional challenge by greatly reducing the annual pulse of flooding that maintains this habitat. Additionally, the spread of reed canary grass, an invasive plant, and excessive flooding caused by climate change prevents native seedlings from establishing. A specific type of this habitat in your region is highlighted in Section 5.

Keeping forests on the landscape is one of the best ways to protect drinking water.

Declining Water Quality

Numerous rivers and streams cover the Rochester Plateau and Blufflands subsections, with a few lakes found in the west. These waters support important fishing and tourism industries and form a vital migratory corridor for birds traveling between nesting and wintering grounds. Despite the economic, social, and ecological importance of these waters, many are suffering declining quality from a variety of contaminants, including sediment, fertilizer, animal waste, and pollutants. Some of the pollutants come from nearby sources such as homes, which can contribute pollutants through erosion and lawn chemical runoff. Other sources of pollution are less easy to pinpoint within the greater watershed such as contaminated runoff from agricultural fields, residential developments, or urban centers. Pollutants in runoff from all of these sources eventually collect in water throughout the region, harm fish and other wildlife, and degrades drinking water and recreational opportunities. Additionally, stream temperatures increase when streamside vegetation is removed, leading to marginal trout habitat.

Acting like natural water filters, forests play important roles in keeping water clean. Trees and leaves slow the movement of rain to the ground. When water moves more slowly, it picks up less sediment when it hits the soil. Additionally, forest soils contain large pore spaces that trap sediment and pollutants. As a result, rainwater that leaves a forest to recharge groundwater or flows into lakes and rivers is clean. Keeping forests on the landscape is one of the best ways to protect drinking water. Forests along shorelines are particularly important, as they serve as the last barrier to filter contaminated runoff before it reaches a river or stream.

Invasive Species

In a part of the country where the landscape is white for much of the year, many people tend to look at the woods in summer and think, "if it's green, it's good!" Unfortunately, there are a lot of things living and growing in Minnesota's woods that do not belong here, and they can cause some pretty big problems. These harmful plants, insects, animals, and fungi are called ***invasive species***. Chances are good that there are a few living in your woods.

The DNR describes invasive species as "species that are not native to Minnesota and cause economic or environmental harm or harm to human health." Not all ***nonnative species*** are invasive. For example, we plant many nonnative plants, such as crabapples, that do not cause trouble. The problems start when species escape cultivation and begin taking the place of native species in the wild.

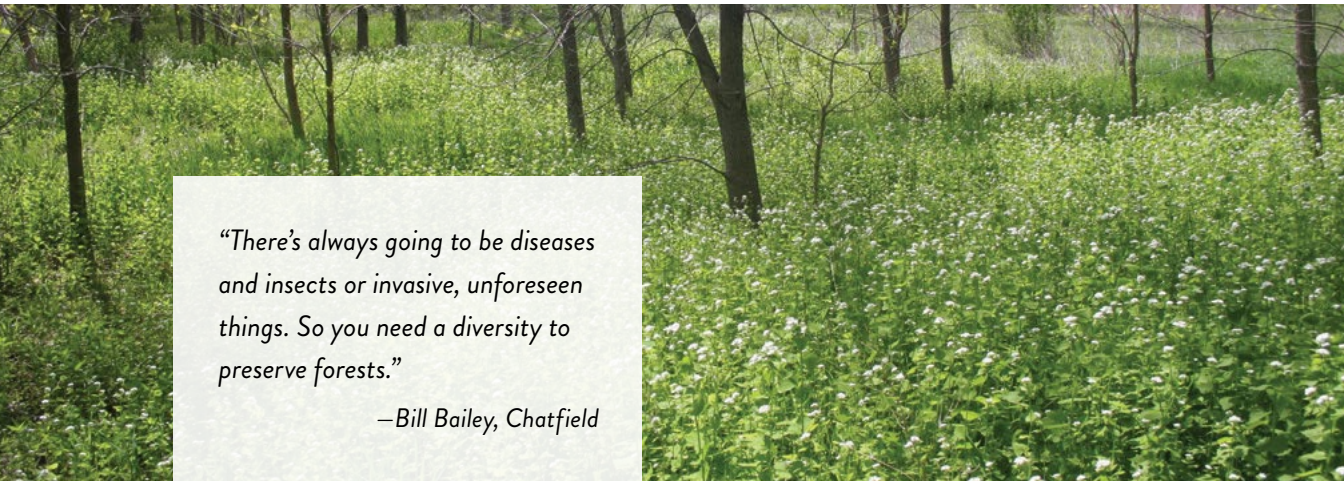
Plants, animals, and fungi that become invasive have many of these characteristics:

- Fast growing.
- Reproduce quickly, or have easily dispersed seeds or spores.
- Thrive in a variety of conditions.
- Lack natural predators or diseases that might otherwise keep their populations in check.

Many plants that are now invasive were originally brought to the United States to be sold as ornamental shrubs and flowers. Other invasive insects, animals, and fungal diseases were introduced accidentally through international trade or brought here purposely for various commercial or ecological reasons. Once an invasive species becomes established, they can spread by natural methods such as by birds or the wind. However, the way invasive species travel the farthest is through humans transporting them unknowingly.

As a landowner, you can do a lot to help manage invasive species on your land. Check the Minnesota DNR website for a current list of invasive species and how to identify them. Tips for controlling invasive species can be found in Chapter 5.

Photo credit: Steven Katovich, Bugwood.org



"There's always going to be diseases and insects or invasive, unforeseen things. So you need a diversity to preserve forests."

—Bill Bailey, Chatfield

INTRUDER ALERT!

Invasive species are an increasing problem in southeastern Minnesota. Here are examples of troublemakers to look for on your land.

Photo credit: Chris Evans, University of Illinois, Bugwood.org

Japanese Barberry

Japanese barberry was used widely as an ornamental plant due to its ability to thrive in both full sun and deep shade and resist deer browsing and drought. Upon entering a forest, however, this low-growing (2–4 feet tall), spiny shrub forms dense thickets that shades out native forest plants, changes the soil chemistry, and may even increase the abundance of ticks carrying Lyme disease.

Because Japanese barberry is popular in the nursery and landscaping industry, its ability to convert the forest understory into a thorny thicket earned it a spot on Minnesota's Noxious Plant "Specially Regulated" List. As a result, the 25 ***cultivars*** that produce more than 600 seeds per plant were phased-out in 2018 and are illegal to sell and propagate.

Japanese barberry is spread both by birds that eat and disperse its bright red berries and by lower branches that readily root into the ground. The best way to protect your woods is to find and eradicate even the smallest infestations early. Hand-pulling and digging out are easiest to do in early spring, well before seeds form. You can also apply herbicide directly to cut stems or on the leaves. For the next 3 to 5 years, you'll need to monitor the area to treat sprouts coming up from the roots.

Photo credit: Steven Katovich, Bugwood.org

Heterobasidion Root Disease

Heterobasidion root disease (HRD) is a destructive disease caused by a fungus. In the Lake States, it tends to plague red pine, white pine, and spruce growing in managed plantations. HRB was first identified in a southeastern Minnesota pine plantation in 2014, but has since been eradicated.

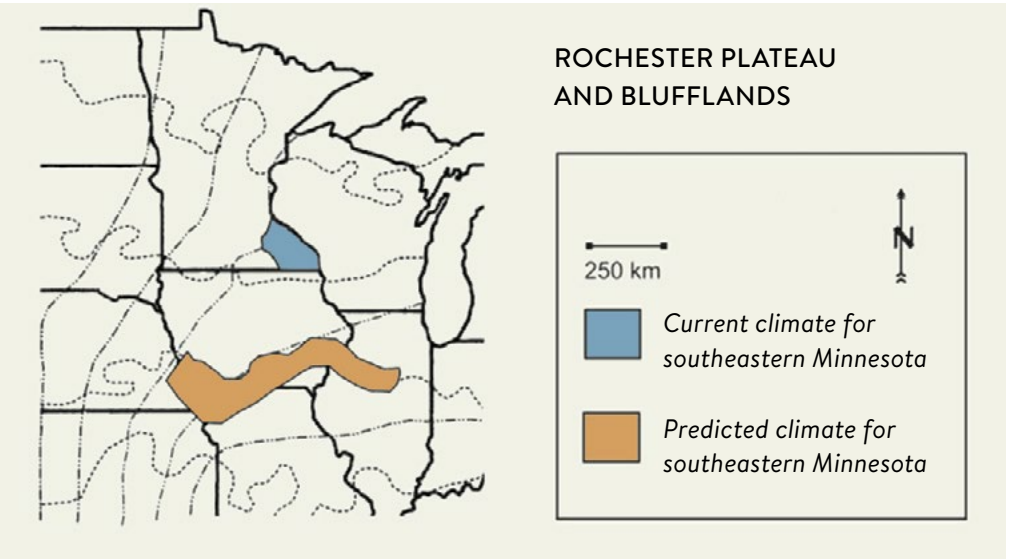
HRD typically appears in plantations after a thinning, where fungal spores infect freshly cut stumps and spread to surrounding trees through connected roots. Infection spreads between infected areas by wind-blown spores or when people move infected logs. Infections often go undetected for years until infected trees start showing symptoms. Initial symptoms are thinning foliage and reduced growth. Nearby trees start to die in 3–8 years, creating an expanding circular pattern of tree death.

Controlling HRD is very expensive. An effective, preventative fungicide called Cellu-Treat® is available for use in Minnesota. It helps prevent a new infection, but will not stop an infection already in the stump. Because infection can happen quickly, apply the fungicide within 24 hours after cutting (including trees near an infection). Infections can persist in plantations for decades. Report any suspected pockets of HRD to your local Minnesota DNR forestry office.

A Changing Climate

Climate scientists predict that as global temperature continues to increase, it will significantly affect Minnesota's climate within the next several decades. Minnesota will experience warmer year-round temperatures—with winter warming faster than other seasons—and changes to rainfall patterns, with more precipitation in the form of big downpours. In fact, your region of Minnesota is already experiencing these changes. Historical climate records show that average low winter temperatures have increased by as much as 4.5 degrees Fahrenheit since 1895. Annual precipitation has increased in this region by an average of 6.5 inches over the course of the historical record—that's about a 23 percent increase.

FUTURE CLIMATE PREDICTION



Source: S. Galatowitsch et al. / Biological Conservation 142 (2009) 2012-2022

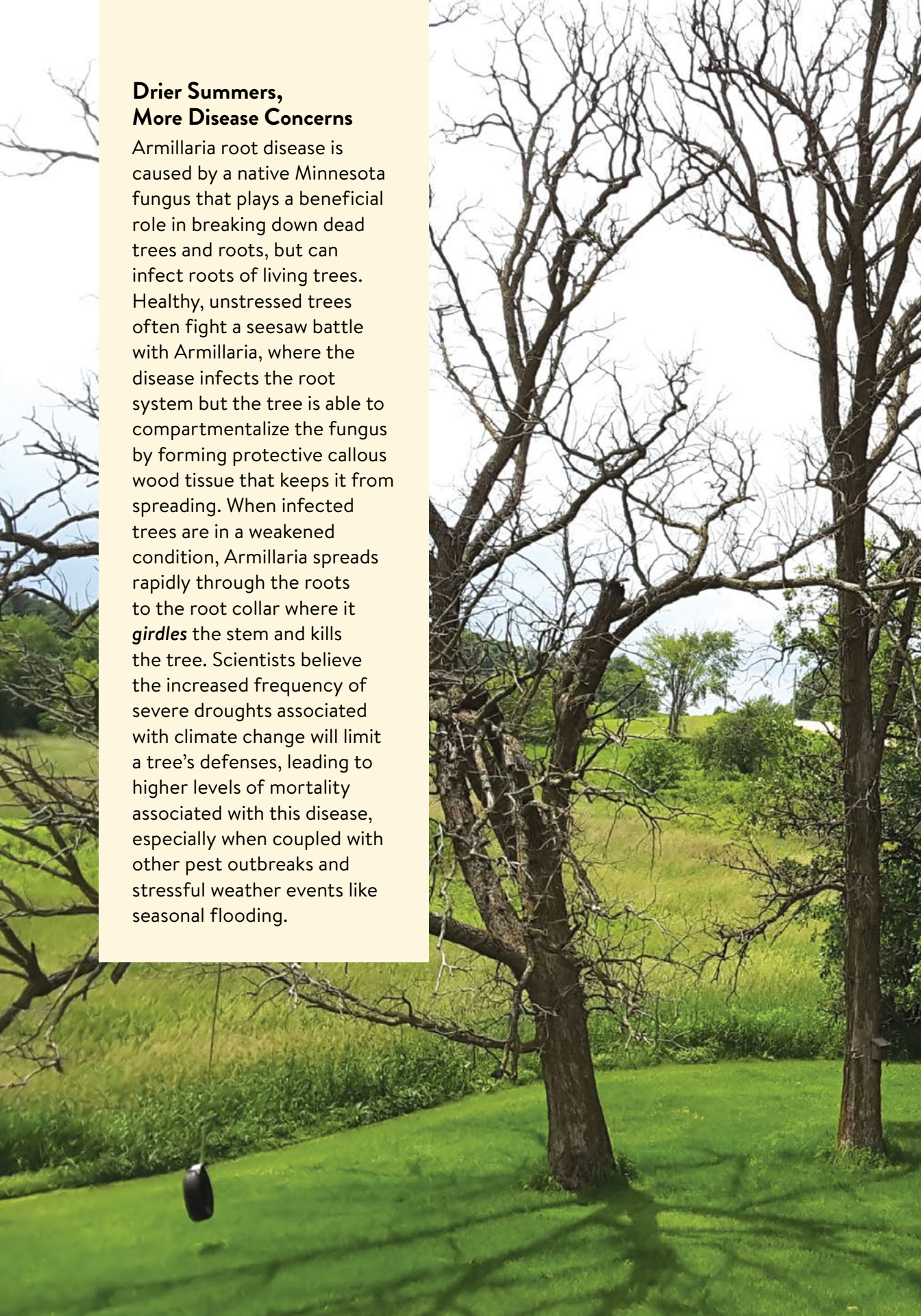
When selecting trees for your woods, consider the future climate. By 2060, it is predicated that the climate of southeastern Minnesota will resemble that of present day southern Iowa.

The variety of ecosystems we see in Minnesota—grassland, deciduous forest, coniferous forest—developed over centuries as a result of the differences in temperature and precipitation from north to south or east to west within the state. However, even small shifts in average temperature and precipitation could, in a relatively short time, cause big changes to the type and health of forests you are used to seeing. Models predict that bigtooth aspen, eastern white pine, northern pin oak, northern red oak, paper birch, quaking aspen, red maple, and red pine are likely to decrease in abundance in your area. Trees likely to increase in abundance include American elm, bitternut and shagbark hickory, black walnut, black willow, boxelder, eastern red cedar, hackberry, and silver maple.

Photo on right: Bur oaks that died from Armillaria.

Drier Summers, More Disease Concerns

Armillaria root disease is caused by a native Minnesota fungus that plays a beneficial role in breaking down dead trees and roots, but can infect roots of living trees. Healthy, unstressed trees often fight a seesaw battle with Armillaria, where the disease infects the root system but the tree is able to compartmentalize the fungus by forming protective callous wood tissue that keeps it from spreading. When infected trees are in a weakened condition, Armillaria spreads rapidly through the roots to the root collar where it ***girdles*** the stem and kills the tree. Scientists believe the increased frequency of severe droughts associated with climate change will limit a tree's defenses, leading to higher levels of mortality associated with this disease, especially when coupled with other pest outbreaks and stressful weather events like seasonal flooding.



The steepness of bluffs in this area make them susceptible to landslides during big downpours.

More wildfires and runoff. Changing rainfall patterns and warmer summer temperatures may create more frequent wildfire-inducing conditions. Increases in the size and intensity of rain events could lead to more erosion, disease, and tipped-over trees.

Warmer winters kill fewer pests. As native trees struggle to adapt or migrate in response to the changing local climate, invasive and native species that thrive in the changed conditions may gain further ground. Trees in flood-prone areas are more susceptible to insects and diseases, which may increase in abundance if warmer conditions allow forest pests to survive through the winter.

Help your woods adapt to climate change. While all of this may sound daunting, understanding how climate change may affect your woods can help you proactively choose tree species and strategies best suited to the future landscape.

1. Carefully monitor changes in your woods and look for new species that may be invasive so you can catch problems early.
2. Maintain diversity in the native species and ages of your trees to help your woods adapt to change.
3. Occasionally thin your trees to decrease competition and increase vigor of the remaining trees.
4. Encourage trees and plants that will do well in future predicted climate conditions. This will help your woods compete with potential invaders and keep healthy forests on the landscape.
5. Help your woods regrow more quickly after a natural disturbance or harvest by planting or seeding any tree species that cannot sprout from their roots.

When you and other landowners take these actions, you help set the stage for healthy, productive, and resilient forests in the face of a changing climate.

