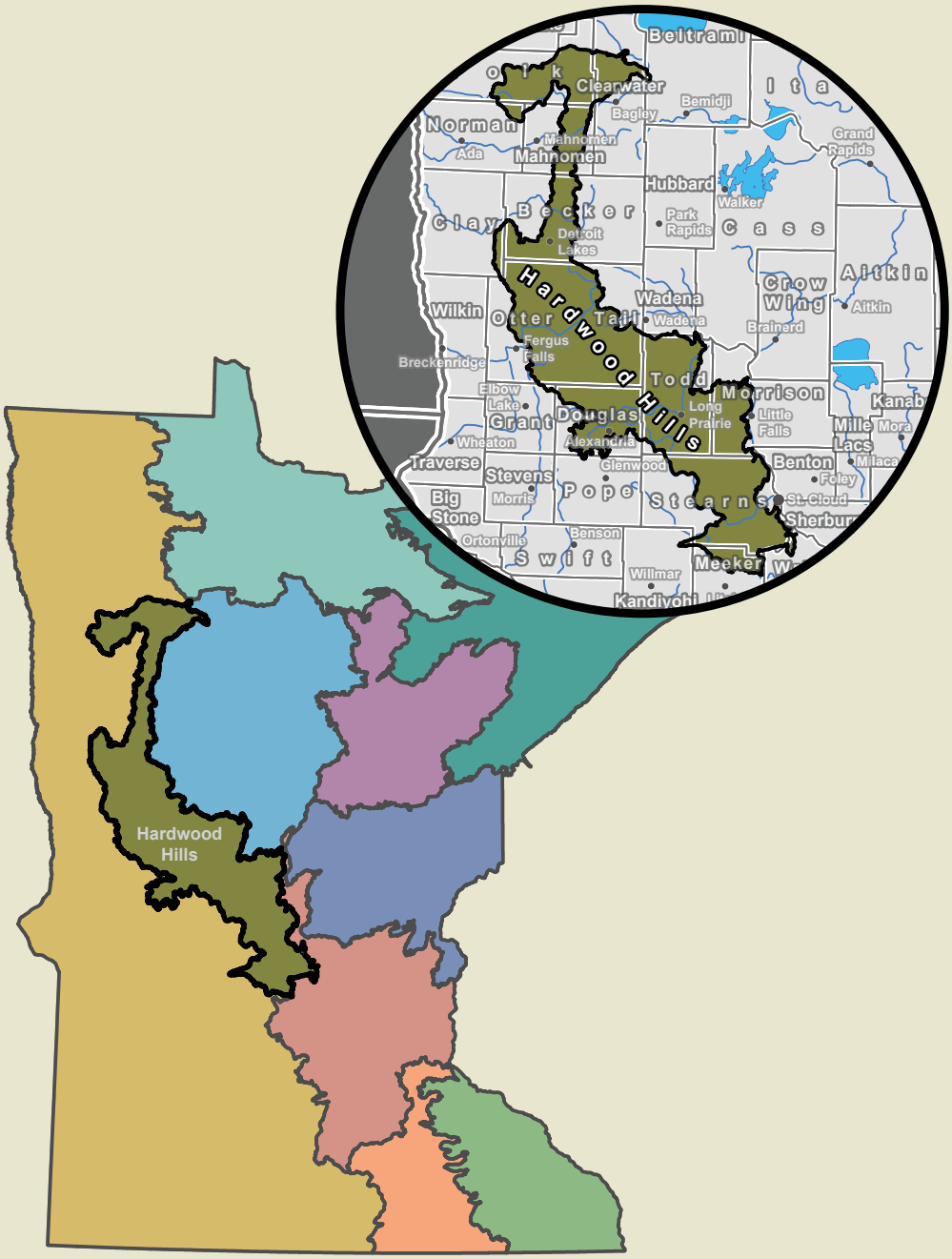
WOODLANDS OF MINNESOTA

Landowner

HANDBOOK

Hardwood Hills

MNDNR



About the Woodlands of Minnesota Series

This handbook is for people who own woodland in Minnesota's Hardwood Hills subsection that is indicated on the map in olive. If you own woods in other parts of the state, see **mndnr.gov/woodlands** for other publications designed for your area.

Cover photo: Maplewood State Park, located 7 miles east of Pelican Rapids, is in a zone of transition between eastern forests and western prairies.

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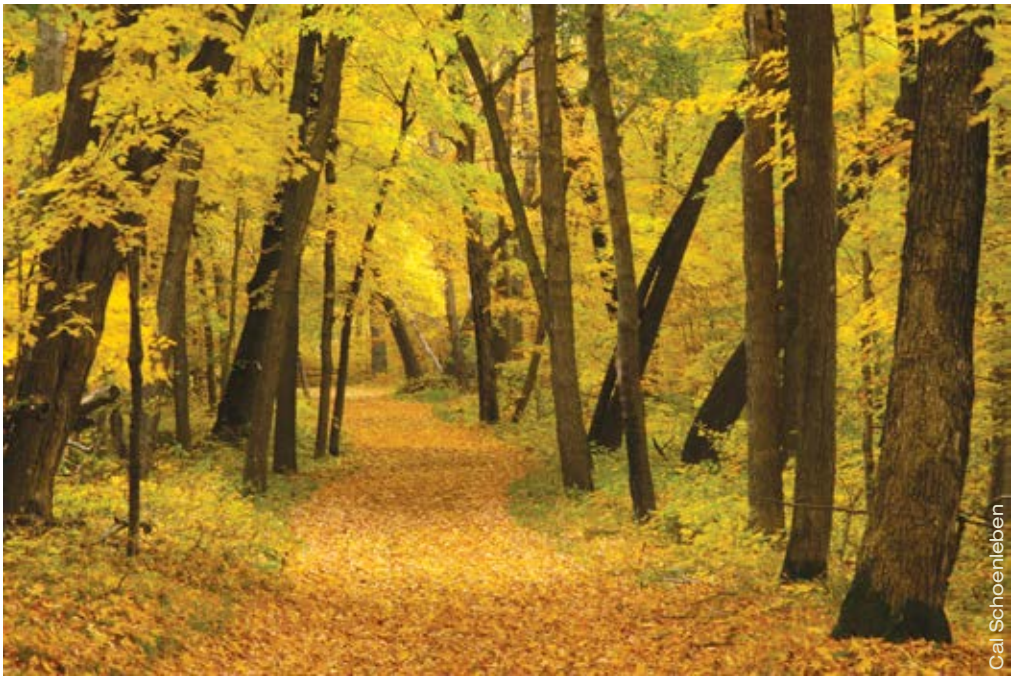
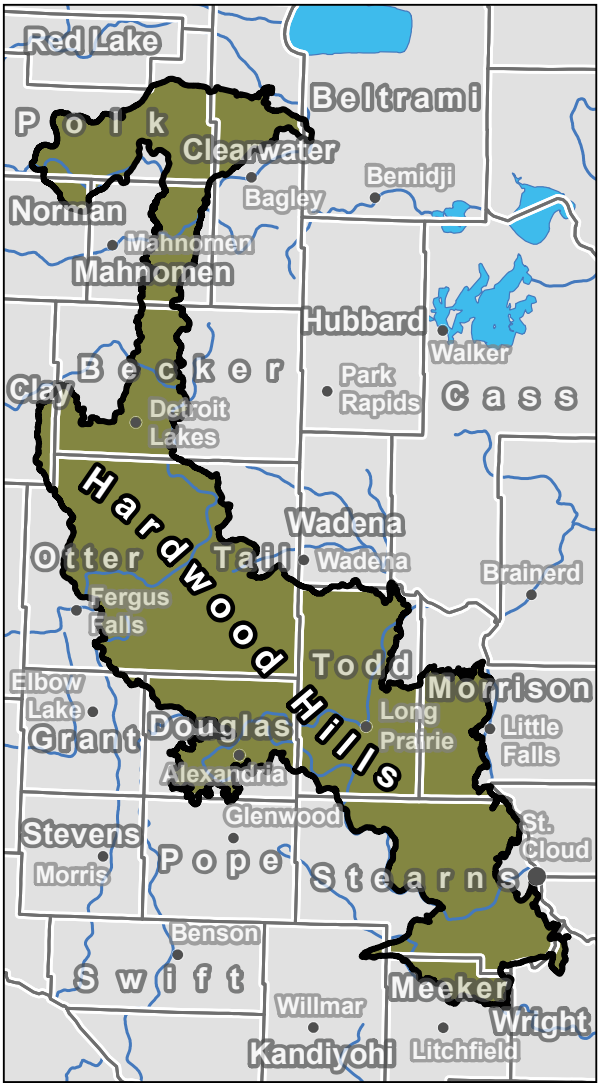


Carl Schoenleben

Introduction

More than 190,000 private woodland owners[1] in Minnesota collectively own more than 6 million acres (about one-third) of the state's total forest land.[2] These are individuals, families, cooperatives, or small businesses who own woods for a wide range of reasons such as recreation, hunting, investment, timber, or simply to have a quiet family getaway in the North Woods. 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 provide wood, paper, and other 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 west-central 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 to accomplish your goals.



Land Covered in this Handbook

This handbook is specially designed for those who own land in areas of west-central Minnesota known by ecologists as the **Hardwood Hills**. This ecologically rich place is where the forests meet the prairies and is home to a diversity of forest, prairie, and savanna habitats, numerous lakes and wetlands, and abundant wildlife. This area spans all or parts of Becker, Clearwater, Douglas, Kandiyohi, Mahnomen, Meeker, Morrison, Otter Tail, Polk, Stearns, Todd, and Wright counties.

How to Use This Handbook

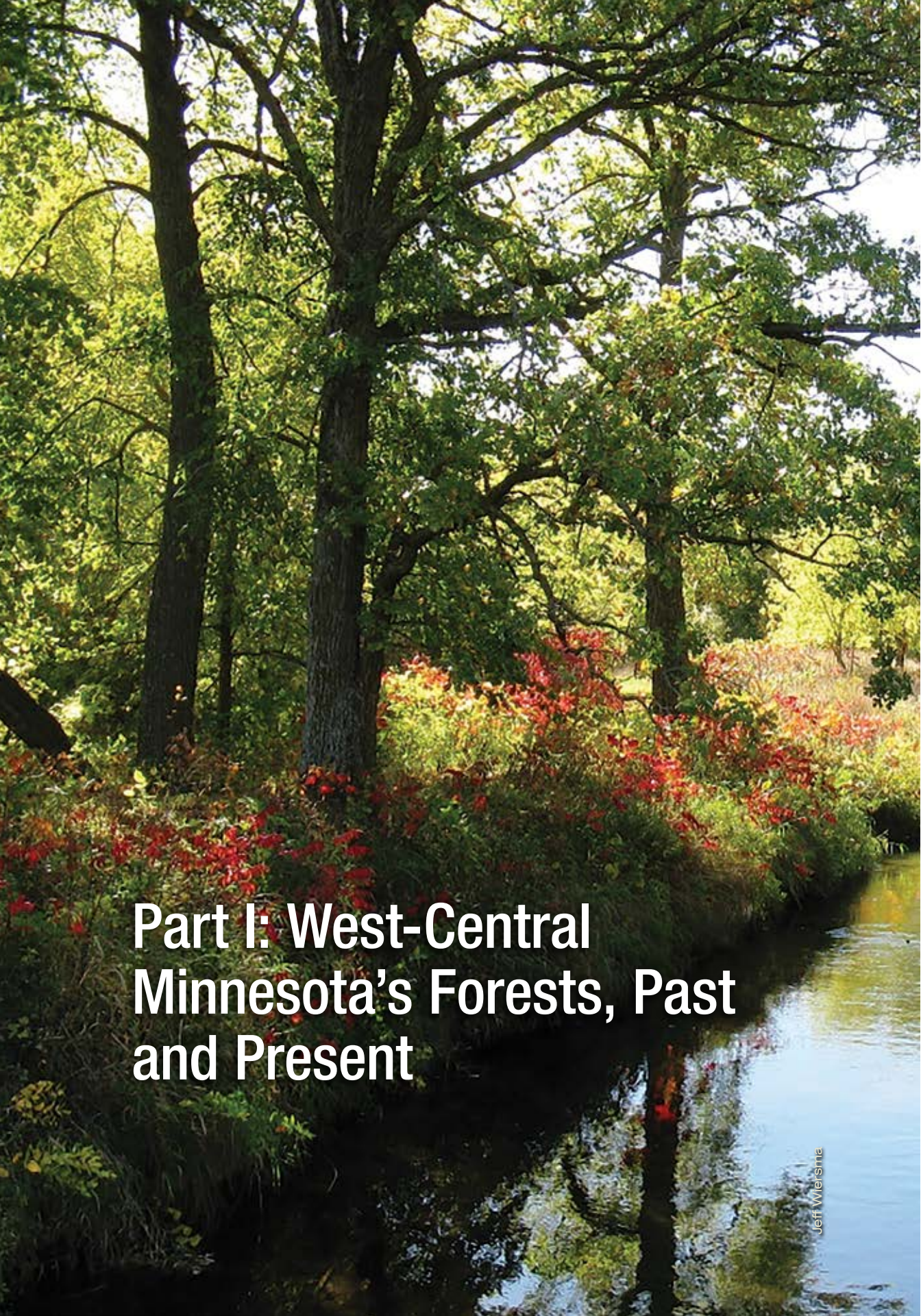
This handbook is both a reference and a workbook. It contains information on the past and present condition of land in this region, insight into some of the biggest challenges woodland owners face here, and tips for making and accomplishing goals for your woods.