Climate Change Response Framework

Since 2009, a collaboration of the USDA Forest Service and other partners, known as the Northern Institute of Applied Climate Science, has been working with foresters and landowners across the northeastern United States to understand and adapt to the impending changes that the shifting climate will bring to forests. In Minnesota, several pilot projects are underway where large and small private landowners are helping to test strategies and determine best options to help people and forests adapt to change. Learn more about these projects at **mndnr.gov/woodlands**

Chapter 2: Why Your Woods Matter

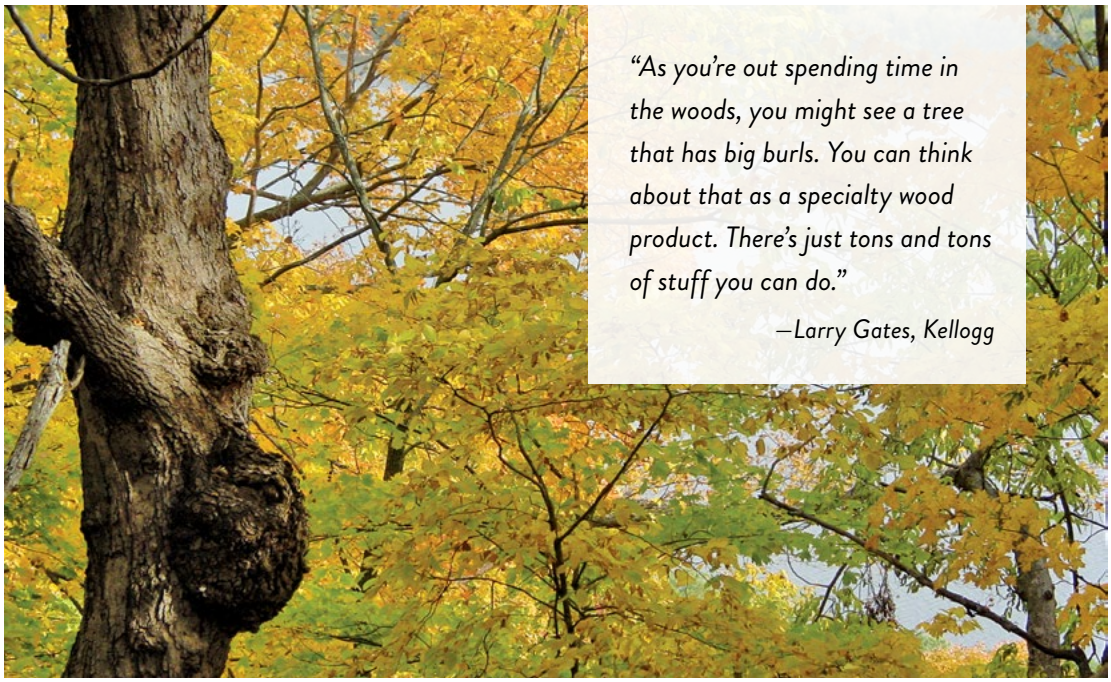
Privately owned woodlands are an important source of wood and all the products made with trees. Your woods may also be a great source of berries, mushrooms, maple syrup, oak burls, and veneer logs. Or you may value your woods as a place to hunt, watch wildlife, or find serenity.

In this chapter, start thinking about specific goals and what you want to see on your property in 10, 20, or 50 years.

Benefits of Forests to You and Your Community

Wood and Pulp

Forests provide a variety of products we depend on. Wood and pulp are often the most important products we get from forests and we use them to make books, buildings, newspapers, toilet tissue, and many other products. Private woodlands are an important source of wood in Minnesota. Harvest levels vary from year to year, but in 2016 an estimated 35 percent of all timber harvested in Minnesota came from private family owned woodlands.



"As you're out spending time in the woods, you might see a tree that has big burls. You can think about that as a specialty wood product. There's just tons and tons of stuff you can do."

—Larry Gates, Kellogg

Furniture makers, artists, and sculptors prize burls for their unique, swirling wood grains.

Some businesses, municipalities, and schools in Minnesota burn ***biomass*** to produce local, renewable energy. For example, District Energy is a non-profit utility that energizes downtown St. Paul by sending hot and chilled water to heat and cool their customers' buildings. Since 2003, District Energy heating services have been nearly 50 percent renewable, using wood waste from the region to generate renewable electricity for Xcel Energy and provide heat for the downtown district system. Minnesota entrepreneurs can use this renewable wood resource is incredibly diverse and continually evolving.

Red oak is used to make furniture and flooring.

Wood: A Local Industry

Forest-based industries contribute a lot to southeastern Minnesota's economy. These businesses provide nearly 1,000 local jobs in logging, forest consulting, and a variety of wood product manufacturing industries. One example is Root River Hardwoods Inc., which employs about 45 people in your region. The company purchases hardwood logs from Minnesota landowners to produce high-quality flooring, paneling, and other custom construction lumber. Keeping your woods healthy means more local jobs, higher demand for your wood, and greater support for maintaining healthy forests. The trees you grow and manage on your land today could end up building the homes of your family and neighbors tomorrow.

Nonwood Products

Forests can provide many other products from the decorative to the delicious. Spring foragers might find tasty morel mushrooms or ostrich fern fiddleheads poking out from under the damp leaf litter. Summer berries and other fruits include blueberries, blackberries, raspberries, strawberries, gooseberries, and chokecherries, just to name a few. Wild hazelnuts are a fall favorite of wildlife and people too, and they can be roasted and eaten like commercial filberts. When winter fades and the tree sap begins to flow, maples can be tapped for making sweet, sticky maple syrup.

Morel mushrooms are a prized favorite of foragers.

Forest Ecosystem Services

Forests provide a great many ***ecosystem services*** that we often take for granted such as clean air and water, healthy soils, erosion control, and wildlife habitat. Forests also help control weather patterns by regulating temperatures and the water cycle.

Importantly, forests store large amounts of carbon in roots, trunks, limbs, and soils. In fact, about half of the weight of a tree is carbon. Healthy, growing forests absorb carbon from the atmosphere in the form of ***carbon dioxide***, a ***greenhouse gas*** that traps sunlight and warms our planet. As excess carbon dioxide builds in the atmosphere as a result of human activities and global temperature increase, maintaining healthy, young forests helps store more carbon in wood and soils, slowing the effects of climate change.

These free ecosystem services cannot be replaced without a lot of expensive infrastructure. Economists are working on ways to estimate the economic worth of the carbon stored in forests. Creating and growing markets for less tangible forest benefits might be an important step toward managing forests in the future.

Support for working forests helps keep them from being converted to other land use so they can provide environmental services and maintain habitats for wildlife and plants.

FOREST FORAGER

Larry Gates—Kellogg, Minn.

BLUFFLANDS

Larry Gates' woods were far from perfect when he bought his 310-acre farm, having endured decades of heavy livestock grazing. But from the top of a narrow "hog's back" ridge that winds through the property, peering down over the rolling, tree-covered hills of the East Indian Creek Valley, it's easy to see why he made the purchase. "It was a place I could work on," he says.

Larry grew up in a farming community near Northfield, Minnesota, and spent his childhood exploring farms that he describes as "bountiful" in their natural riches. "I'd go out there to hunt, fish, and see all kind of stuff happening," he says. But as the decades passed, Larry watched the agricultural landscape of southeast Minnesota change. Farms became larger and less diverse in what they grew, while water quality worsened and native wildlife began to fade from the farm setting. Concerned for the landscape he loved, Larry wanted to show that food production could be both sustainable and profitable. He named his farm "Ours for a Short Time," as a reminder that he and his family were only temporary stewards of the land. "When I moved onto this farm, we were real interested in being able to demonstrate different ways to use the land and still achieve these ecological functions. So I was always interested in wild harvesting."

In addition to growing fruits and vegetables, Larry forages many kinds of wild edibles from his woods, which he sells at farmers' markets and to local restaurants through a grower's cooperative called the Southeast Minnesota Food Network. His product list has included everything from well-known favorites like blackcap raspberries and morel mushrooms to lesser-known delicacies like fern fiddleheads, dryad's saddle mushrooms, and even stinging nettles! "I like the nettles. They're easy for me to harvest, they're abundant, they're good for you, and they come on early in the season. They're fantastic." Larry notes that the best nettles grow in the partial shade of a woodland setting where they can be harvested from spring through early fall. Importantly, nettles

lose their sting once they are cooked. “Just wilt it in the steamer, and add a little bit of lemon juice, butter, salt and pepper,” he says, adding that “in spring of the year, it’s just great to have a green.”

Larry has spent the last few weeks in his woods hunting morels. “Look for the dead elms. It’s not exclusively dead elms, but if you’ve got them, it’s the dead elms that are still retaining their bark,” he advises. Spotting morels takes practice and patience. “You develop a search image for it, to almost the exclusion of anything else, which is unfortunate,” he says with a grin. Even seasoned mushroom-hunters can get stumped sometimes though. Larry says there are times he will be searching high and low with no luck. “Then I’ll see one. Then there’s 10! It surprises me how this still can happen.” He cuts the mushrooms at ground level and inspects them for ants before bagging them. Morels can be dried, frozen, or cooked fresh. Larry likes sautéing them with garlic and onions, thickening the sauce with wine and flour, and serving the savory mixture over crusty toast with fresh steamed asparagus: “It’s hard to find anything better.”

Larry hopes that more farmers and other landowners will learn to see value in their woods, and he sees foraging as a way to build that awareness. “You’re learning to look at the woods differently. You see all kind of neat stuff if you’re out there paying attention.” Larry enjoys sharing his passions for forests and local food with others. He has cooked lunch for the Southeast Landscape Committee of the Minnesota Forest Resources Council meetings with ingredients that he’s grown or gathered from his land. “I always liked the idea of representing this stuff as close to home as possibly,” he says. For Larry, good food leads to good relationships, which leads to working together to get things done on the landscape. When it comes to building trust, he says: “Food always works.”

Part 1 Vocabulary

Alluvium
A deposit of clay, silt, sand, and gravel left by flowing streams in a river valley, typically producing fertile soil.

Biomass
Living and recently dead plant and woody material that can be used as fuel or for industrial production.

Blufflands
A ***subsection*** of the ***Ecological Classification System*** in southeastern Minnesota characterized by bluff prairies, steep bluffs, and stream valleys that are often 500 to 600 feet deep, and covers 1,287,434 acres (2.4 percent of Minnesota). This subsection encompasses portions of Dakota, Fillmore, Goodhue, Houston, Olmsted, Wabasha, Washington and Winona counties.

Canopy
The ceiling of a forest created by branches and leaves from several trees. Forests with dense canopies allow less sunlight to reach the ground than do forests with open canopies.

Carbon dioxide
A colorless, odorless gas that is produced when a carbon-based fuel is burned; a ***greenhouse gas***.

Cultivar
A plant variety that has been produced in cultivation by selective breeding to develop desirable characteristics.

Eastern Broadleaf Forest
A ***province*** of the ***Ecological Classification System*** which serves as a transition between the semi-arid portions of the country that were historically covered in prairie and the semi-humid mixed coniferous-deciduous forests to the northeast. This province covers nearly 12 million acres of Minnesota in addition to portions of Arkansas, Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New York, Ohio, Tennessee, and Wisconsin.

Ecological Classification System
A method to identify, describe, and map units of land with different capabilities to support natural resources. This is done by integrating climatic, geologic, hydrologic, topographic, soil, and vegetation data.

Ecosystem
A community of organisms and their environment that functions as an ecological unit.

Ecosystem service
The benefits that people obtain from ***ecosystems***. Ecosystems services include soil formation, nutrient cycling, decomposition of wastes, regulating climate, purifying air and water, recreational experiences, among many things.

Girdle
A ring around a tree made by removing bark and often leads to the death of the tree.

Greenhouse gas
A broad term for any gas present in Earth's atmosphere that contributes to planetary warming by trapping heat from the sun's energy. Examples include ***carbon dioxide***, water vapor, and methane.

Habitat
The place or environment where a plant or animal naturally or normally lives and grows and can access needed food, water, cover, and space.

Invasive species
A ***nonnative species*** that invades lands or waters, particularly natural communities, causing ecological or economic problems.

Karst
A topography formed when soluble rock such as limestone dissolves.

Landscape
All land uses (such as forests, agriculture, urban) and ownerships (public, private, tribal) within a defined area. Landscapes typically cover thousands or millions of acres.

Land-type association
Units within ***subsections*** within the ***Ecological Classification System*** that are defined using glacial landforms, bedrock types, topographic roughness, lake and stream distributions, wetland patterns, depth to ground water table, soil parent material, and pre-European settlement vegetation. Minnesota has 291 land-type associations.

Loess
Predominantly silt-sized sediment formed by the accumulation of wind-blown dust.

Mesic
An environment or habitat that contains a moderate or well-balanced amount of moisture. Moisture does not limit plant growth during the growing season and soils are not saturated except following rain or spring snowmelt.

Native plant community
A group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native species form recognizable units such as an oak forest, prairie, or marsh, which tend to reoccur over space and time.

Nonnative species
Species that have been introduced or moved by human activities to a location where they do not naturally occur. A nonnative species is not necessarily harmful unless it becomes invasive.

Patch
Relatively homogeneous forest units that differ from surrounding habitat at an ***ecosystem*** scale.

Plateau
An area with relatively level high ground.

Province
The largest units of land defined using the ***Ecological Classification System***. Provinces are defined by major climate zones, native vegetation, and biomes such as prairies, deciduous forests, or boreal forests. Minnesota has four provinces.

Rochester Plateau
A ***subsection*** of the ***Ecological Classification System*** in southeastern Minnesota characterized by level to gently rolling terrain and covers 1,359,429 acres (2.5 percent of Minnesota). This subsection encompasses portions of Dakota, Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Wabasha, and Winona counties.

Section
Units within the ***Ecological Classification System provinces*** that are defined by origin of glacial deposits, regional elevation, distribution of plants, and regional climate. Minnesota has 10 sections, two of which are within the ***Eastern Broadleaf Forest Province***.

Species in greatest conservation need
Animals whose populations are rare, declining, or vulnerable to decline, and are below levels desirable to ensure long-term health and stability.

Subsection
Units within the ***Ecological Classification System*** sections that are defined using glacial deposition processes, surface bedrock formations, local climate, topographic relief, and the distribution of plants, especially trees. Minnesota has 26 subsections, seven of which occur in the ***Eastern Broadleaf Forest Province***.

Watershed
An area that contains all the land and water features that drain excess surface water to a specific location on the landscape such as a river.

PART 2
PLANNING FOR THE FUTURE OF FORESTS

Chapter 3: Goals for the Landscape, Caring for Your Woods

Your woods are part of a larger landscape. Understanding more about that landscape can help you make decisions about your own property. This chapter introduces you to these landscape goals and helps you consider top priorities for your woods.

Private landowners like you own about 85 percent of the forested land in the Rochester Plateau and Blufflands subsections. Therefore, your decisions and the decisions of all woodland owners in the region have an impact on the health and beauty of southeastern Minnesota.

"Letting nature take its course" on your woodland is in itself a decision that impacts the forest landscape. However, current forces—including suppression of natural wildfire, changes in wildlife populations and forest size, changing climate patterns, and invasive insects, diseases, and plants—have already disrupted nature's "course." So taking no action against these forces may result in less healthy and diverse forests than nature would have produced hundreds of years ago. As a woodland owner, you can restore some of the natural balance through ***woodland management***—actively shaping and directing your woods to keep them healthy, productive, and resilient.

Managing Your Woods

Taking care of your woods often requires a plan. This handbook guides you through the steps:

- Setting goals
- Choosing a management theme
- Selecting strategies
- Working with a professional forester to develop a personalized Woodland Stewardship Plan
- Choosing work projects, depending on tools and budget

The Big Picture—Thinking From a Landscape Perspective

Knowing how your woods fit into the larger landscape can provide a useful perspective. For example:

- The wildlife on your property is influenced by habitat conditions beyond your property lines.
- The movement of wildlife can be helped or hindered by how your land connects with surrounding forest and other habitat.
- Your property may be home to unique plants, animals, forest habitat, cultural resources, or other features that are rare in the broader landscape.
- Water quality in other parts of the watershed is influenced by how you manage your streambanks, hillsides, and wetlands.
- The visual quality of the area is impacted by your management choices.
- Allowing access to your road may reduce the need for additional roads in the area, thus reducing disturbance to forests.
- Surrounding trails may provide opportunities for you to link to a broader trail network.

The actions you take on your land can help support broader goals for forests in your region. Likewise, you may see opportunities to tie your goals with landscape features found beyond your property lines.

"I'm real interested in the landscape outcomes. Right across the fence my neighbor could be managing vastly differently than I am. And we should have some common goals about water, diversity, or habitat complexity."

—Larry Gates, Kellogg

Goals for the Landscape

Before determining goals for your own back-forty, it's a good idea to understand the landscape management goals shared by natural resource professionals, land managers, and local community members. Collectively this group is known as the Minnesota Forest Resources Council's "Southeast Regional Landscape Committee." More information about the MFRC is in Chapter 7.