This handbook includes:

- **Landowner Spotlights**—Meet a few of your west-central Minnesota neighbors! Their stories, experiences, and words of wisdom may inspire ideas for your own woods.
- **Woods Workbook**—The workbook on pages 64-67 guides you through setting goals for your woods and how to get them done. A digital version can be found on **mndnr.gov/woodlands**.
- **Glossary**—The words in **olive**, bold are defined in the glossary at the end of this book.
- **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

Part I: West-Central 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 woodland 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 "Todd County" or "south of Detroit Lakes." Sometimes they use nearby natural features as reference points such as "just west of Otter Tail Lake" or "along the Redeye River." Based on the soils, climate, water, and plants in this region, ecologists call this region the Hardwood Hills **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 is part of a larger landscape.

Historic Land Cover and Current Land Use

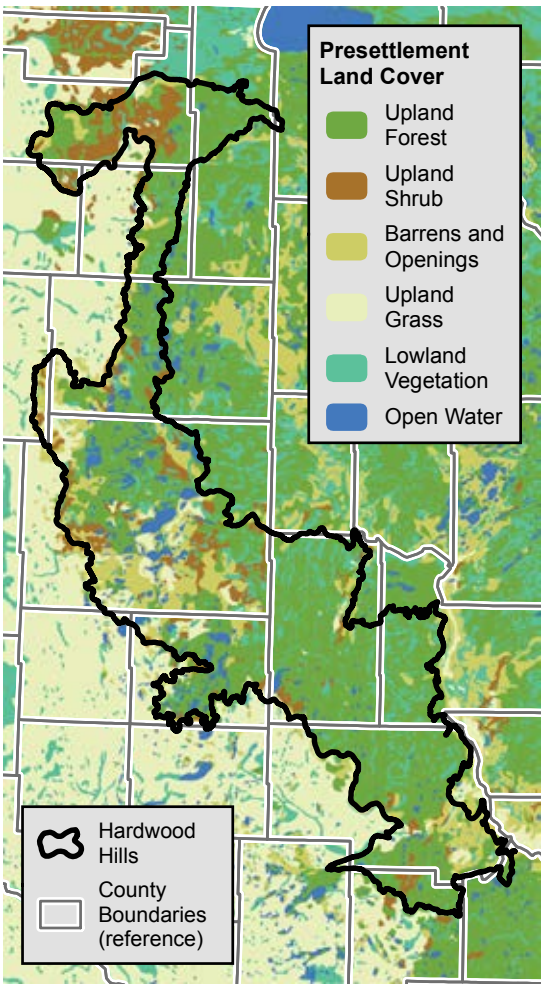
The area covered in this handbook encompasses approximately 3.5 million acres, which consists of steep slopes and high rolling hills that were formed during the last ice age when massive glaciers compressed the landscape. These glacial relics include glacial **moraines** and **outwash plains** on glacial till deposits that are 100 to 500 feet deep. Scattered between these rolling hills are abundant **kettle lakes** and wetlands. Many of these lakes and wetlands are small, but the region also contains more than 400 lakes larger than 160 acres. Soils in this region are typically **loamy** and range from well-drained on the outwash plains to denser, slower draining soils on the moraines.

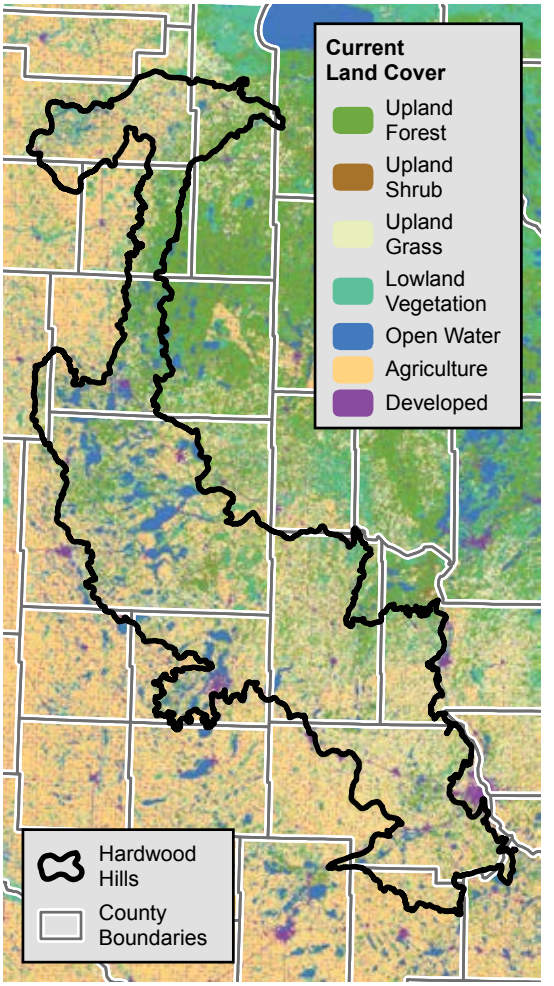
Before European settlement, the region consisted of a mosaic of maple-basswood forests interspersed with oak woodlands, oak savannas, and tallgrass prairies. The irregular **topography** and presence of numerous lakes and wetlands provided a partial barrier to fires approaching from the prairies along the western boundary. The varying levels of fire protection led to a patchwork of vegetation ranging from tallgrass prairie and savanna communities with few trees other than fire-resistant bur oaks to areas of mixed hardwood forests of sugar maple, basswood, and oak where local landforms provided natural protection from fire.

Total annual precipitation in the region ranges from 24 inches in the west to 27 inches in the east. Of this, 10.5 to 11.5 inches falls during the growing season, which lasts for approximately 122 to 140 days.

The Hardwood Hills subsection contains a mix of forests, prairies, and waterways.

This landscape has changed in recent times. Agriculture, especially row-crop agriculture, is a major land use in the region and is important to the local economy today. Throughout the subsection, approximately 1.8 million acres (over 51 percent) are used for growing crops or pasture.[3] However, almost 21 percent of the subsection remains forested and forestry remains a part of the local economy. Much of today's forestland is found in small, **fragmented** patches adjacent to lakes or on steep landscapes. Many of the historic wetlands have been drained. However many potholes remain, providing opportunities for recreation and habitat for waterfowl and shorebirds. Fishing is especially popular for walleye, largemouth bass, and northern pike in Lake Osakis, Lake Miltona, and in the Alexandria chain of lakes. In addition, tourism and outdoor recreation are significant industries in the region, with the forests and lakes attracting owners of second homes and tens of thousands of visitors every summer. Increased lakeshore development, wetland loss, and fragmentation of intact forests are significant conservation concerns in this subsection.

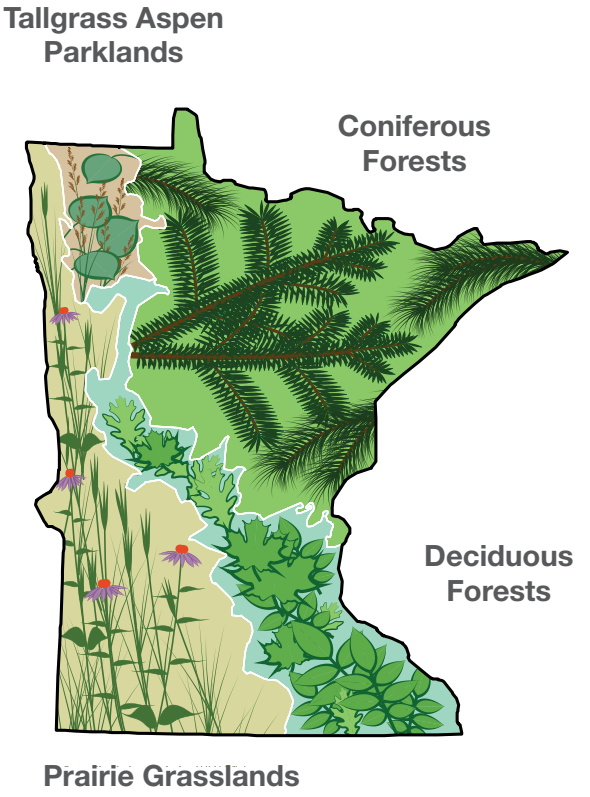




How We Classify Forests Today

Minnesota is located at a great North American transition zone where 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 hardwood 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 Minnesota.

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

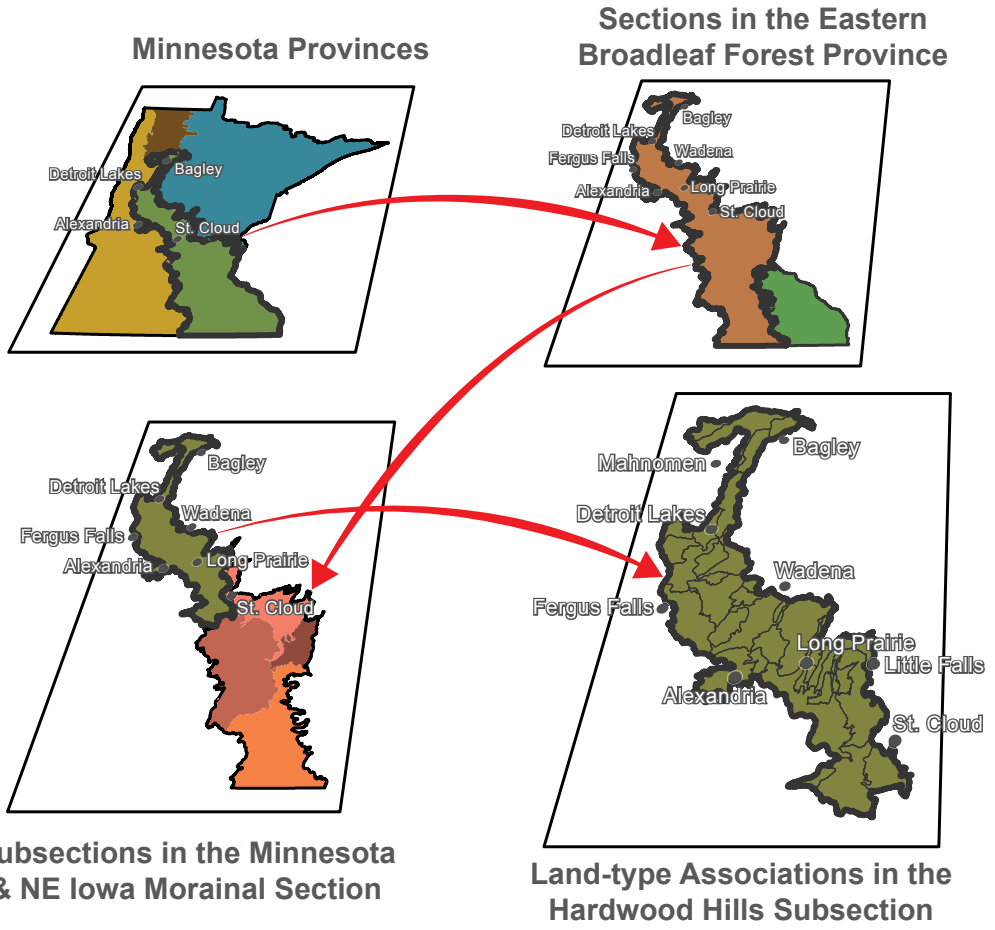


Ecological Classification System

A statewide land mapping project known as the Ecological Classification System (ECS) was created by ecologists 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**, followed by **section**, **subsection**, and **land-type association**. Note that these ecological boundaries extend across state lines. For instance, the **Eastern Broadleaf 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 ecological subsection called the **Hardwood Hills** (located within the **Minnesota and Northeast Iowa Morainal Section**), which contains a mix of deciduous and coniferous forests as well as prairie and savanna habitats.