The MFRC developed goals for southeastern Minnesota that includes the Rochester Plateau and Blufflands subsections through large-scale forest planning efforts. These goals show a long-term vision of what future forests in this area could look like while providing for wildlife, the local economy, and society:

- **Increase forest cover.** Increase forest cover, especially next to existing forested areas, by encouraging the growth of beneficial tree species that grow well in the site's conditions and by using prescribed fire to regenerate oaks, where appropriate.
- **Reduce forest *fragmentation*.** Wildlife, especially migrating birds, need continuous forest cover. Fragmented forests are less healthy, have more invasive species, and are less diverse. Intact forests protect and enhance biodiversity.
- **Protect forest health.** Keeping forests healthy means protecting them from invasive pests, planning for the effects of climate change, and monitoring the effects of large-scale disturbances caused by fire, windstorms, insects, and diseases.

- **Protect water quality.** Forests and water are linked intimately. Forests regulate the flow of water across the land, filter drinking water, and prevent erosion. Protecting forests nears wetlands, seasonal ponds, natural shorelines, and streams is key to protecting local water quality.
- **Establish consistent technical and financial assistance.** Natural resource professionals provide education and services to help private landowners manage their lands. Managed forests are healthier and support more public and private benefits.
- **Create a vibrant forest products industry.** Establishing larger markets for local wood, especially in fast-growing counties, can increase the number of forest-based jobs. Encouraging forest businesses that support managing forests sustainably ensures a steady supply of wood, a renewable resource.

What Are Your Goals?

Your goals may include making a financial investment, improving the health of your woods, maintaining privacy, or passing your land onto the next generation. When setting your goals, consider the broader landscape goals made by natural resource professionals. Doing so will help you succeed long-term because you are using a basic framework for what tends to work best in your region. In other words, landscape goals provide the foundation. It is up to you to build the rest.

Biodiversity Counts

When developing goals for the landscape, biodiversity counts. The Minnesota Biological Survey is an ongoing effort by the state to collect detailed information on rare plants and animals, native plant communities, and local landscapes. The surveying began in 1987 and has been completed for most counties. The results of this work have taught us a lot about the locations and abundance of Minnesota's flora and fauna. Visit **mndnr.gov/mbs/index.html** to learn more.

Many woodland owners own land for wildlife habitat.

Setting Goals for Your Woodland Using the "Woods Workbook"

The workbook on pages 88-93 of this book and on **mndnr.gov/woodlands** is for you to record your observations and woodland goals. Use this workbook as a field tool—don't be afraid to take it outside and get it dirty!

Speaking of dirt, the best way to get to know your woods is to explore them. Perhaps you already do this regularly, but in case you are not familiar with what lies in your back-forty, you may have some questions. For example, which trees make up the canopy and what is growing underneath? How old are your trees? What does the ***understory*** look like: is it brushy or open? Are there any invasive species growing in your woods? The Woods Workbook will help guide you through these and other important questions.

Once you have a feel for the lay of your woods, consider why you own them. Perhaps the land has been in your family for generations and you inherited it. Maybe you purchased it recently as an investment or as a place to hunt deer every autumn. It could be a part of your home that you enjoy for the solitude and visual beauty it provides. Or maybe your woods are simply a part of your property that you have not thought much about. The Woods Workbook will help you think about your reasons for owning woodland and the benefits that you want from that land.

Choosing a Management Theme

Once you have identified your goals, develop a management theme to guide your strategies to achieve your goals. You may not be able to accomplish all your goals on one piece of woodland or all at once, but having a central theme can help you focus and prioritize your efforts. Here are four common themes that many woodland owners use to guide their decisions.

Theme 1: Wildlife habitat

Perhaps you are interested in attracting game species such as deer, wood ducks, or wild turkey. Or maybe you are an avid birder and wish to make your land a desirable stopover location for migrating songbirds and waterfowl. You might value providing habitat for rare species. Whatever your interests, you can take steps to make your woods more friendly for wildlife.

Wildlife need four key features: food, water, shelter, and space.

Songbirds, wood ducks, foxes, and other species rely on nut- and fruit-bearing trees and shrubs such as dogwood, serviceberry, blueberry, mountain maple, northern bush honeysuckle, and chokecherry. Deer, squirrels, and some birds especially depend on acorns and nuts. Wildlife can generally find their own water sources, given suitable habitat.

To attract wildlife, some landowners also choose to create ***wildlife openings***—clearings in the woods. Chapter 5 discusses how to create wildlife openings and choose vegetation.

Large-diameter trees with cavities and dead trees—or ***snags***—provide shelter for a variety of wildlife species. Brush piles, understory trees, and shrubs can provide protected areas for birds and small mammals. Maintaining large, connected woodland patches provides space and attracts wildlife that prefer forest interiors.

Maintaining wooded ***corridors*** between smaller patches of woods provides shelter for wildlife passing between them. Keeping woody debris in streams creates habitat for juvenile trout and provides refuge areas and deep pools for larger fish. And, woody debris in lakes provides habitat for species such as ducks, turtles, aquatic insects, and fish. Finally, preserving any wetlands, bogs, or swamps on your property provides shelter, food, and water for many types of creatures.

Different wildlife species have different needs, so any action you take will inevitably favor certain species over others. Be sure you are clear about what kinds of wildlife you wish to attract before making any changes to your land.

Snag

Know Your Critters

Visit **mndnr.gov/woodlands** to learn more about the animals living in your area, how to look for them, and how to provide suitable habitat.

"Have your trail someplace that can actually be mowed. Make it wide enough that you can run a tractor and mower along it in the woods, once or twice a year. This will keep the bushes down. You will not have to use chemicals or any other types of control for invasives."

—Bill Bailey, Chatfield

Theme 2: Recreation

Perhaps you want to use your woods to hunt, hike, watch wildlife, snowmobile, or do some other form of recreation. If improving recreation is your theme, make sure that your management strategy includes increasing access to key places on your property. Where trees have become too crowded, strategically thin your woods to improve the health and quality of the remaining trees. Removing invasive plants can make recreation more enjoyable while also improving forest health. Building trails creates accessibility. The design of your trails will depend on their purpose, who will use them, and your land's features. Your land's shape, size, slope, soil, and ecology will determine the best route for the trail, points of interest to highlight or protect, and steps you need to take to prevent erosion and spreading invasive species. Chapter 5 provides more information on how to do this.

Learning to identify the trees and plants growing in your woodland is fun in any season. For links to field guides and to learn more, visit **mndnr.gov/woodlands**

PlayCleanGo

While important for recreation, trails also provide pathways for invasive species to enter your woods. To help prevent this, clean dirt, bugs, and plant material from shoes, clothes, equipment, vehicles, and pets before and after trail use. **PlayCleanGo.org**

Theme 3: Healthy woods

Many woodland owners want healthy woods. Keeping your woods healthy may involve actively managing your woods to mimic natural disturbances such as wildfire and blowdowns and increasing the diversity of trees and plants.

Woodland stand improvement activities keep your woods healthy and resilient. Activities include:

- Removing invasive species, less desirable trees and shrubs, and dead and diseased trees.
- Thinning out overcrowded trees.
- Preventing the establishment of invasive species.
- Planting a diversity of tree species that are suitable for your site.
- Creating layers of vegetation in the canopy, understory, and forest floor.
- Keeping a mix of trees that are young-, middle-, and old-aged.

A professional forester can assess your woods, develop a plan to increase its health, and recommend trees to plant. Chapter 4 provides information on who to contact for advice on actively managing your woods and species.

"Diversity is the key, whether it's within a prairie, within a forest, within a farm, whatever. Anything that you concentrate with one species is going to lead toward disease and problems."

—Tim Gossman, Chatfield

Healthy woods have multiple layers of vegetation and trees of different ages.

Theme 4: Income

Your woods can provide economic returns for generations to come such as income earned from harvesting timber or leasing your woods for hunting. The condition of your woods, dominant tree species, and your goals determine the type of harvest to use. Foresters may prescribe clear-cuts with reserves of live and dead trees when full sunlight is needed to regrow trees such as red oak. Thinning is used to decrease competition for the trees you wish to keep and grow into the future.

"Get a good understanding of what a contractor is going to do in your woods so you know they did the work."

– Janice Stalsberg, La Crescent

To get the most revenue out of your woods, you may want to do ***timber stand improvement*** activities. Timber stand improvement helps your woods grow faster, become healthier, and allows you to harvest sooner and more frequently. Depending on your woods and your specific goals, these improvements may involve thinning out lower quality or overcrowded trees, removing diseased or dying trees, pruning trees, and protecting trees from damage. See Chapter 5.

Your woods may also provide forest products that have established markets such as large hardwood slab tabletops, furniture, cabinetry, bowls, and much more. You could also collect seeds, nuts, or acorns and sell them to the Department of Natural Resources, the USDA Forest Service, or private nurseries for growing seedlings. The University of Minnesota Extension's ***Minnesota Harvester Handbook*** provides many more examples.

Finally, you might be able to defray your land ownership costs by enrolling in a woodland cost-share, tax-relief, or incentive payment program. Because private woods provide many public benefits, you can use public funds to help pay for some of the costs incurred from improving your woods. See Chapter 6.

Combination Approach: Multiple Benefits

Management themes may overlap, and you want to incorporate elements of most or all of them into your approach. You might have different goals for different areas of your woods, or perhaps your goals do not fit into one of these categories. Examples might include planting a shelterbelt around your home or improving the water quality in your woodland creek. Certain activities, such as clearing invasive species, thinning the understory, and planting diverse native tree and understory species, can support multiple strategies because they benefit everything from forest health to timber production to wildlife. Thinning woods that are within 100 feet of homes, barns, and garages can also help protect expensive structures from wildfires.

The purpose of this chapter was to get you thinking about how you use your woods and what you want them to be like in the future. To learn more about rare plants and animals, trees to harvest, and property taxes, read Chapter 4.

Chapter 4: Choosing a Strategy

Chess players know that good strategy is key to winning the game. Like chess, managing your woods requires foresight. While you can't predict the future and may need to adjust your plans, having an organized, long-term strategic approach increases your chances of success.

Once you have determined goals and a management theme for your woods, achieving those goals depends on your interests and available resources. Options range from a simple walk through your woods with a forester to enrolling your land in a long-term conservation program. This chapter covers some helpful first steps. As you become more interested in investing in your woods, see Chapter 6.

"I think it's really important that landowners get a forester out as soon as they get their land, and get some idea of what's going on. Get a plan, know what the problem species are in your woods."

—Janice Stalsberg, La Crescent

Photo credit: Leslie Robertson/NASF

Attending a field tour is a great way to meet other landowners and get project ideas for your woods.

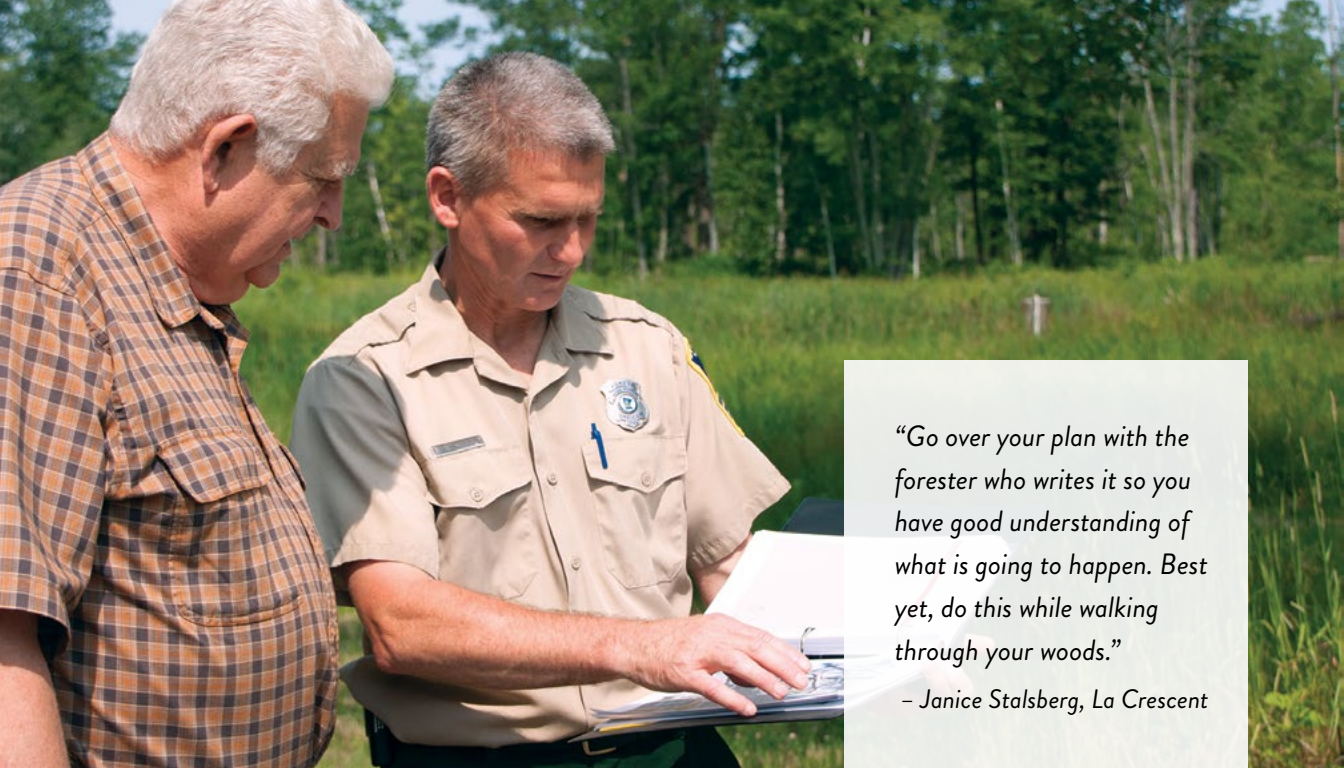
Who to Know: Key Players

Key players can help you reach your goals. Minnesota has many agencies and organizations that can help.

Join a Group: These organizations provide print materials, online resources, classes, workshops, field days, and other professional advice. Additional groups to join are discussed in Chapter 7.

- **University of Minnesota Extension**—The University of Minnesota delivers practical, research-based education programs and information to landowners. Extension also manages the MyMinnesotaWoods website and other free electronic communications for landowners. **myminnesotawoods.umn.edu**
- **Minnesota Forestry Association (MFA)**—MFA is an organization for private woodland owners that offers educational opportunities and other services. Their "Call Before You Cut" hotline directs woodland owners to free information before a harvest including lists of foresters, certified loggers, and a variety of other resources. **minnesotaforestry.org**

Other sources of information include the federally administered Natural Resources Conservation Service and Farm Service Agency and the state-administered Board of Water and Soil Resources. Financial assistance is often available through these agencies.



"Go over your plan with the forester who writes it so you have good understanding of what is going to happen. Best yet, do this while walking through your woods."

– Janice Stalsberg, La Crescent

Photo credit: Leslie Robertson/NASF

What to Do: Create Your Strategy

Based on your goals and theme, develop a strategy starting with these basic steps.

1. **Get advice.** Schedule a time for a professional forester to visit your property and walk through your woods with you. A forester will help you learn more about your woods' potential for wildlife management, timber harvest, and recreation, and identify invasive species, areas in need of thinning or restoration, and important natural features. This process can help you plan your strategy and choose specific projects you want to do in your woods.

- **Minnesota Department of Natural Resources (DNR)**—The DNR is a state agency that helps take care of Minnesota's natural resources. DNR foresters protect and manage 5 million acres of public forest land and assist Minnesota's private landowners with woodland decisions and projects. The DNR can also direct you to many other resources and people, including other agencies and private sector consultants. Local DNR Forestry offices often have long-standing relationships with a network of private foresters and loggers. If you decide to have a plan written for your property or a timber harvest performed, locate your closest forester at **mndnr.gov/woodlands/cfm-map.html**
- **Private Consulting Foresters**—Private, independent consulting foresters help woodland owners meet their goals by writing stewardship plans, developing project plans, setting up timber harvests, and much more. **web.paulbunyan.net/norfor**

- **Soil and Water Conservation Districts (SWCDs)**—SWCDs are local government agencies that help private landowners manage their natural resources. Some SWCDs have foresters who can visit your woods and provide advice. There are 90 SWCDs in Minnesota, at least one for each county. **maswcd.org**
- **Industry Foresters**—Employed by timber harvesting companies, they can set up a timber sale and write a stewardship plan.

2. **Have a management plan prepared.** The DNR's Forest Stewardship Program helps woodland owners finalize goals and prepare a professional, voluntary ***management plan*** for their woods. A management plan (also known as a ***Woodland Stewardship Plan***), is a nonbinding, written document that lists your land's potential, what you want to accomplish, and specific actions you can take to accomplish those goals within a given timeframe. Woodland Stewardship Plans are discussed in Chapter 6. If you want something simpler, your forester can also create a brief or streamlined management plan using the ideas that you have recorded in your Woods Workbook.
3. **Decide how the work will get done.** A "project" may include activities such as tree planting, woodland stand improvement, invasive species removal, wildlife habitat improvement, development of recreational trails, or timber harvesting. When planning how the work will get done, consider your available time and budget. Doing the work yourself is one option. This saves money, but requires more time investment. Many landowners enjoy doing their own management activities, as it provides an opportunity to be out in their woods and get great exercise.

"The biggest thing for me was to have somebody reliable. The DNR does provide a list of contractors. I did check with some other people the contractor had worked with."

—Janice Stalsberg, La Crescent

Photo credit: Leslie Robertson/NASF

If you can't do the projects yourself, hire a contractor. Several organizations maintain directories of forestry professionals and logging contractors in Minnesota.

- **Minnesota Logger Education Program (MLEP)**—MLEP educates loggers on sustainable forestry practices. MLEP-certified loggers meet Minnesota Master Logger standards, and may market timber from private lands as "certified wood." The organization also has a free, online directory of its trained member including a list of Minnesota Master Loggers. **mlep.org**
- **Minnesota Association of Consulting Foresters** (MACF) has a similar directory of trained professional foresters, along with descriptions of their experience and service areas. **web.paulbunyan.net/norfor**
- Your local DNR Forestry office also has lists of contractors for your surrounding area. ***mndnr.gov/areas/forestry***
- You might consider asking your neighboring landowners if they've had woodland work done and what their experiences were like.

Part II covered some of the goals for the forested landscape of which your land is a part, how your own goals intersect with these landscape goals, and how to develop a strategy for doing the work necessary to reach your woodland goals. Part III starts you down the path of becoming a more active woodland manager by giving you the tools you need to begin your first project and pointing you in the right direction for getting more involved in the future.

WORKING WOODLANDS SPOTLIGHT

Janice Stalsberg—La Crescent, Minn.

BLUFFLANDS

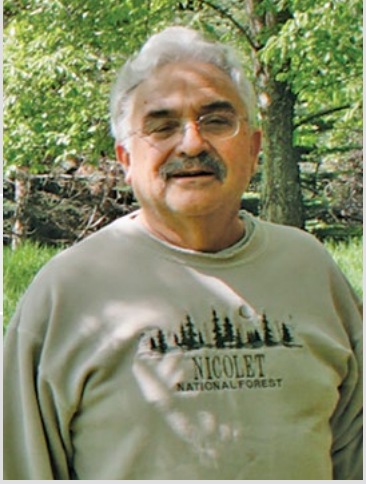
Janice Stalsberg grew up about 3 miles from the beautiful 160-acre wooded farm that she would one day own. She was renting a piece of the land for raising horses when the chance arose to buy the whole property. “It was one of those things—the opportunity just presented itself.”

Janice has contracted several harvests on the property, which helped pay for the land and her management activities. “Any money that I’ve ever got from timber sales always went right back into the land. It’s kind of like a separate account,” she says. Two of these harvests yielded valuable oak and walnut lumber for veneer and other products. She also had woodland stand improvement harvests, where the contractor removed invasive plants such

as Japanese barberry, buckthorn, honeysuckle, and multi-flora rose, along with competing native trees and vines to open up the woods for growing the next generation of high-quality hardwoods. Janice hired a forester to advise her on her harvests. “Normally I’m the kind of person that will not pay a fee for anything,” she jokes, “but I did feel in this case, there’s so much at stake it was worth paying a professional.”

Janice also enjoys working in the woods herself. “The more you can do yourself, the more of a vested interest you have in your woods and the easier it is for you to want to maintain it.” She and her husband built a fence to keep the horses and cattle out of the woods and installed a series of trails that Janice uses to access the furthest corners of the property. Earlier, she would travel these trails to search for work that needed to be done. She has since learned to adjust her perspective: “It’s become a mindfulness thing to go through the woods and just appreciate the trees, and the space, and the wildlife.”

WORKING WOODLANDS SPOTLIGHT

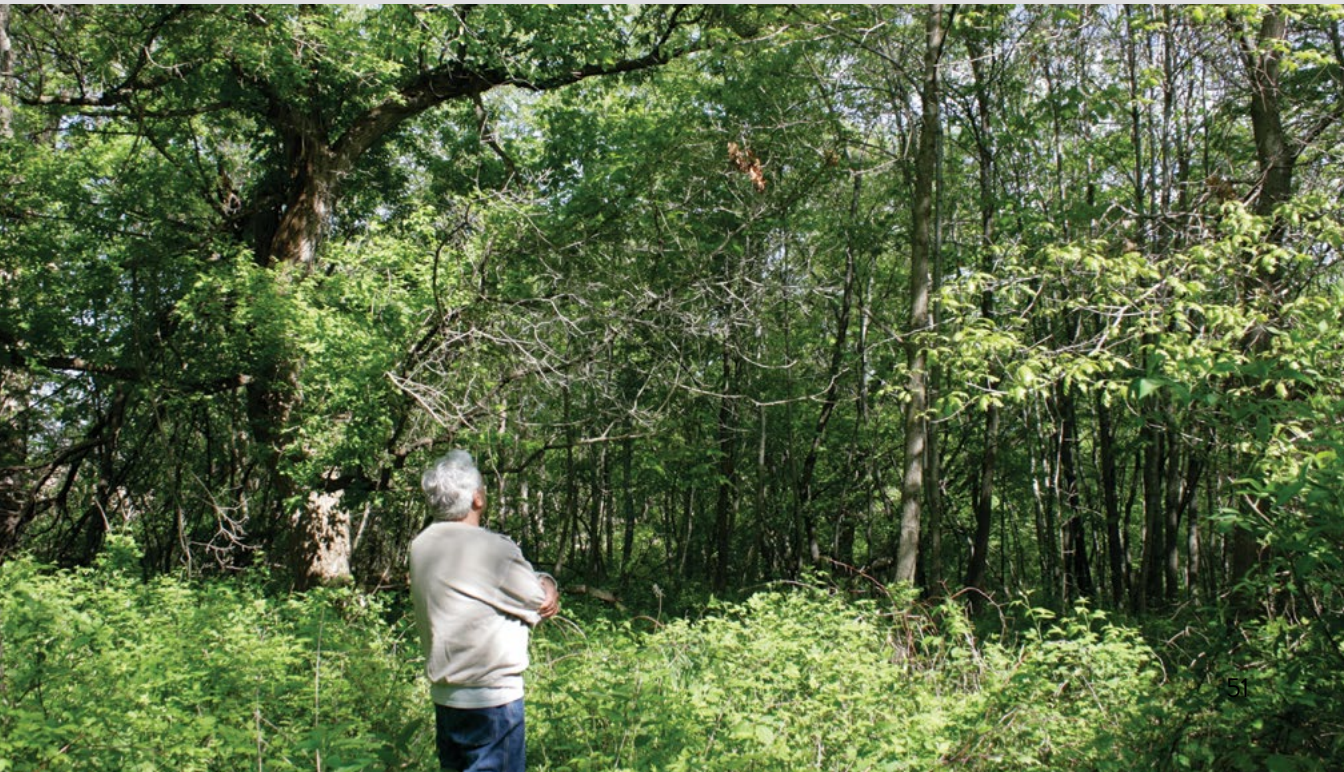


Ken Nichols—Oronoco, Minn.

ROCHESTER PLATEAU

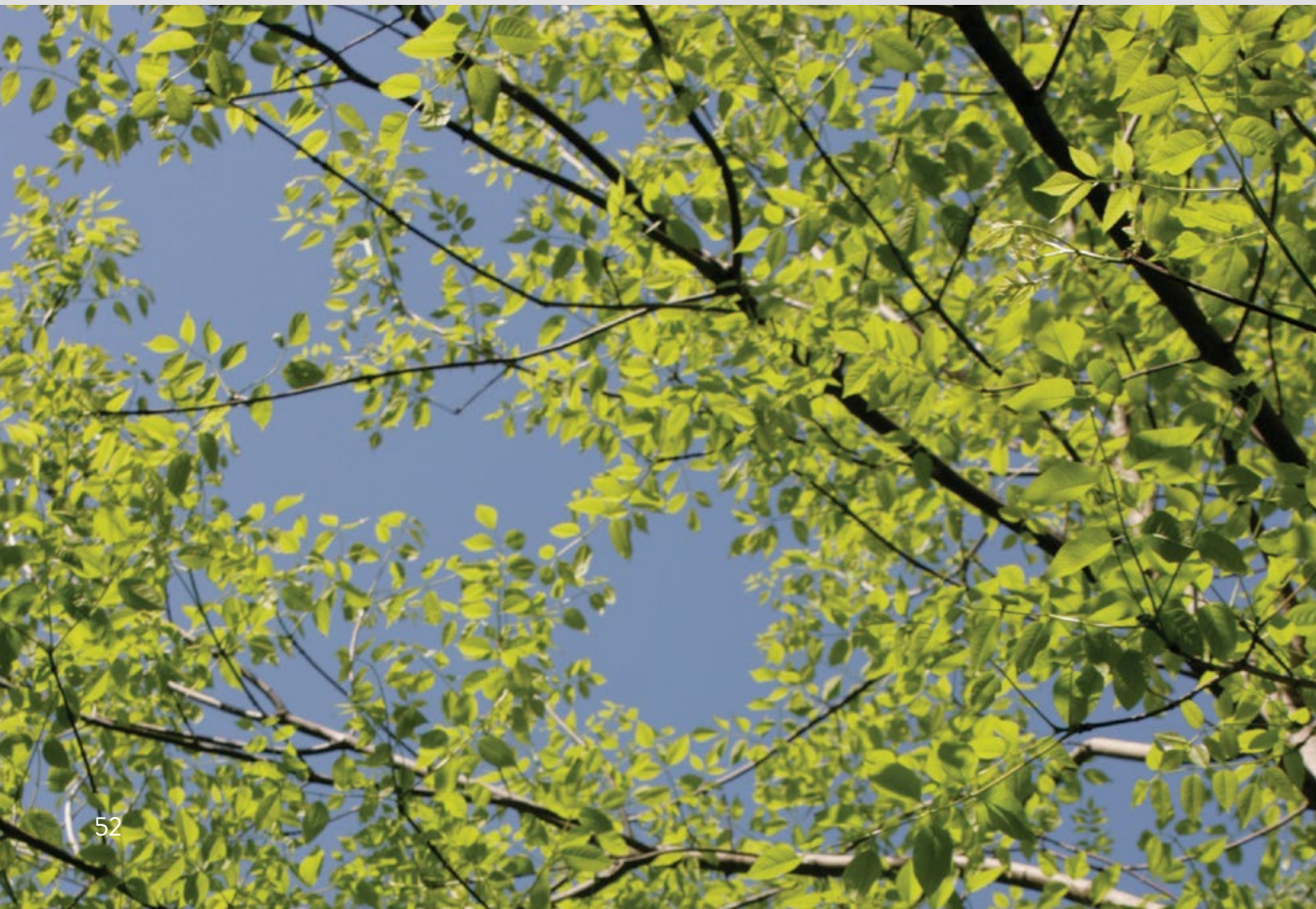
"I like the way these oaks are looking. I feel like a proud grandparent," says Ken affectionately as he strolls through his woods. Ken and Sharon Nichols maintain about 12 acres of woods on their 56-acre farm near Oronoco, Minnesota. Ken jokes that trying to choose a favorite spot in his woods is "like asking a parent what kid they like best."

The Nichols have a right to be proud. They have transformed their woods over the last 25 years. "The woods were very heavily grazed by sheep and cattle," says Ken, "It was a tangly mess of boxelder and prickly-ash, and a few scattered bur oaks." Ken spent many hours crawling through thickets of prickly-ash to clear it for planting trees, work which required "a handsaw and a lot of Band-Aids!" The Nichols weren't alone in their work, though: "We had tree planting parties," Ken says, "We had friends come over to plant trees, and then we'd have a picnic."



The couple focused on adding species that would attract wildlife—oak, walnut, and fruit trees such as nannyberry and wild plum. Their hard work paid off. "When we first moved in, the woods were so barren. If we saw a squirrel at the bird feeder we got excited. Now we've got all kinds of stuff here—gray catbirds, American redstarts, brown thrashers." Ken estimates around 100 bird species hang around the property including pileated and redheaded woodpeckers. "We do leave a lot of dead trees for snags, for woodpeckers and whatever else wants to use them."

Ken is a lifelong learner with a thirst for knowledge. "I have constant curiosity," he says. He gathers information for managing his woods from as many sources as he can including his Woodland Stewardship Plan and the Master Woodland Advisor classes he took from University of Minnesota Extension. Still, he knows he can't predict everything. Some of the swamp white oaks he planted shortly after buying the property are already bearing acorns. "I was under the understanding that we wouldn't get acorns for 30 years," he says, adding wryly "these trees obviously didn't read the book."



Part II Vocabulary

Corridor
Areas of protective vegetation, such as trees, shrubs, or tall grass, connecting larger ***patches*** of habitat and providing shelter for wildlife traveling between these patches.

Fragmentation
The splitting or isolating of ***patches*** of similar habitat.

Management plan
A nonbinding, written document, usually written by a professional forester, that outlines your land's potential, what you want to accomplish, and specific actions you can take to accomplish those goals within a specific timeframe. Also called a ***Woodland Stewardship Plan***.

Snag
A dead, decaying tree that provides habitat for wildlife.

Timber stand improvement
A practice in which the quality of a forest stand is improved by removing less desirable trees, vines, and occasionally large shrubs so the best-quality trees have more room to grow. Also called "forest stand improvement" or "***woodland stand improvement***."

Understory
The vegetative layer of trees and shrubs between the forest ***canopy*** and the ground cover.

Wildlife opening
Small areas cleared in the forest to mimic openings that naturally occur from disturbances such as wind and fire. They create less disturbance to the soil, support native plants, require less labor and expense, provide fewer opportunities for invasive plant introduction, and have greater plant diversity and structure than traditional ***food plots***.

Woodland management
The process of caring for woodlands so they remain healthy and vigorous and provide the products and amenities desired by the landowner. Also called "forest management."

Woodland stand improvement
A practice where less desirable trees and shrubs are removed to increase health and encourage the growth of best-quality trees. Also called "forest stand improvement" and "***timber stand improvement***."

Woodland Stewardship Plan
A ***management plan*** written by a certified plan writer.

PART III
PUTTING IT ALL TOGETHER—MANAGING YOUR WOODS

Chapter 5: Woodland Projects

By now you should have identified your goals, a theme, and a strategy for managing your woods. Begin executing those strategies with tools, a budget, and some defined work projects.

Tools

First, you need to prepare your toolbox. This involves more than just sharpening your chain saw!

Important tools include:

- Personalized woodland management plan written by a professional who has walked your land and discussed your goals with you.
- Aerial photographs of your property.
- Soils information.
- Mechanical equipment.
- Names and contact information of resource professionals or other landowners that can help.
- Project plan. Online project plans and planning tools, such as the American Forest Foundation's "My Land Plan," can also help.

As with any project, your most useful tool is knowledge. Visit **mndnr.gov/woodlands** for resources that can help.

Work with a professional to conduct a controlled burn.

Budget

Your budget will influence the size and scope of the project you choose. Several options for financial assistance that may help stretch your management dollars are discussed in Chapter 6. Record your budget in your Woods Workbook on pages 88-93.

Choose a Work Project

Choose a project that fits your budget, timeline, and long-term goals. Projects range from simple tree pruning to in-depth ***riparian area*** restoration. Here are a few examples that correspond with the wildlife, recreation, healthy woods, income, and combination management themes described in Chapter 3. Each of these projects may be tailored to meet multiple goals.