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 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 you may find similar native plant communities great distances from one another if the local conditions are alike, 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 west-central Minnesota include Southern Dry-Mesic Oak Woodland (**mesic** means between wet and dry), Central Mesic Hardwood Forest, or Southern Rich Conifer Swamp. Six types of forested communities found in west-central Minnesota are considered "imperiled" statewide by the DNR, meaning they are rare or threatened within Minnesota.[4] It is especially important to protect these 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 can reveal clues about the soil and climate. This can help you plan which tree species might be most productive, predict where nontimber forest products (such as mushrooms, wild berries, and maple syrup) you might find, and which wildlife species might be present. To learn more, visit **mndnr.gov/woodlands**.

Serviceberry

Challenges in the Hardwood Hills

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

Habitat Loss

West-central Minnesota is home to a multitude of wildlife species including some that are rare, declining, or threatened. The DNR refers to these as **species of greatest conservation need**. There are 345 species given this classification in Minnesota.[5] Examples in your area include the common mudpuppy (salamander), red-shouldered hawk, veery (songbird), least weasel, fluted-shell mollusk, least darter (freshwater fish), and the smooth green snake.

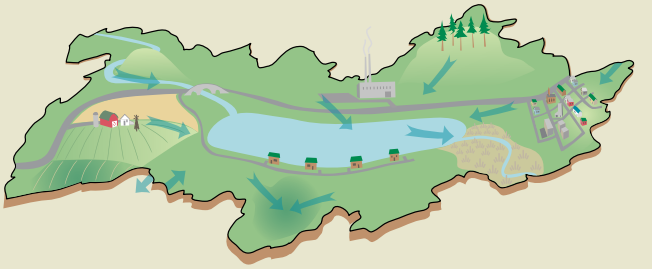
The greatest threat to these species is **habitat** loss or degradation, which affects over 86 percent of these species in the Hardwood Hills. The major cause of habitat loss in this region has been the conversion of forests, wetlands, savannas, and prairies to agriculture. Other contributing factors include residential development, which is increasing in the area as summer and year-round lake homes become more popular.[6]

Red-shouldered hawk

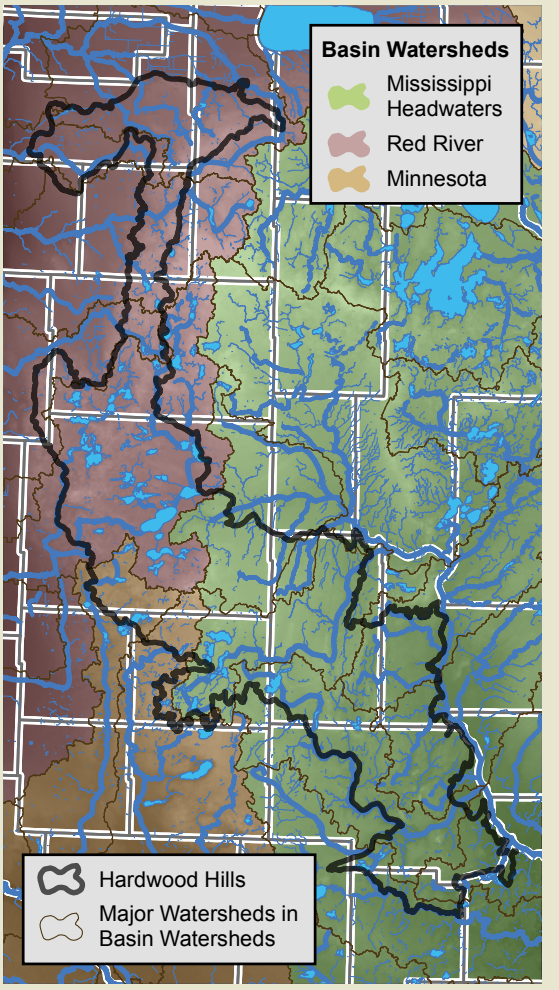
Habitat Spotlight: Mature Hardwood Forests

Mature hardwood forest provide important habitat for many wildlife species in your region, especially for birds such as red-shouldered hawks and multiple species of warblers and wrens. Least weasel, tree frogs, spring peepers, wood frogs, and garter snakes all also depend on mature hardwood forests. This habitat has declined by over 60 percent in the last 100 years as a result of conversion to agriculture. Today it is under additional pressure from land use conversion, fragmentation, and residential development. Consider your role in maintaining this habitat on the landscape through carefully managing your land to support these resident and migratory species that rely on mature hardwood forests. A specific type of this habitat in your region is highlighted in Section 5.

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. West-central Minnesota is located along a great divide in North American water flow. Depending on your land's exact location, your actions can affect the quality of water that will flow either into Hudson Bay by way of the Red River, or into the Gulf of Mexico by way of the Mississippi River. To learn more, visit **mndnr.gov/woodlands**.



Declining Water Quality

Nearly 320,000 acres of lakes and rivers cover the Hardwood Hills. These waters support important fishing and tourism industries and form a vital migratory corridor for birds traveling between their nesting and wintering grounds. Despite the economic, social, and ecological importance of these waterbodies, many are suffering declining quality from a variety of contaminants including sediment, fertilizers, and pesticides. Some of these pollutants come from nearby sources such as homes with non-functioning septic tanks or lawns bordering lakes, which can contribute pollutants through erosion or 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 collects in water bodies throughout the region, harms fish and other wildlife, and degrades drinking water and recreational opportunities.

As natural water filters, forests play an important role. Trees and leaves slow the movement of rain to the ground. The slower-moving rain picks up less sediment when it hits the soil. Additionally, forest soils contain large pore spaces that trap sediments and pollutants. As a result, rainwater that leaves a forest to recharge groundwater or flow 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 a last barrier to filter contaminated runoff before it reaches a lake.