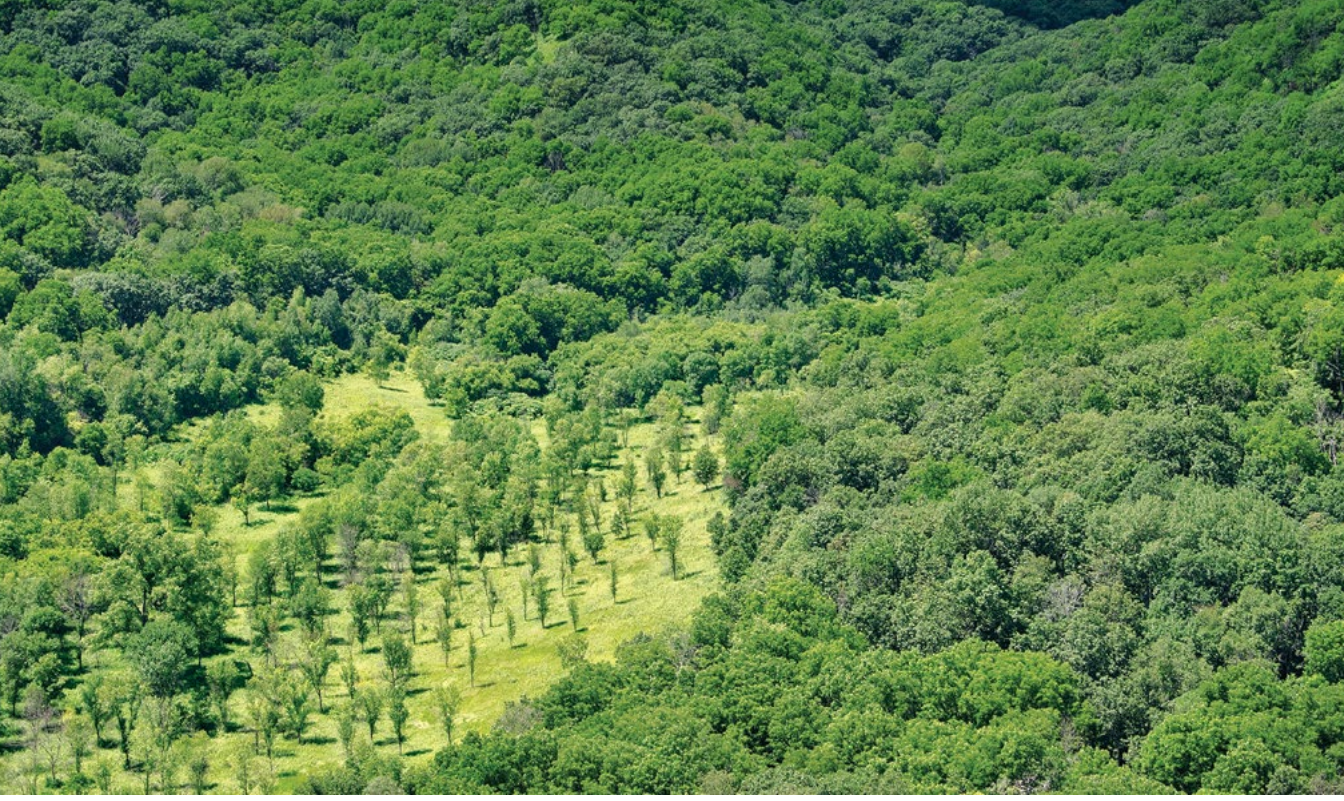
Option 1, wildlife habitat focus: Creating a wildlife opening

If you want to attract wildlife to your property, you might consider creating a wildlife opening as your first woodland project. Unlike traditional ***food plots***, which usually consist of planted non-native grasses or crops, wildlife openings use native vegetation more suitable to meeting wildlife needs.

Wildlife openings are clearings in your woods—ranging from a ½ to 5 acres—that mimic the type of openings created by natural disturbances such as fires or wind. Disturbance is nature's way of renewing a forest, and many creatures depend on specific habitats created by a forest disturbance. Methods for

Safety First!

Working in the woods can involve some inherently dangerous activities such as operating chain saws or other mechanical equipment, using herbicides, handling noxious plants such as wild parsnip and poison ivy, and working around deer ticks and other biting insects. Arm yourself with the proper equipment (e.g., hard hat, eye protection, gloves, long sleeves, chain saw chaps, insect repellent) and the right knowledge before trying any of these activities. Some organizations offer short courses on chain saw safety and herbicide application.



Wildlife opening.

creating and maintaining your wildlife opening could include hand-cutting trees and shrubs, brush mowing, and controlled burning with the help of a professional. Maintaining your opening is best done outside of the primary nesting season for birds (mid-May through early August). A natural resource professional can help you decide where to place the openings and best methods for creating them.

You do not need to remove all of the trees and shrubs in your opening. It benefits wildlife to leave or plant nut- and fruit-bearing species, a few snags, fallen logs, and brush piles for shelter. Openings should be irregular in shape, placed on a south- or southeast-facing slope to take advantage of the sun, and about three times as long as they are wide if small in size.

If your property is located within the range of moose, creating larger openings that encourage the growth of young trees and shrubs and maintaining young forests with brush or saplings provides both food and cover.

You may not need to clear new areas if you can improve existing openings by planting or regenerating native species. Pre-existing openings include yards, old pastures, edges between forest and agricultural fields, and open areas near rivers and streams. You might also consider improving an existing food plot. Using pre-existing openings can prevent unnecessarily fragmenting your woods.

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Dry-Mesic Oak-Hickory Woodland

Commonly found on steep, exposed, south- and west-facing bluffs in southeastern Minnesota, this deciduous community is often adjacent to and blends with grassy bluff prairies. Bur oak, shagbark hickory, American elm, black walnut, and boxelder are characteristic canopy trees with northern pin oak, white oak, northern red oak, and black cherry often present. The shrub-layer is often dense with American hazelnut, gray dogwood, poison ivy, prickly ash, prickly gooseberry, and red raspberry in addition to shagbark hickory, American elm, black cherry, and hackberry saplings. Important ground-layer species include woodland sunflower, white snakeroot, elm-leaved goldenrod, shining bedstraw, Canadian and gregarious black snakeroots, and heart-leaved Alexanders.

Older canopy trees in this community often feature open and spreading branches, indicating they likely grew in more open conditions than may currently exist on the site. Historically, open-grown trees benefited from frequent mild surface fires that affected this community about every 15 years. Larger, catastrophic fires where much less frequent. Since 1900, modern fire suppression has led to the loss of this mosaic of oak openings and a closing of the forest canopy. To keep this native plant community healthy, you should consider management activities that mimic the frequent mild to severe fires that once shaped this ecosystem. You might consider a strategy of using prescribed burning to create openings, especially adjacent to bluff prairies, to maintain an interrupted canopy with open growing conditions.

Option 2, recreation focus: Controlling invasive plants

Invasive species can be a big problem for forests when they displace native species. For example, shrubs such as buckthorn and honeysuckle can crowd the understory of your woods or proliferate along your trails, making recreational access difficult. Prevention is the first and least costly step to combat any plant, insect, or fungi you don't want.

Here are some steps you can take:

- Identify invasive species or signs of their presence for harder to find species such as insects.
- Avoid spreading seeds, insects, and microbes found in wood or soil to new areas by cleaning boots, tires, pets, and equipment after being in the woods. **PlayCleanGo.org**
- Minimize disturbance to native vegetation where possible, and maintain healthy communities of native species.
- Monitor high-risk areas such as roads, trails, and disturbed ground for new invasive species.
- Detect outbreaks of invasive species early and eradicate quickly.

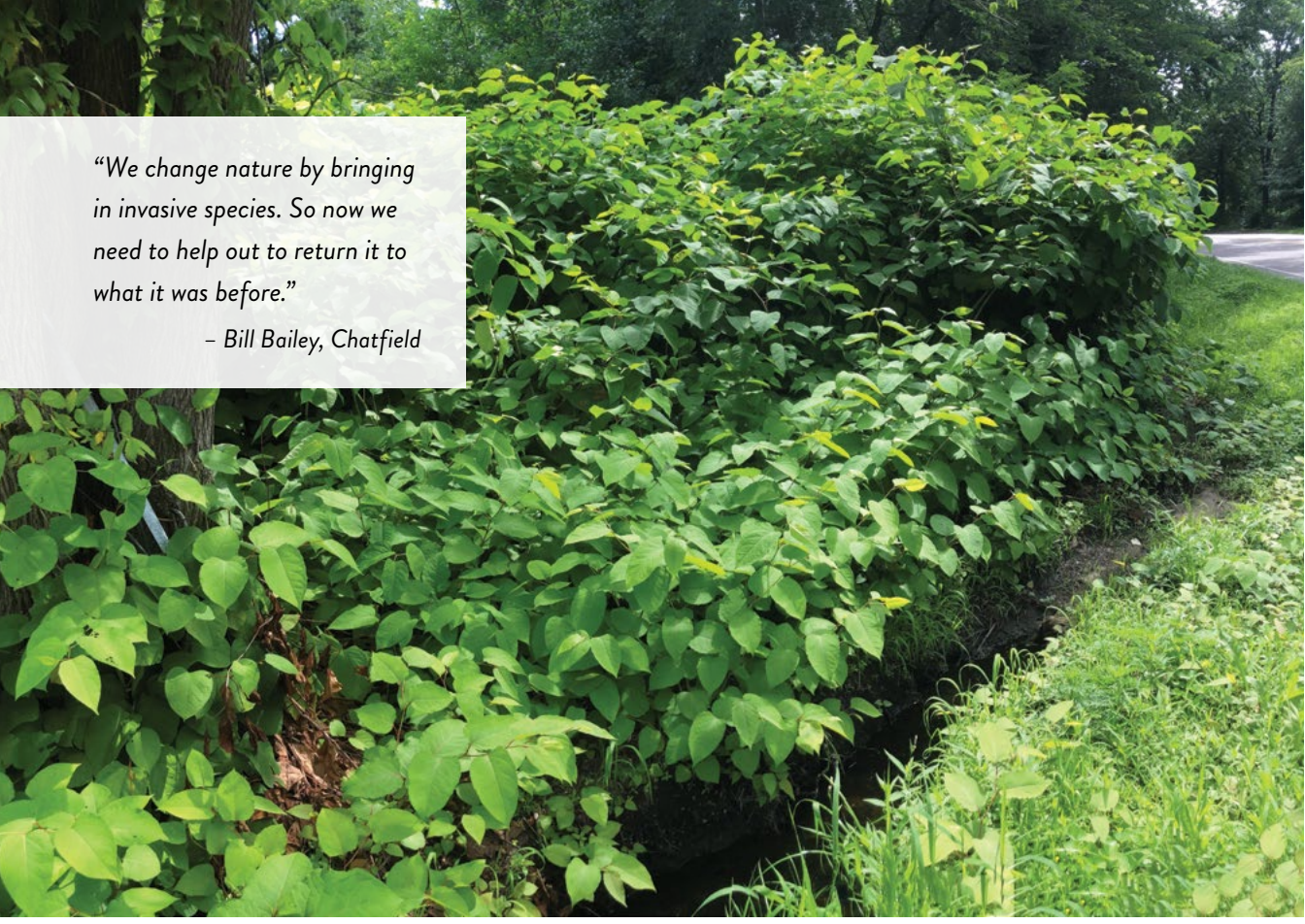
If you have confirmed that invasive plants are growing in your woods, taking steps to control them is a good first woodland management project. Catching an infestation early can be critical to successful eradication. The best time to remove an invasive plant is before it becomes well-established. Once established, eradication is more difficult and expensive, but you can still manage the problem and give your native plants a chance to compete.

Woody and weedy invasive plants in your region include:

- Common buckthorn
- Several species of non-native honeysuckle
- Japanese knotweed
- Non-native thistles, especially Canada thistle
- Oriental bittersweet
- Japanese barberry
- Multiflora rose

Garlic mustard is an especially prolific understory plant in southeastern Minnesota. Look in May for plants about a foot tall having clusters of small four-petaled white flowers and garlicky scented leaves. Additionally, garlic mustard releases compounds from its roots that prohibit other seeds from germinating. If you spot garlic mustard, act quickly to remove before it becomes established and degrades your woods.

Visit **mndnr.gov/woodlands** to help identify these and other invaders that might be present in your region, and tips for distinguishing invasives from natives.



"We change nature by bringing in invasive species. So now we need to help out to return it to what it was before."

– Bill Bailey, Chatfield

Japanese knotweed forms dense thickets that suppress native vegetation.
Photo credit: Cheryl Culbreth

A variety of methods are used to control invasive plants.

- **Hand-pulling:** Pull by hand small seedlings in the spring when the soil is moist, taking care to remove the entire root so the plant does not resprout.
- **Herbicide:** Spray the leaves of young invasive sprouts and seedlings, preferably after native plants have lost their leaves and gone dormant. This reduces the chance of killing the plants you want to keep. Cut the base of large woody plants and treat the stumps with the appropriate herbicide to prevent resprouting. You can apply specific oil-based herbicides as a "basal bark treatment." This is done by spraying herbicide on the bark around the lower portion of the plant's stem. The herbicide penetrates through the bark and kills the standing tree. Finally, you can control infestations of invasive plants using spot herbicide treatments. As always, be sure you're treating the correct plant and take care to protect native plants. Before applying any herbicides, ask your forester to recommend the most effective treatment and the best product for your site. Finally, wear protective clothing and follow instructions on the product label when applying herbicides—it's the law.

- **Fire:** ***Prescribed burning*** can be effective at killing seedlings and sprouts. Consult with a professional to determine if burning is appropriate for controlling the invasive species in your woods, and how frequently you need to burn. Just as with the use of herbicides, it is best to talk to a professional before tackling a prescribed burn. You will also need to get a burning permit. **mndnr.gov/forestry/fire**
- **Mowing or grazing:** Some invasive plants can be deterred by repeatedly mowing the plants before they go to seed. Alternatively, livestock such as cows, sheep, or goats can be used to graze heavily infested areas of certain invasive species. Talk to your forester if grazing might be an option.
- **Insects:** In a few cases, scientists have identified insects that selectively attack particular invasive plants. These ***biological controls*** can target invasive species while sparing native species. For example, two types of weevil are used to control spotted knapweed, an aggressive invader of open or disturbed areas. One weevil attacks the seedhead. Another weevil attacks the roots of the knapweed, weakening or killing those plants. Both weevils are needed to control knapweed. Purple loosestrife and leafy spurge are two other species that have biological control insects in Minnesota. For information on applying biological controls on your property, contact your county agricultural inspector or the Minnesota Department of Agriculture.

Goats eating buckthorn.

Arrest the Pest

You are able to report newly detected invasive species to the Minnesota Department of Agriculture by leaving a message at **Arrest.the.Pest@state.mn.us** or **888-545-6684**. If you can, provide digital photographs and GPS coordinates of the infested site.

Remember that seeds in the soil can germinate for several years after you remove mature plants. You must be persistent in removing new plants until the seedbed is exhausted or the infestation will return.

After you remove an invasive species, plant native species to fill the void, otherwise new invaders may quickly return to the disturbed area. Native trees and shrubs that could replace buckthorn and honeysuckle include highbush cranberry, nannyberry, pagoda dogwood, American hazelnut, common elderberry, and native bush honeysuckle. Native ***forbs*** in your region include wild bergamot, bloodroot, zigzag goldenrod, sharp-lobed hepatica, rough blazing star, and rattlesnake master. More information about choosing native plants is on **mndnr.gov/woodlands** and **mndnr.gov/plants**

Unfortunately, new invasive species can pop up in areas where they have not been spotted before. Stay current on forest pests, including insects and diseases, and watch for them. Projects that increase the diversity of plant species and ages will strengthen your woods' resiliency to change. Always clean your equipment to reduce the chance of introducing unwanted pests to your land.

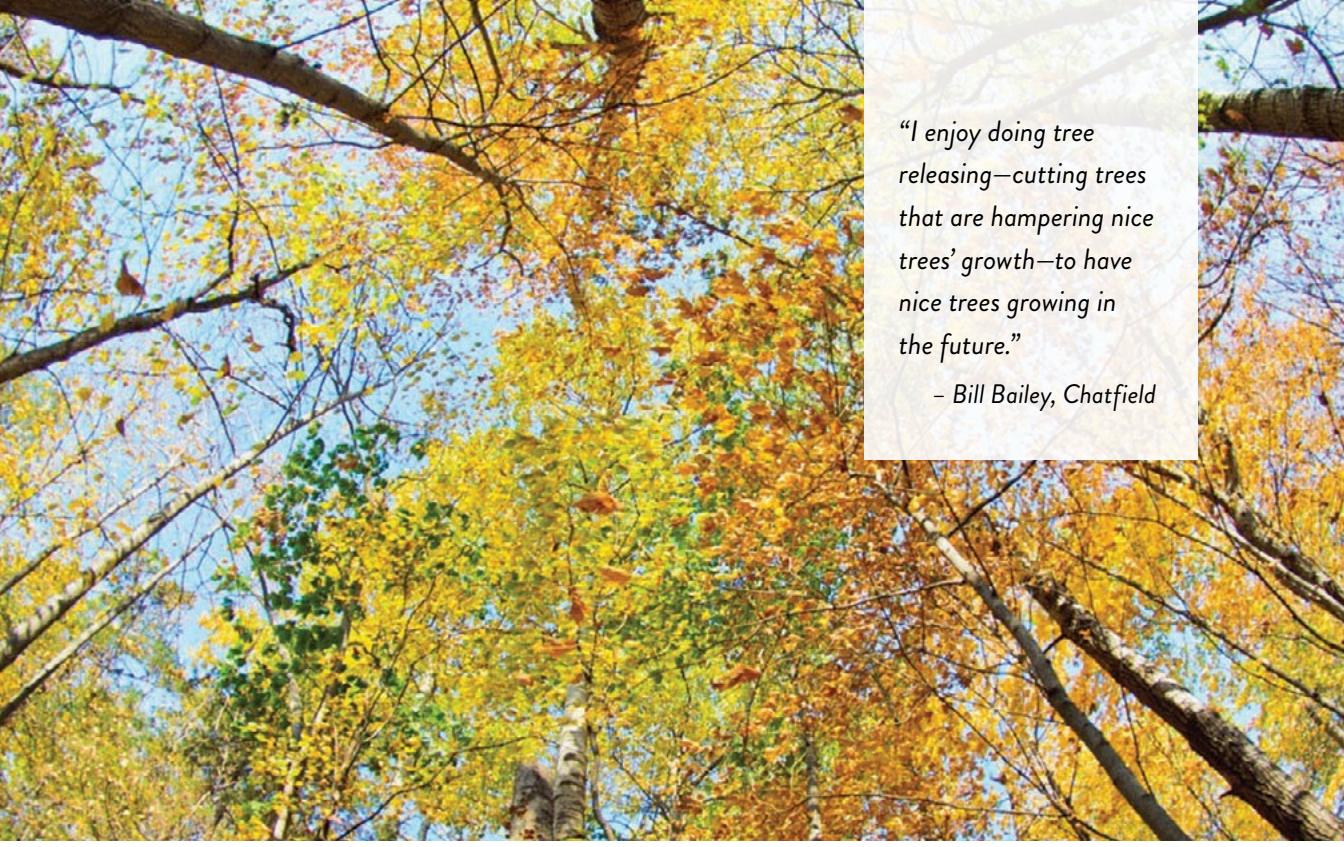
Fire can be used to control some invasive species. Always take precautions and get a permit.
Photo credit: Elena Teich

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Wet-Mesic Hardwood Forest

This lowland deciduous forest community is found in the rich stream valleys of southeastern Minnesota. The composition of canopy species varies, but often features sugar maple, American elm, red elm, rock elm, basswood, black ash, green ash, hackberry, boxelder, and bur oak. Butternut, black walnut, and black maple are also present in some stands. The understory often contains a variety of species including blue beech, chokecherry, Missouri gooseberry, and canopy tree seedlings. Herbaceous plants such as false rue anemone, blue phlox, hispid buttercup, appendaged waterleaf, Virginia spring beauty, white trout lily, and yellow trout lily often blanket the forest floor. Other common and often abundant species include Virginia waterleaf, cleavers, and wood nettle.