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

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 growing in Minnesota's woods that do not belong here, and they can cause some pretty big problems. These harmful plants, insects, other animals, and fungi are called **invasive species**. Chances are good you have 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 crabapple trees 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 (usually).
- Reproduce quickly, or have easily dispersed seeds or spores.
- Thrive in a variety of conditions.
- Lack natural predators or diseases that might otherwise keep them in check.

Many plants that are now invasive were originally brought to the United States to be sold as ornamental shrubs and flowers. On the other hand, many invasive insects, animals, and fungal diseases were introduced accidentally through international trade, though some were brought here purposely for various commercial or ecological reasons only to become problems later.

As a landowner, you can do a lot to help manage invasive species on your land. Tips for controlling invasive species can be found in Chapter 5.

"I like to cross-country ski or walk the woods when there isn't any snow. The forest is my cathedral."
— Marcia Rapatz, Cushing

Intruder Alert!

Invasive species are an increasing problem in the Hardwood Hills. Here are examples of troublemakers to look for on your land.

Spotted Knapweed

Spotted knapweed *(Centaurea maculosa)* is a biennial or short-lived perennial that was introduced to the United States from Eurasia as a contaminant in imported hay and alfalfa seed. In the first year, the plant forms a rosette of grayish leaves at the base. In following years, the plant forms a wiry, 2- to 3-foot tall flowering stem with many thistle-like pinkish-purple

flowers that bloom from June to October. The bristly brown seeds it produces can catch on fur and hair, harvested hay, and equipment, which then spread the seeds to new locations. Knapweed thrives in dry, sandy or gravely areas such as dry prairies, dunes, oak and pine barrens, and disturbed landscapes such as marginal agricultural land and overgrazed pastures. It is invasive throughout much of the United States and Canada, and is a growing problem in central Minnesota.

Spotted knapweed is **allelopathic**, meaning it releases toxins into the soil that inhibit the growth and/or germination of other plants, allowing knapweed to take over an area.

Problems from knapweed also arise because areas infested with the weed do not absorb water as well as areas with native plants, leading to runoff and erosion where knapweed dominates. Spotted knapweed is listed on the Minnesota Noxious Weed's "control" list, meaning that sale of the plant is illegal and that efforts must be made to prevent spreading the plant whenever possible. You can control small areas of knapweed through hand-pulling (wear protective clothing—knapweed can irritate skin), and larger areas by using herbicides, grazing, or introducing certain insects as biological controls (see Chapter 5). Landowners should take care to prevent spreading seeds by avoiding mowing during the summer and fall, keeping equipment clean, and using extreme caution about the source of hay brought into knapweed-free areas. More information on controlling invasive plants can be found in Chapter 5 and on the handbook website.

Emerald Ash Borer

Emerald ash borer, or EAB, is a small, brilliant green beetle from Asia that is about 1 centimeter long—shorter than the diameter of a penny. The insect itself can be hard to see, but the damage it causes is easily observed: dead ash trees. Adult beetles lay their eggs on the bark of ash trees. The young larvae hatch, bore through the bark, and meander undetected below the bark's surface, eating the living tissue that the tree uses to transport nutrients. This eventually kills the tree. The adult beetle emerges in the late spring and summer through a small hole in the bark that looks like a sideways "D." It then flies to a nearby ash tree and repeats the process.

As of early 2015, EAB has not been found in west-central Minnesota. However, it has been found in the Twin Cities, southeastern Minnesota, and Duluth, as well as neighboring states to

the east and south including northern Wisconsin (along Lake Superior). West-central Minnesota has a lot to lose if the beetle spreads from these or other areas. All three of Minnesota's native ash trees—black, green, and white—are at risk of EAB attack. West-central Minnesota has large numbers of green ash. These trees often grow in the moist bottom land along the lakes and streams of your region. Also they were widely planted as ornamental and windbreak trees following the loss of American elms struck down by Dutch elm disease. EAB can spread quickly when firewood is moved across state lines or from one part of Minnesota to another. This is one reason why you should always burn local firewood.

Emerald ash borer larvae kill ash trees by tunneling under the bark.

A Changing Climate

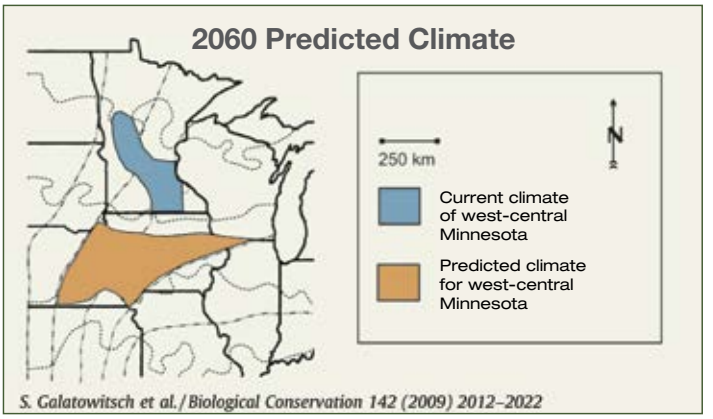
Scientists predict that at observed rates of global temperature increase, Minnesota is likely to experience significant changes in climate over the next several decades. These changes include warmer year-round temperatures—with winter warming faster than other seasons—and potential changes to rainfall patterns, which will likely lead to drier summers, wetter springs and winters, and a greater number of severe storms. Some of these changes are already being seen in west-central Minnesota where historical climate records show that average low winter temperatures have increased by as much as 5 F since 1901.[7]

As native trees struggle to adapt or migrate in response to the changing local climate, invasive species that thrive in the new conditions may gain further ground. Increased temperatures may cause moisture stress in trees, making them more susceptible to invasive and native insects and diseases, which may be more abundant if warmer winters prevent the usual levels of pest dieback. Changing rainfall patterns and warmer summer temperatures may also create more frequent wildfire-inducing conditions and an increase in storm severity could lead to more erosion and blowdowns.

The Hardwood Hills are located at one of these transition zones where the prairie and hardwood forest meet. As a result, many of the tree species in west-central Minnesota are at the western edge of their range. This means that even small shifts in average temperature and precipitation could mean big changes to

the type of forests you are used to seeing—or even the existence of healthy forests. Under higher temperatures, hardwood forest tree species, such as sugar maple, basswood, northern red oak, and paper birch, are likely to experience more stress and be replaced by species adapted to savanna conditions such as bur and northern pin oak.[8]

Future Climate Prediction



When selecting trees for your land, consider the future climate. By 2060, it is predicted that the climate of west-central Minnesota will most resemble that of present-day central Iowa and northeast Nebraska.[9]

Wetter Springs are Bad News for Bur Oaks

Bur oak blight is a disease that causes healthy bur oak leaves to turn brown and die. Over time this disease weakens the tree and can kill it when coupled with another pest such as two-lined chestnut borer or *Armillaria* root disease. While healthy bur oaks typically drop all their leaves in the fall, trees infected with bur oak blight will retain their leaves throughout the winter—a useful identifier. Rainwater spreads the fungus' spores from the dead leaves. There are indications that the earlier spring rainstorms brought on by Minnesota's changing climate may be increasing the severity of the disease.[10] The fungus only attacks bur oak, and poses a bigger risk for bur oaks in open, upland areas, rather than in dense forests or bottomlands. If you suspect a disease in your oak, send leaf, leaf stem, and branch samples (wrapped in paper towels) to the University of Minnesota's Plant Disease Clinic for testing.

While all of this may sound daunting, understanding the changes that may happen on your property over the next few decades can help you proactively choose tree species and strategies that are best suited to the future landscape. Carefully monitoring changes in your woods such as noting tree deaths and the presence of new, possibly invasive species can help you catch problems early. Maintaining diversity in the native species and ages of your trees can help make your woods more able to adapt to change. Occasionally thinning your trees may help decrease competition and increase vigor of the remaining trees. Favoring species that are predicted to do well in the new conditions may help your woods compete with potential invaders and keep native forest on the landscape. These actions, taken by you and other landowners, could help set the stage for healthy, productive, and resilient forests in the face of a changing climate.[11]

European buckthorn is a highly prolific woody plant that can invade woodlands and prairies in 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 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 with large and small private landowners to test these strategies and determine the range of available options to help both people and forests adapt to change. Learn more at **mndnr.gov/woodlands**.

Chapter 2: Why Your Woods Matter

Privately owned forests are an important source of wood and all the products made from trees. Your forest may also be a great source of berries, nuts, mushrooms, or maple syrup. Or you may value your forest 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.

> "My goal is to get the whole forest in a healthier state. Getting some of the oaks cut before they get too old, or before an insect or blight comes around. If they were going to use it for actual lumber such as cabinets or whatever, they will want healthy wood."
>
> — Duane Stiegen, Fergus Falls

Benefits of Forests to You and Your Community

Wood and Pulp

Advancements in technology are expanding the number of ways we can use wood. For example, pine and mixed hardwoods including aspen are used to create engineered products such as oriented strand board (OSB), which is used to make building panels and siding. The Sappi Mill in Cloquet has modernized its pulp machines so they can switch production between papermaking pulp and a dissolvable wood pulp that is used to make clothing, textiles, and cellophane.[12] The primary trees used to make these materials are aspen and maple.

In the future, more facilities in Minnesota (such as schools, municipalities, and nature centers) may burn wood waste and low-grade wood as **biomass** to produce local, renewable energy. For example, the Minnesota Power plant in Duluth creates steam for the nearby paper mill and electricity for its regional customers using branches, low-grade wood left over from traditional timber harvests, and mill byproducts such as sawdust. The innovative ways that Minnesota entrepreneurs are using 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 are important contributors to west-central Minnesota's economy. These businesses provide over 1,100 local jobs in logging, forest consulting, and a variety of wood product manufacturing industries.[13] For example, The Barrel Mill employs about 50 people in the Avon area to manufacture premium oak barrels, oak inserts, and various display items for the spirit industry. Having a healthy forest economy in your region means more local jobs, higher demand for your wood, and greater support for maintaining healthy forests. What is more, the trees you grow and manage on your land may ultimately be converted into the paper used to print a book like this, the barrels used to age and store your alcohol, or any of the other wood based products we use every day—all while supporting local jobs.

Oak is used to make wine barrels.

Nonwood Products

Forests can provide many other products from the decorative to the delicious. Spring foragers might find tasty morel mushrooms or ramps (wild onions) 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 some people too, as they can be roasted and eaten like commercial filberts. As winter fades and the tree sap begins to flow once more, maple trees can be tapped for making sweet, sticky maple syrup.

Maple syrup

Sulfur shelf mushroom

Forest Ecosystem Services

Forests provide a great many **ecosystem services**, which are "free" services provided by nature that we often take for granted: clean air, clean water, healthy soils, erosion control, and wildlife habitat. Forests also help control weather patterns by regulating temperature 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. Because excess carbon dioxide is building up in the atmosphere as a result of human activities, global temperatures are increasing. Maintaining healthy forests helps store more carbon in wood and soils, which can help slow down current climatic changes.

> "It's fulfilling to know you're carbon negative. As these trees get bigger, their volume starts to impress with how much carbon they're absorbing."
>
> — Doug Ploof, Little Falls

Ecosystem services cannot be replaced without a lot of expensive infrastructure. Some economists are working on seeking ways to estimate the economic worth of the carbon stored in forests or the value of undiscovered species and genetic information. Creating and growing markets for these less tangible forest benefits might be an important step toward conserving forests in the future.[14]

Forest Foragers

Spotlight: Rana and Todd Holmer—Frazee, Minn.

Hardwood Hills

Wild Berries

Every summer, Rana Holmer keeps a close watch on the old chokecherry bushes growing at the edge of their fields. "If you don't check them often enough, the bears are better at checking them than you are," Rana says with a laugh. "When the berries start to get dark, you know, that dark brandywine color, you better keep checking them every day because if you don't they'll be gone."

Much of Rana and Todd Holmer's land near Frazee is enrolled in the Conservation Reserve Program (CRP), which gives incentives for removing sensitive land from agricultural production. With the CRP help, the Holmers have planted upwards of 200,000 trees, converting what was once thistle-infested abandoned pastures into young woodland. "My number one goal for the woods is to provide a place for wildlife to grow and replenish, which we've really seen since we've been here," Todd says. The list of critters they've spotted is long: deer, pheasants, grouse, ducks, trumpeter swans, bear, bobcats, coyotes, wolves, and even possibly a mountain lion.