These beautiful, nutrient-rich communities attract recreationist but are also vulnerable to a number of invasive species. Monitor the understory and woodland edges for invasive plants such as garlic mustard, buckthorn, Japanese barberry, wild parsnip, and other weedy invaders. Taking fast action to eradicate them protects this biologically important southeastern Minnesota ecosystem.



"I enjoy doing tree releasing—cutting trees that are hampering nice trees' growth—to have nice trees growing in the future."

– Bill Bailey, Chatfield

Open up the canopy by removing smaller trees.

Option 3, healthy woods focus: Harvesting firewood

If you enjoy keeping the hearth crackling throughout the long Minnesota winter, a woodland stand improvement harvest will give you abundant firewood while improving the health of your woods.

Harvesting firewood on your property also saves money. Choose your firewood trees strategically. Mark for harvest trees that are:

- **On the small side**—Trees that measure 6 to 8 inches in diameter (or 19 to 25 inches in circumference) at 4½ feet from the ground are good choices for firewood harvests.
- **Dying or dead**—Choose trees that have diseases or insects, as they will likely not survive to be part of your future forest. You may wish to leave a few dead trees behind for wildlife habitat, especially ones that wildlife such as wood ducks, owls, or bats are already using.
- **Low timber quality**—Choose trees that are crooked, damaged, or have trunks that fork close to the ground. Harvest species that are less desired by timber markets.
- **Crowding out high-quality trees**—If the trees in your woods are too crowded, they compete for resources. Thinning some of the trees that surround your best quality trees allows those remaining trees to thrive and grow more quickly. To identify overcrowded trees, look up at the crowns (the tops) of the trees. Make sure that your best trees have plenty of room for their crowns to grow.

Don't Move Firewood!

Are you tempted to transport and store firewood from your land to another location? Resist the urge! Instead, use firewood from trees cut in your county, or buy firewood that is heat-treated and certified by the Minnesota Department of Agriculture. Moving firewood from one location to another can quickly move invasive forest pests such as oak wilt, gypsy moth, emerald ash borer, and other organisms that kill trees. This is true even if the wood is burned shortly after being moved. For many of these pests, we don't have an effective way to remove them once they are established in an area. Preventing further spread is the most effective means of control. Some Minnesota counties have quarantines that prohibit moving firewood, and violations can result in hefty fines.

Logs cut from dead or dying trees may contain insects or fungi that can harm remaining trees, and some insects from nearby trees are attracted to recently cut logs. To prevent these organisms from spreading, it is best to cut and process your firewood in cold weather. Split, stack, and cure the wood on site for two years before moving it to another area on your property.

If you choose to harvest trees yourself, having a project plan prepared by a professional forester can help you identify where, how many, and which species of trees to cut. Visit **mndnr.gov/woodlands** for information about safety considerations when felling trees.

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Dry-Mesic Oak Forest

This deciduous community is most commonly found on the north-facing slopes of bedrock bluffs but is also present on bluff crests and west- or east-facing slopes. The most common canopy species are northern red oak, white oak, and basswood with shagbark hickory occasionally present. The density and abundance of seedlings and saplings in the shrub and sub-canopy layers depends on the available light filtering though the canopy and usually contains seedlings and saplings of the dominant canopy species. Black cherry, chokecherry, American hazelnut, Missouri gooseberry, and pagoda dogwood are also present in the shrub-layer. Ground-layer plants such as lady fern, Clayton's sweet cicely, wild geranium, hog peanut, and white snakeroot typically cover 25 to 100 percent of the forest floor.

Catastrophic disturbances were historically rare in this community, while events such as light surface fires that created pockets of tree loss were much more common. Creating medium to large gaps—up to an acre—allows oak and hickory seedlings to access the full sunlight they need to succeed. Making smaller gaps—single trees or small clusters—may favor basswood. Either strategy will help create diverse age groups among your trees similar to the effects of fires in the past, improve wildlife habitat, and help your woods resist environmental stress.

Photo credit: Leslie Robertson/NASF

Option 4, income focus: Having a timber harvest

The first step to having a good harvest is working with a professional forester who can walk your property to design a harvest that meets your goals. Those goals may include generating income, improving wildlife habitat, or increasing the health of your woods.

Working with a forester—whether DNR, consulting, or industry—is an investment of time and money. You will likely recover your costs because your forester will design a plan to maximize revenue, improve your woods, and address your goals.

Your goals determine which trees to harvest. Removing older trees can create deer or grouse habitat and removing dead or dying trees can improve your woods health. Depending on your harvest design, your forester will paint the boundaries of the sale or individual trees to show the logger which trees to cut.

If not performing a clear-cut, avoid removing the biggest and best trees during a harvest. Removing these trees reduces the health of your woods and its future value. Focus on removing trees competing with the biggest and best trees in your woods.

Use extra caution when harvesting trees on steep slopes to prevent damaging the remaining trees and soil. If your goal is to grow oaks, plant oak seedlings and remove unwanted trees before a harvest.

Having your timber appraised is key to collecting a fair price for the trees you sell. Many factors influence tree value, including:

- Industry—forest product companies are interested in certain tree species.
- Species—some species are worth more than others.
- Diameter and length—larger and longer trees can be more valuable.
- Quality—straighter trees with fewer defects can be more valuable.
- Accessibility—easy access by loggers makes harvesting cheaper.
- Location—sites closer to mills are often more desirable to loggers.

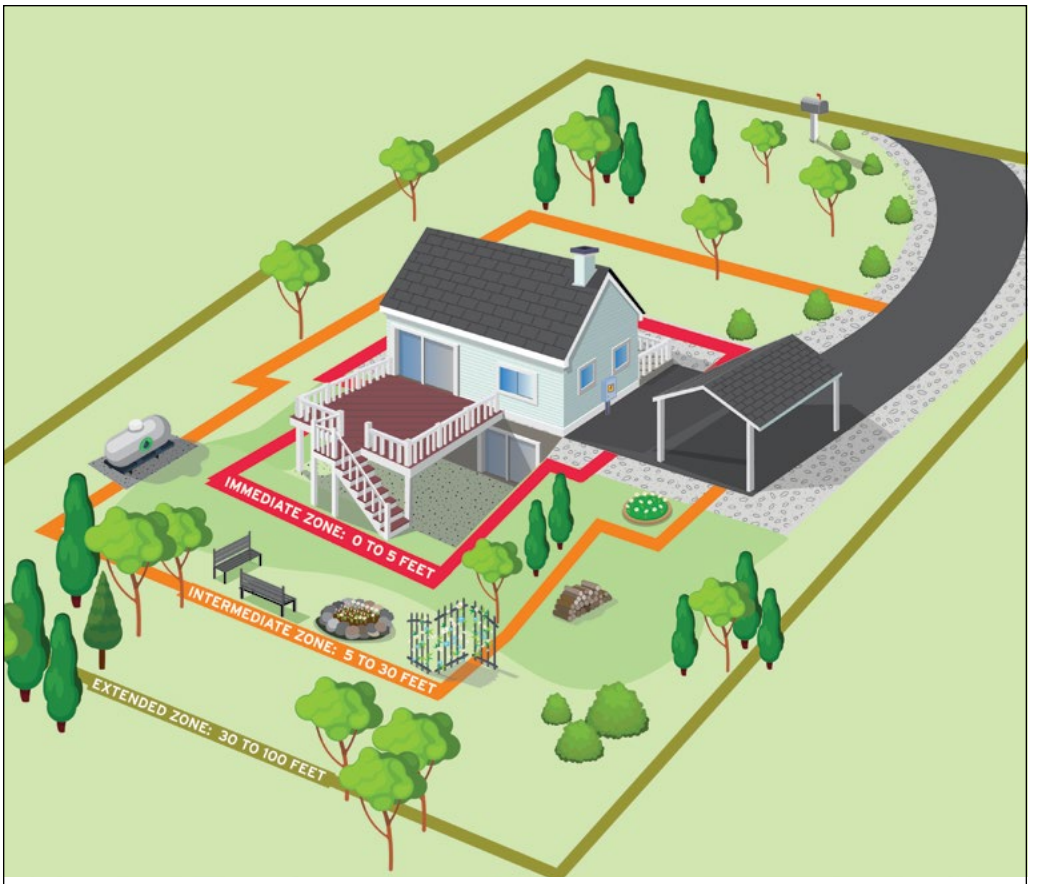
Consider a joint timber sale with adjacent woodland owners to make your harvest more desirable to loggers. Be sure to work with your forester to develop a plan to regrow trees in your woods.

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Mesic Maple-Basswood Forest

Present on sites that have been historically protected from fire, this deciduous forest is most often found on middle and lower slopes on north and northeast facing bluffs. The canopy is strongly dominated by sugar maple, with lesser amounts of basswood and northern red oak present. Sugar maple, bitternut hickory, basswood, prickly gooseberry, and chokecherry are common in the shrub-layer. Important ground-layer species include Virginia waterleaf, bloodroot, yellow violet, large-flowered bellwort, wild leak, blue cohosh, and early meadow-rue.

A forest with mixed age classes, heights, and tree species will be more resilient to Minnesota's changing climate. To diversify your forest, create openings by conducting scattered removals of individual trees ready for harvest or removing small patches of trees. This will encourage smaller sugar maple and basswood trees in the understory to grow into the gaps created by the harvest while discouraging sun-loving trees like red and bur oak. Repeat harvesting individual or small patches of trees every 10–20 years to maintain a diverse maple-basswood dominated forest. If you want to increase the amount of oaks, clearcut your woods one to two years after pre-planting oaks to a density up to 600 seedlings per acre. Remove competing trees and shrubs until oaks dominate the canopy. Care must be taken to protect remaining canopy and understory trees from damage during the harvest.



Firewise properties can better withstand wildfires.

Be Firewise

Protect your home, barn, and other structures from wildfire with these easy, inexpensive steps:

- Maintain at least 5 feet of cleared area around buildings.
- Limit or remove flammable materials such as trees, overhanging branches, brush, and firewood within 30 feet of a building.
- For trees that are within 30 feet of a building, prune lower branches 6 to 10 feet from the ground, or no more than one-third the tree's height.
- In a 30- to 100-foot zone around each building, reduce fuels by mowing grasses, removing brush, and pruning lower branches to decrease the intensity of approaching wildfires.

firewise.org

Combination focus: Riparian area restoration

Forests play a critical role in maintaining the health and beauty of southeast Minnesota's rivers and streams. If you own property along a river or stream, a riparian area restoration project will provide habitat for birds, fish, and other wildlife. It also improves recreational opportunities by maintaining good water quality and can potentially increase the value of your land by improving visual quality.

You can take several steps to improve the quality of your ***riparian area***:

- **Stabilize the soil bank**—If the bank is eroded or sensitive to erosion, you need to stabilize the soil to keep it from muddying the water. Planting native trees, other woody vegetation, or deep-rooted perennials and grasses is one way to secure the bank and prevent further erosion. Visit **mndnr.gov/woodlands** for tips on selecting native plants in your county.
- **Control invasive plants**—Aggressive invasive species, such as reed canary grass and purple loosestrife, plague the banks of rivers and streams in your area. Controlling invasive plants helps native plants compete for space.
- **Create wildlife habitat structures**—If the area has few snags and downed logs, consider installing some habitat structures for wildlife such as tree boxes for wood ducks or floating nest platforms for waterfowl.

Specific recommendations for riparian area restoration projects vary depending on the condition of your bank, the local ecology, your goals, and regulations governing your shoreline. The DNR's online Restore Your Shore tool on **mndnr.gov/restoreyourshore** is an excellent resource to assess the current condition of your riparian area and find tips to increase ecosystem health along your water's edge. For grants and general planning assistance, check with your local county soil and water conservation district, watershed district, or with a DNR fisheries habitat specialist for more information.

Leaving logs in a river creates habitat for wildlife.

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Terrace Forest

This nutrient-rich plant community occurs throughout southern Minnesota where occasionally flooded sites transition to upland forests and floodplains. These conditions make terrace forests the most diverse tree community in the state, often containing a mix of: American elm, green ash, hackberry, basswood, boxelder, silver maple, black ash, black walnut, cottonwood, and other species. Their understories are much more diverse than floodplain forests and feature abundant spring ***ephemeral*** flowers. Species include: wood nettle, Virginia waterleaf, spotted touch-me-not, tall coneflower, Virginia bluebells, and eastern narrow-leaf sedge.

These forests are vital to protecting the region's water quality and provide important wildlife habitat. Many of these forests have been converted to agriculture fields or lost due to invasion by reed canary grass, which dominates sites where light reaches the forest floor. Reed canary grass greatly impedes the establishment of tree seedlings. Consider enhancing or expanding the forested stream buffer by planting native tree seedlings and controlling invasive species to help the region's water quality and wildlife habitat. You will also improve forest diversity, including high-value black walnut, which could provide a hefty return in years to come.

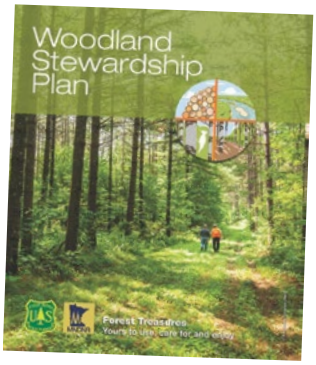
Next steps:

- Choose your project.
- Record it in your Woods Workbook.
- Write your expected timeline and the contact information of any professionals with whom you are working.
- Consider breaking your project into concrete steps and record these as well.
- Take before and after photographs of your woods.

Chapter 6: Next Steps

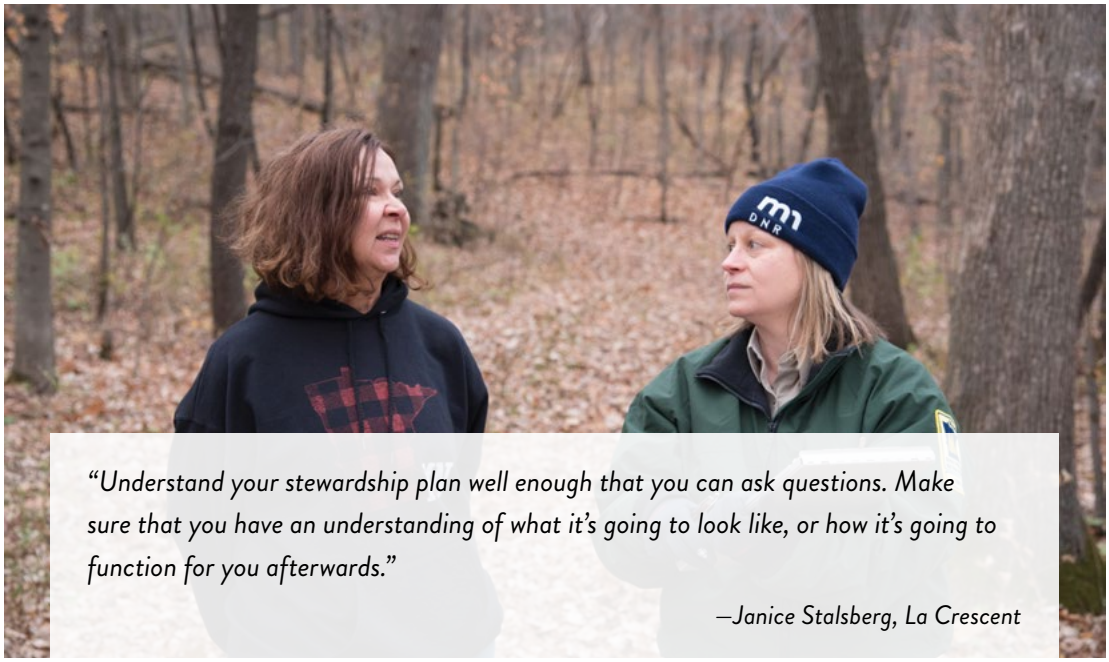
Programs and resources are available to help you develop an in-depth property plan, use sustainable practices, save money, and protect your land long-term.

Getting a Woodland Stewardship Plan



The DNR's Forest Stewardship Program helps woodland owners create and use voluntary management plans for their property. A Woodland Stewardship Plan written by a certified plan writer and registered with the DNR qualifies landowners to apply for one of Minnesota's cost-saving woodland tax-relief or incentive programs. To access one of these programs, a landowner must have at least 20 qualifying acres of land. Of those 20 acres, at least 10 must be currently wooded or will be converted to woodland or woody vegetation.

Plan-writing services include the DNR, private consulting foresters, industry foresters, some county soil and water conservation districts, and certain environmental organizations. Costs for plan-writing services vary by provider. To locate a certified plan writer, visit **www.mndnr.gov/foreststewardship**



"Understand your stewardship plan well enough that you can ask questions. Make sure that you have an understanding of what it's going to look like, or how it's going to function for you afterwards."

—Janice Stalsberg, La Crescent

To create your personalized plan, you'll walk through your woods with a forester discussing your goals while they note your woodland's current status and potential. You may wish to have your Woods Workbook on hand as a reference for your goals and interests. The forester then prepares a written plan specifically for your land, usually including information on your woods' diversity and health, timber quality and species, rare species and historical sites, specific project suggestions, aerial photographs and maps of your property, and information about the surrounding landscape. Recommendations made in these plans are voluntary. However, if you enroll your plan in a tax-relief or incentive payment program, you are expected to follow its recommendations.

Management Plan Options for Landowners With Less Than 20 Acres

Managing smaller woodlots is becoming more important as more wooded plots are subdivided into smaller ownerships. All woodland owners, regardless of acreage, can contact the DNR or another professional to schedule a woods walk and get a streamlined management plan or a plan designed for a specific project. A streamlined management plan provides a list of work projects. A project plan focuses on a single project such as tree planting, harvest, or invasive species control. It describes the current and desired future conditions of the project area and specific steps for completing the project. Another option is to team up with your neighbors and have an in-depth Woodland Stewardship Plan written for multiple properties. Owners with less than 20 qualifying acres are not eligible to enroll in a tax-relief or incentive payment program. For more information, ask your forester.

Voluntary Guidelines

The ***Minnesota Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers, and Resource Managers*** is a set of science-based guidelines designed to reduce negative impacts during activities such as woodland stand improvement, timber harvest, site preparation, pesticide use, reforestation, managing for recreation, managing with fire, and building roads. A digital copy of the guidelines is available free on **mndnr.gov/woodlands**

Following voluntary guidelines keeps our water clean by reducing erosion after a harvest.

Minnesota Forest Management Guidelines: Quick Reference Field Guide

A condensed version of the guidelines that focuses on timber harvesting is available in a durable, pocket-sized format. The field guide presents key guidelines for woodland, water, and soil protection in a concise, user-friendly format that includes picture examples, general rules of thumb, and a comprehensive resource directory. Request a free paper copy of the field guide from the Minnesota Forest Resources Council by emailing **mfrc.info@state.mn.us**

Financial Assistance

Because managing your woods can benefit nature and society, public financial assistance is available. Programs are always changing, so go to the website for the most up-to-date information **mndnr.gov/woodlands**

Cost-share programs:

Federal

- **Conservation Reserve Program (CRP)**—Administered through the Farm Service Agency, the CRP provides annual compensation payments to farmers who remove environmentally sensitive land from agricultural production and plant perennial species such as trees that improve soil and water quality and wildlife habitat. Contracts last 10 to 15 years.
- **Environmental Quality Incentive Program (EQIP)**—EQIP is a program of the Natural Resources Conservation Service (NRCS) that provides reimbursement to landowners who implement certain conservation practices. Technical assistance is also provided. Requirements include a "practice" plan or project plan that has a schedule of planned activities. Contracts last up to 10 years.

State

- **DNR Division of Forestry**—Cost-share funding may be available to help woodland owners complete projects to improve their woods and to get a Woodland Stewardship Plan.

County

- **Soil and Water Conservation Districts (SWCD)**—Cost-share funding may be available through your local SWCD, which receives cost-share funds from the Minnesota Board of Soil and Water Resources. SWCDs can sometimes access funding sources such as those generated by Minnesota's Legacy Amendment.

Tax and incentive programs:

Federal

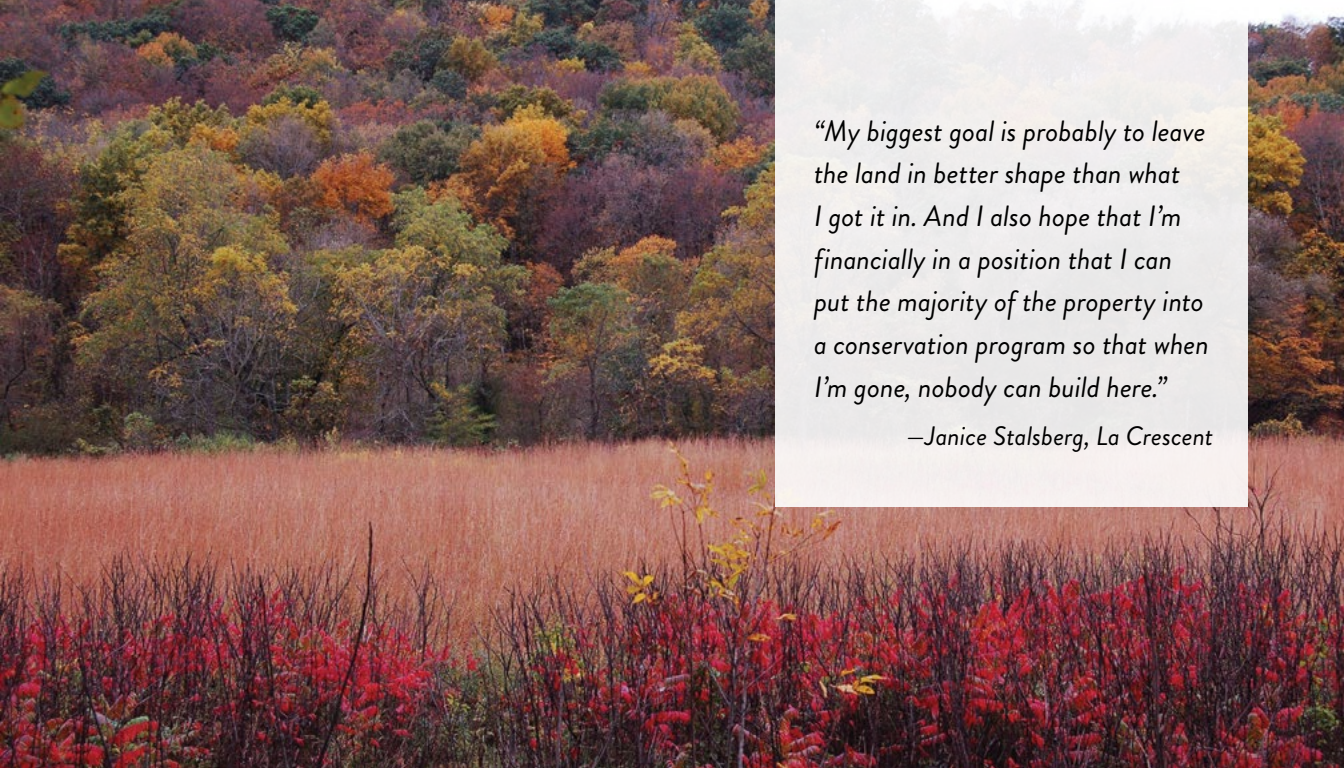
- **Reforestation Tax Credit**—Treating your woods like an investment or a business may make you eligible for certain federal tax incentives. For example, the IRS allows landowners to deduct eligible reforestation costs from their income—up to $10,000 per year—with the option to amortize (write off) additional expenses over seven years.

State

- **Sustainable Forest Incentive Act (SFIA)**—Passed in 2001, landowners who enroll their land in the program receive a fixed annual payment per acre. Requirements include a minimum enrollment of 20 qualifying acres, an 8-year minimum commitment, and a Woodland Stewardship Plan that was written in the last 10 years, is registered with the DNR, and includes a schedule of planned activities.
- **2c Managed Forest Land**—Created in 2008, 2c reduces landowners' property taxes by 0.65 percent. Requirements include a minimum enrollment of 20 qualifying acres and a Woodland Stewardship Plan that was written in the last 10 years, is registered with the DNR, and includes a schedule of planned activities.
- **Green Acres (2a Productive Agricultural Land) and Rural Preserve (2b Nonproductive Agricultural Land)**—These programs provide reduced taxes on woodlands that produce agricultural products (maple syrup, biomass) or is adjacent to a landowner's farmland.

Minnesota State Forest Nursery

The Minnesota State Forest Nursery sells native, bareroot seedlings grown from seeds collected in Minnesota. Nursery staff notes seed source locations and tracks where seedlings are shipped. When possible, seedlings are shipped to the same region from which the seeds were collected. This way the seedlings are well-adapted to local growing conditions and have a better chance of survival. Seedlings sales begin in mid-October and seedlings are shipped for planting in the spring. More information is available at **mndnr.gov/nursery**



"My biggest goal is probably to leave the land in better shape than what I got it in. And I also hope that I'm financially in a position that I can put the majority of the property into a conservation program so that when I'm gone, nobody can build here."

—Janice Stalsberg, La Crescent

Conservation easements protect our natural resources from development.

Conservation Easements

Some landowners sell or donate a ***conservation easement*** on their land to make sure their land will never be developed or converted to another use. Conservation easements are generally intended to protect important features of a property. Landowners enter these voluntary, legal agreements to give up some of the rights (such as restrictions on the right to develop, divide, mine, or farm the land) to protect long-term goals such as ensuring healthy land, water, habitat, open spaces, and other conservation values. Agreements are tied to the land and not the owner so that the property remains in a largely natural state no matter who owns it in the future. Easements are visited regularly (usually annually) by the organization holding the easement to monitor the conditions of the property.

There are two kinds of easements. Perpetual conservation easements are intended to last forever. Term easements are for a specified length of time, up to 30 years or more, but most are permanent.

Public agencies and some nonprofit organizations whose purposes include conservation preservation can hold conservation easements. Interested landowners can either sell or donate an easement.

Organizations that offer conservation easement programs:

- **Agricultural Conservation Easement Program (ACEP)**—Administered by the Natural Resources Conservation Service (NRCS), ACEP protects

agricultural and nonindustrial private woodlands from development through agricultural conservation easements. The easements can be temporary (30 years) or permanent. The program also offers wetland conservation easements that are purchased and then maintained by NRCS. Easement plans are required.

Forest Legacy Program (FLP) and Minnesota Forests for the Future (MFF)—The DNR administers the FLP and MFF programs to prevent the conversion of forests to nonforest uses. Working forests provide an array of public benefits including habitat, clean water, recreational opportunities, timber, and other forest products. The FLP is a national program administered in partnership with the USDA Forest Service, while the MFF is strictly a Minnesota easement program. Both programs are intended to conserve and protect private forests that provide economical, recreational, and environmental benefits to the state and its citizens. Conservation easements are permanent and easement rights are either purchased or donated.

- **Reinvest in Minnesota (RIM)**—RIM is administered by the Minnesota Board of Water and Soil Resources and local soil and water conservation districts. The program focuses on restoring wetlands and sensitive agricultural lands such as those along rivers. An easement plan is mandatory. The landowner is responsible for maintaining any conservation projects in the plan, but the program can provide financial assistance. Conservation easement rights are purchased. Most easements are permanent, but some may be temporary (20 years or more).
- **Nonprofit organizations**—Some nonprofit organizations purchase or accept donated conservation easements on land that fits certain criteria. Examples include Minnesota Land Trust, Ducks Unlimited/Wetlands America Trust, and The Nature Conservancy.

"About two years ago I thought, 'I want to make sure my land is passed on.' So I met with an estate planner and went through the business necessary to write up my wishes for how this place will be managed, and then I could start gifting it to my daughter."

—Larry Gates, Kellogg

Transferring Land to the Next Generation

If you want to keep your woods in the family and make sure it remains intact, consider creating a family limited liability company (FLLC or LLC) for your land. An LLC is a business entity that can hold and manage land while shielding the owners from certain personal liability issues. Placing woodland in an LLC also helps landowners transfer their property to the next generation while minimizing the risk that a future heir sells the land—known as "avoidance of partition" in legal terms. Rather, the land is titled in the name of the company and divided into units of membership, similar to the way a corporation is divided into shares. You, as the owner, can gift portions of the value of the land in the form of company units to your heirs over time. You retain decision-making power over the land as a majority partner until such time that you see fit to pass on responsibility. Bestowing land as annual gifts below a certain maximum value can help landowners potentially decrease the estate taxes associated with high-value property.

Importantly, LLCs offer opportunities to engage the next generation in caring for and managing the land during your lifetime, and may provide a good platform to pass on your goals and values. While LLCs are easy to create, you may need to take many steps to ensure that the LLC functions as you intend. Further, inheritance and tax law can be complicated and may change frequently. For these reasons, it is important to work with a certified public accountant or attorney who is familiar with the specific needs of Minnesota woodland owners. Again, visit **mndnr.gov/woodlands** for details.

Now that you know more about investing in and protecting your land, continue to Chapter 7 to connect with other landowners and become more involved in your local landowner community.

Chapter 7: Your Landowner Community

Many activities are more fun when you are part of a community. Anglers, stamp collectors, sports fans, book lovers, birders, and ballroom dancers all have their own communities. Woodland management is no different. There are more than 190,000 private woodland owners like you in Minnesota. This chapter outlines some programs and organizations that can connect you with other woodland owners and local natural resource professionals.

Minnesota Forestry Association (MFA)

MFA is a private, member-funded woodland owner organization. It is Minnesota's oldest conservation organization, founded in 1876. Working on behalf of family forest owners through education and advocacy to promote woodland stewardship, MFA offers educational opportunities such as field days on member properties. **minnesotaforestry.org**

Minnesota Women's Woodland Network

The Minnesota Women's Woodland Network (MNWWN) recognizes women play a vital role in keeping Minnesota's forests healthy. MNWWN focuses on engaging women woodland owners in sustainable woodland management by creating peer-learning opportunities. These small groups offer informal and supportive education on topics that include trees, nature, and land management. MNWWN also helps build relationships between women woodland owners, their families, and professionals through local networks. Visit MNWWNs website to find the local network closest to your neck of the woods. **mnwwn.org**

"I think it's easier to learn in a group setting, and everybody can add something from their own experiences. There's no better teacher than experience, and everybody has different experiences."

—Janice Stalsberg, La Crescent

Photo credit: Barb Spears

University of Minnesota Extension Woodland Owner Programs

The University of Minnesota Extension teaches landowners how to best steward their land and improve forest health in their community. See **myminnesotawoods.umn.edu**

- **Master Woodland Owner**—This program offers training to landowners who want to become better stewards of their woods. Participants complete self-paced, online educational courses on a range of woodland stewardship topics, and attend in-person field tours and workshops. Participants complete a capstone exercise designed to help them implement a project on their property.
- **Forest Pest First Detector**—This program trains citizens to become community leaders who identify, detect, and report on Minnesota's most threatening forest invasive species.
- **Woodland Transition Workshops**—The University of Minnesota occasionally offers workshops on how to bestow your woodland legacy to the next generation. Woodland owners learn how to develop a vision for their property, share their vision and goals with family, and explore wills, trusts, and limited liability companies.

Urban and Community Forestry Organizations

To help protect the trees that grow in urban and community areas, consider these organizations:

- **Minnesota Shade Tree Advisory Committee (MnSTAC)**—MnSTAC advocates for the interests of Minnesota's public and private community forests and serves as a forum for sharing ideas and information. The committee works with policy makers and community leaders to identify legislative priorities and leads initiatives to protect urban and community trees and forests. **mnstac.org**
- **Tree City USA**—Tree City USA is a national program of the Arbor Day Foundation. It recognizes communities with tree management plans and encourages action and public education around sustainable community forests. To see if your city has a Tree City USA designation, visit **arborday.org/treecityusa**
- **Minnesota Tree Care Advocate**—Minnesota Tree Care Advocate is a program committed to enabling volunteers to create healthy community forests. The program, administered by the University of Minnesota's Department of Forest Resources, trains and connects volunteers to opportunities within their community. They also work directly with communities to develop locally based volunteer programs to meet needs of the community. To learn more, go to **www.mntca.umn.edu**
- **Minnesota Tree Inspector**—Certified tree inspectors identify and manage disease and insect problems in communities and counties. **mndnr.gov/treeinspector**

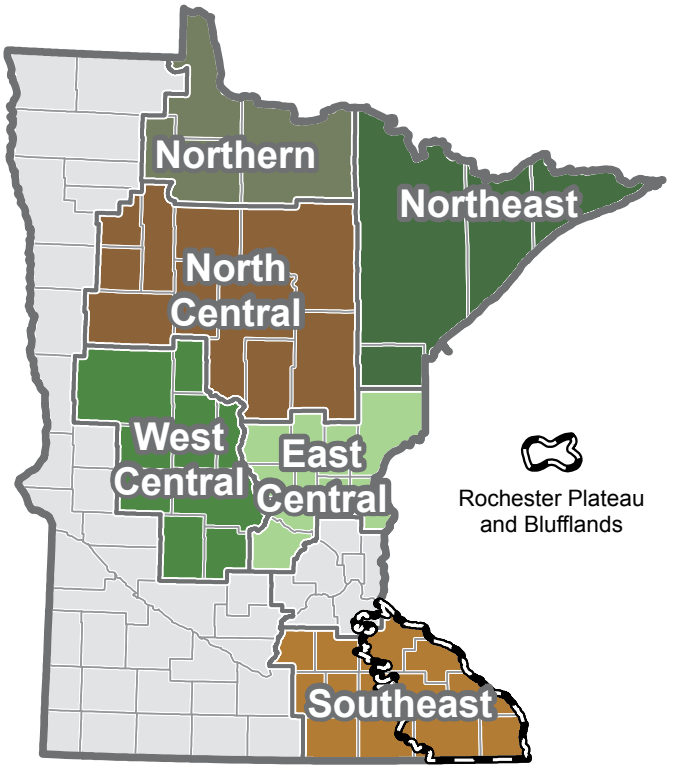
Minnesota Forest Resources Council (MFRC) Landscape Committees

The MFRC is a state-appointed council established by Minnesota statute and exists "to promote long-term sustainable management of Minnesota's forests." The Council consists of 17 members who represent forest-related interests in the state including timber, conservation, and private woodland owners. Staff manage several supporting programs including a Landscape Program that supports and guides six regional Landscape Committees spanning the forested areas of the state.

Each Landscape Committee contains volunteers from the public and private sectors including natural resource professionals, landowners, and other interested community members. Committees partner with local natural resource groups to coordinate and support forestry projects based on the broader landscape plans that the MFRC has designed for the regions.

Landowners bring important on-the-ground perspectives to these committees. Your region is represented by the Southeast Landscape Committee. The committee meets quarterly and is open to the public. **mn.gov/frc/regional-landscape-committees.html**

MFRC LANDSCAPE REGIONS



Minnesota Tree Farm

Minnesota Tree Farm is a chapter of the American Tree Farm System, a program of the American Forest Foundation. The program recognizes woodland owners who adhere to a set of sustainable forestry principles including: protecting forest, soil, and water quality; growing productive forests; and maintaining biodiversity and wildlife habitat. Applicants must own at least 10 acres of woods and a management plan. Membership is free. Benefits include; free technical advice from volunteer foresters during inspections; opportunities to network with other landowners and educators through workshops, field days, and seminars; and an annual national convention. Email **info@minnesotaforests.com** for more information.

Walnut Council

The Walnut Council is an international non-profit organization with local chapters in 12 states. While Minnesota does not have a state chapter, landowners can join the international organization. The council provides information about growing hardwood trees for nuts and timber, especially black walnut. You can get information about growing other fine hardwood tree species such as black cherry, hickory, and sugar maple. Due-paying members can access information and attend the annual meeting. **www.walnutcouncil.org**

Landowner Cooperatives

Woodland owner cooperatives provide services to members such as education, equipment-sharing, and access to markets. Examples in your area include Goodhue County Forestry Committee, Rice County Forestry Committee, Root River Woodland Council, and Wabasha County Forestry Committee.

Throughout this handbook, you have read the perspectives and experiences of some of your fellow landowners. Getting involved in one or more of these landowner organizations will help you meet, learn, and share your knowledge and experiences with your woodland neighbors. You may also meet local natural resource professionals, who may help you throughout your woodland-owning journey.

LANDOWNER LEADERS SPOTLIGHT

Tim Gossman and Bill Bailey—Chatfield, Minn.

ROCHESTER PLATEAU AND BLUFFLANDS

"We just enjoy nature and the outdoors," says Bill Bailey, referring to reasons for managing his family's farm in Chatfield, which has been in the Bailey family for nearly 100 years. "And if we own it, other people cannot build houses on it." He and Tim Gossman laugh. Tim and his wife, Susan, own the farm adjacent to Bill's. "You make your own best neighbor, right?" chides Tim, who adds, "He makes a good neighbor to me as well."

Tim and Bill own about 400 total acres of woods between their farms, and share about a mile of property line. The two neighbors share more than a common border, they share common goals and values for their land as well, including importance of biodiversity, woodland management, and building good trails. This last belief led Tim, Bill, and others to cooperate with the Fillmore County Soil and Water Conservation District (SWCD) to form the Lost Creek Hiking Trail, a 6.35 mile trail passing through a mix of public and private land, beginning in the city of Chatfield and crossing Lost Creek before ending at Ninebark Road. The trail is open to the public year-round (except during firearm deer hunting season). "Several of us got together and thought, 'We have this land that is nice, and we think people would enjoy it. How could we share our land with folks?'" says Tim.

The Bluff Country Hiking Club, LLC was created for the trail's landowners and non-landowning members interested in helping maintain the trail. "Instead of just calling it the 'Lost Creek' Hiking Club, we decided to go with 'Bluff Country' because we thought maybe there are other people who would want to do something similar," explains Tim. The club has two main goals: provide exercise and enjoyment for trail-users and provide education on sustainable woodland management practices visible along the trail. For this second goal, the club once again joined forces with the Fillmore SWCD to install numbered signs along the trail pointing out woodland management practices and interesting natural features. For example, a hiker can see examples of woodland stand improvement, wildlife trees, invasive species control, grown back clear-cut harvests, and unique geological features such as a limestone bluff, a sinkhole, and a 'blowhole' that emits steam in the winter. Brochures with descriptions of each numbered site are located at either end of the trail. "We regard it as kind of a permanent field trip," says Tim.

The club holds monthly meetings to discuss activities they'll host on the trail. Past events have included bird and wildflower hikes and an annual trail run. They also give tours to explain the various woodland management practices along the trail. "I show them what practices are presently being done there, what practices were done in the past to make it possible for that to be, and then some ideas of what more should be done," says Bill of a recent tour. "We find in a group that people are sometimes reluctant to ask a question of the presenter, but there is somebody else in the group they will ask. And you can get a lot more education done by having other people that they trust talking to."

The forest floor along the trail is a sea of purple wild geraniums, here for just a short time to replace the hepaticas and trout lilies that have begun to fade. Tim searched a bit and found a pair of delicate, perfect yellow lady's-slippers in full bloom. To preserve it, they carefully dug up and moved the rare plant before the trail went in. "Do no harm," Tim advises. True to this philosophy, the club installed anti-erosion features when the trail was built, which the two neighbors point out. "You have drainage points from the trail so the water does not continue to run down the trail," Bill explains. Ultimately, Bill and Tim see carefully planned, well-maintained trails as an essential tool for woodland management.

To get details about each numbered location, visit **fillmoreswcd.org**

Part III Vocabulary

Biological control
The use of natural enemies (e.g., insects, pathogens) to control nonnative pests.

Conservation easement
Voluntary land protection agreements that restrict development while ensuring biological diversity, sustainable timber management, and in some cases, public access.

Ephemeral
Something that lasts for a very short time, such as spring wildflower blooms or snow-melt ponds.

Food plot
A small area planted to annual or perennial agricultural crops to provide a supplemental food source for wildlife. They have less value to native wildlife than ***wildlife opening***.

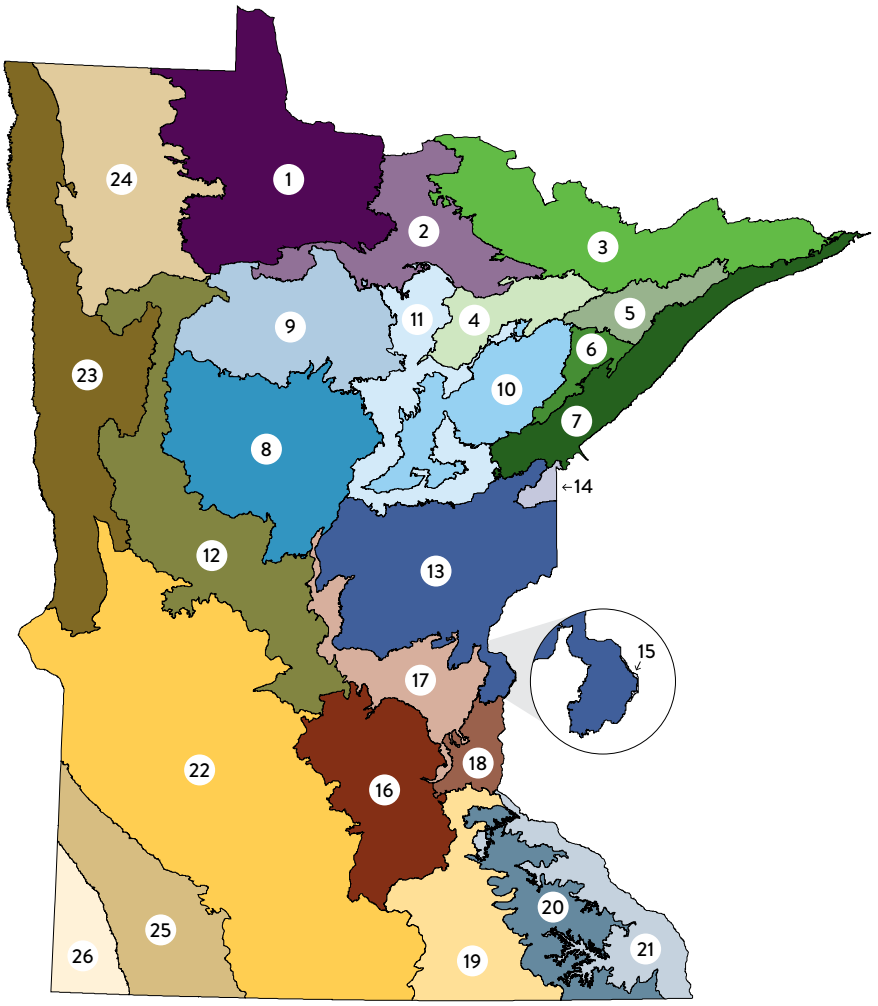
Forb
An herbaceous, flowering plant that is not a grass, sedge, or rush.

Prescribed burning
The controlled application of fire to naturally occurring vegetative fuels, under specific environmental conditions and following appropriate precautionary measures, to achieve clearly-defined objectives such as controlling brush, producing high-quality browse, or reducing fuel hazards.

Riparian area
Interface between land and a river or stream.

Ecological Subsections Within Minnesota

1. Agassiz Lowlands
2. Littlefork–Vermilion Uplands
3. Border Lakes
4. Nashwauk Uplands
5. Laurentian Uplands
6. Toimi Uplands
7. North Shore Highlands
8. Pine Moraines–Outwash Plains
9. Chippewa Plains
10. Tamarack Lowlands
11. St. Louis Moraines
12. Hardwood Hills
13. Mille Lacs Uplands
14. Glacial Lake Superior Plain
15. St. Croix Moraine
16. Big Woods
17. Anoka Sand Plain
18. St. Paul–Baldwin Plains and Moraines
19. Oak Savanna
20. Rochester Plateau
21. Blufflands
22. Minnesota River Prairie
23. Red River Prairie
24. Aspen Parklands
25. Coteau Moraines
26. Inner Coteau



Woods Workbook

You can print a user-friendly version of this workbook at **mndnr.gov/woodlands**

About my property

Begin by answering a few background questions. Visit **mndnr.gov/woodlands** for information about your watershed and ecology of your land.

How many acres do I have? _____

Is my property in multiple parcels? If so, how many? _____

What county or counties is my property located in? _____

What Ecological Classification System subsection is my land located in?
☐ Blufflands ☐ Rochester Plateau ☐ Other:
What major watershed is my land in? _____

What minor watershed is my land in? _____

Evaluating my property

Take a leisurely walk through your woods. What do you notice? Consider these questions and take notes:

- What kinds of trees are there? Are they old, young, or a mix of ages?
- How dense is the tree cover in my woods? Has there recently been a harvest? Are there openings from trees that have died or blown over?
- Are there 'islands' of woods surrounded by open land or is all of my woodland connected?
- What is the understory like? Is it thick with shrubs and brush or is it open?
- What wildlife is there?
- Are there any invasive species? Which species? Where are they located?
- Are there any ponds, wetlands, swamps, springs, or streams within my woods or nearby?
- What is the terrain like? Is it hilly or flat?

_____

_____

_____

_____

_____

_____

Consider repeating this exercise with each new season. You may notice different plants and animals in different seasons.

Identifying what interests me about my woods

First, note topics. Then, set goals. Here is a list of topics that may interest you as a woodland owner. Check any that apply to you. This isn't an exhaustive list, so add any additional topics that are important to you.

Topics:

What are your top three topics? _____

- ☐ Game wildlife
- ☐ Non-game wildlife
- ☐ Rare plants and animals
- ☐ Recreation
- ☐ Timber harvest
- ☐ Tree planting
- ☐ Cost-share
- ☐ Tax incentive programs
- ☐ Invasive species
- ☐ Forest health
- ☐ Protecting important habitats
- ☐ Wetlands
- ☐ Shoreline management
- ☐ Water quality
- ☐ Prescribed burning
- ☐ Investment
- ☐ Intergenerational land transfer
- ☐ Carbon capture
- ☐ Nontimber forest products (mushrooms, maple syrup, etc.)
- ☐ Other:

Identifying my management theme

After looking at your top three topics, your theme may be managing for wildlife habitat, recreation, income, or something else.

My goals

Write a short goal statement about each of your top three topics. Example: If "game wildlife" is one of your top three topics, then your goal might be to "Make sure my property supports more wild turkeys."

Goal 1: _____

_____

Goal 2: _____

_____

Goal 3: _____

_____

Other goals: _____

_____

_____

Consult a professional forester

A professional forester can give advice and can walk your property with you to discuss your goals and write you a voluntary, non-binding, personalized Woodland Stewardship Plan.

Describe a work project

First, choose a goal you want to tackle that may involve setting up a work project. Example: If your goal is to "Make sure my property supports more wild turkeys," then your project may be to "Locate existing openings and enhance them by removing trees and planting native species that turkeys eat."

Describe a work project that will help you achieve your woodland goal:

_____

_____

_____

_____

Identify action steps

If possible, break down your project into smaller action steps. Take as many steps as you need. Use extra sheets if necessary. **Example:** Step 1—Locate existing openings by examining aerial photos. Step 2—Schedule walk with forester to visit openings I want to enhance. Step 3—Ask my forester to recommend times to mow or burn. Step 4—Conduct mowing or burning. Step 5—Plant shrubs and trees that are good for wildlife (ask my forester for recommendations).

Step 1: _____

_____

Step 2: _____

_____

Step 3: _____

_____

Step 4: _____

_____

Step 5: _____

_____

Pull it together

For each work project, use the Action Step Work Project template to list individual action steps, set a time to do each step, estimate budget needs, and record notes and observations about how things are going along the way. Remember to take before and after photos!

ACTION STEP CONSIDERATIONS:

Date/Season

- For action steps within a project, consider the season, the order of action steps, and amount of time you need to complete each step. Example: Most harvests occur in winter when the ground is frozen to minimize damage to the soil.
- In what order will you tackle your work projects? Example: Control invasive species at trail entrance—year one; Enhance wildlife openings—year two; Incorporate as an LLC—year three; etc.

Tools needed

- You might include aerial photos, chain saw, management plan, project plan, shovel, seedlings, etc. You may want to note where you might get these tools.

Partners/Contacts

- List names and phone numbers of people who could advise on or help with each step such as your local forester, a neighbor, etc.

ACTION STEP WORK PROJECT

Work project name and description: _____

_____

_____

Year: _____

Steps (describe): _____

_____

_____

_____

Date/season: _____

Tools needed: _____

_____

_____

Partners/contacts: _____

_____

_____

Budget estimates: _____

_____

_____

My contribution: _____

Financial assistance: _____

Notes: _____

_____

_____

_____

Acknowledgments

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WOODLANDS OF MINNESOTA

LANDOWNER HANDBOOK

If you own woods in southeast Minnesota, your decisions can impact the future of this rich and unique forest landscape.

This handbook is a tool for taking care of your woods and connecting your property to the larger landscape. It helps you:

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- Plan for what you want your woods to be in the future.
- Understand what you can do to keep your woods healthy.
- Consider strategies for accomplishing goals in your woods.

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What will your woodland owning legacy be?

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