"My number one goal for the woods is to provide a place for wildlife to grow…"

To improve wildlife habitat, the Holmers included native chokecherry, wild plum, and highbush cranberry among their CRP plantings. But animals aren't the only ones who benefit from these wild edibles. During chokecherry season, Rana collects buckets full of the astringent fruits and turns them into delicious jellies and syrups. "First you pick and clean them and take out leaves and other stuff. Then you cook it. Boil them just so where they pop." Rana

Wild plums growing on the Holmer's property.

drains the juice, cooks it with sugar (and pectin for the jelly), and cans it in glass Mason jars for her family to enjoy throughout the winter. She also makes wild plum jelly. "The fruit is growing there, so it's nice to use it," she says of the summer bounty. "It's like what our grandmothers used to do." Sometimes they'll give the tasty spreads and syrups away as gifts. "That's if you do a lot though," Rana says, "otherwise you don't want to give it away!"

Rana is also an avid hunter of morels—a delectable wild mushroom. "When they start popping out of the ground in the spring I go out to find them almost every day after work. I love the hunt!" For a few short weeks in May, Rana and Rocky, the Holmer's energetic Labrador retriever, explore the wet soils near their creek, poking around dead logs in search of the seasonal delicacy. Rana freezes the mushrooms, dehydrates them, or cooks them fresh. "This year we stuffed them with cheese and breaded and deep fried them. Oh my gosh they were good." Though not a morel fan initially, Todd recently came around to the spring treat. "The last couple years she's got me eating them," he admits. Rana says with mock regret, "I should not have done that, because now I have to share!" ◆

Part II: 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 land.

Private landowners like you own nearly 92 percent of the forested land in the Hardwood Hills.[15] Therefore, your decisions and the decisions of all woodland owners in the region have a big impact on the health and beauty of the region.

"We're cutting down dead and older trees. We're promoting new growth and trying to get rid of buckthorn. I don't think that's part of our grant, but of course we just should do that. Clean up. Maintain."

— Misty Lemke, Long Prairie

"Letting nature take its course" on your woodland is a decision that impacts the forest landscape. 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.[16] However, as a woodland owner, you can restore some of the natural balance through **woodland management**—actively shaping and directing your woodland to keep it healthy, productive, and resilient.

The Big Picture—Thinking From a Landscape Perspective

Knowing how your woods fit into the larger landscape can provide a useful perspective.[17] 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 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 enhance your own objectives by tying them in with landscape features found beyond your property lines.

Goals for the Landscape

Before determining goals for your own back-forty, it's a good idea to understand the landscape management goals developed by natural resource professionals, land managers, and local community members. (Collectively this group is known as the Minnesota Forest Resources Council's "West Central Regional Committee." More information about the MFRC is in Chapter 7.) The goals[18] for the Hardwood Hills were developed over the years through large-scale forest planning efforts. They show a long-term vision of what future forests in this area could look like and provide for wildlife, the local economy, and society.

- **Encourage diverse, native forests.** Diverse forests tend to be healthier and more resistant to stress. Encouraging forest diversity means increasing the variety of native trees on of your land and maintaining a balance of young and old forest on the landscape.
- **Increase forest cover.** Converting land into agriculture or residential development has greatly reduced the region's overall forest cover. Increasing forest cover on appropriate sites, particularly those near existing forests that can serve as habitat

connections, can result in higher quality habitat and recreational opportunities in the region.

- **Support productive forests.** We rely on our state's forests as an important source of wood products. Managing forests to increase their production of quality timber helps ensure a steady supply of wood products and a healthy forest-based economy.
- **Reduce forest fragmentation.** Forest fragmentation—reducing forest land into small, isolated patches disrupted by other land uses—is a leading cause of forest habitat loss and degradation. Maintaining and expanding large blocks of forest that are not interrupted by development can result in higher quality habitat, healthier forests, more recreational opportunities, and increased forest value.
- **Protect water quality.** Forests and water are intimately linked, especially within the water-rich west-central region of Minnesota. Forests play a key role in the water cycle by regulating the flow of water across the land, filtering drinking water, and preventing erosion. Protecting forests near wetlands, seasonal ponds, natural shorelines, and streams is key to protecting local water quality.
- **Enhance grassland habitat.** Increasing the overall grassland cover and encouraging native prairie species produces a large number of benefits for water quality and wildlife. On historic prairies, oak savannas, and other areas managed for treeless habitat, avoid planting trees and prevent forests from encroaching.
- **Manage for wildlife and habitat.** There are more than 400 wildlife species in your region. Natural resource professionals are trying to ensure that each of these species can maintain a healthy population while reducing adverse effects that some species may have on forests. Special steps are often taken to protect the region's rare and threatened species.
- **Protect forest health.** Forest health underpins many of the goals above such as maintaining diverse and productive forests. 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.
- **Preserve cultural resources.** Forests are special places for many Minnesotans, providing peace, beauty, recreation, and the opportunity to visit important historical artifacts and unique natural features. Natural resource professionals in Minnesota strive to manage forests in ways that preserve these cultural resources and reduce negative visual impacts on the landscape.

Pileated woodpecker

What Are Your Goals?

You may have other goals for your woodland such as making a sound investment, 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.

"The people who have the best forests are the people who are out in the woods, cutting firewood, hunting deer, collecting mushrooms, walking and skiing trails, hunting ducks. Fall in love with your woods. If you love them, you'll take care of them. I know so many people who have houses in the woods, and I'd be surprised if they walk in their woods five times a year. So get out into your woods."

— Marcia Rapatz, Cushing

Setting Goals for Your Woodland Using the "Woods Workbook"

The workbook on pages 64-67 and on **mndnr.gov/ woodlands** is designed to help you 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 get out and 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, what kinds of trees make up the canopy and what species are 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 woodland, it is time to consider your main reasons for owning it. 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 that it provides. Or maybe your woodland is 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.

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 at the time of this printing. The results of this work have taught us a lot about the locations and abundance of Minnesota's flora and fauna.
Visit **mndnr.gov/ woodlands** to learn more.

Choosing a Strategy

Once you have identified your top goals for your woodland, you can begin to develop a strategy for achieving those goals. You may not be able to accomplish all of your goals on one piece of woodland, but having a central focus can help you prioritize your efforts. Following are examples of three common themes that many woodland owners use to guide their decisions.

Theme 1: Wildlife habitat

Your main goal for your woodland may be to make it a good place for wildlife. Perhaps you are interested in attracting game species such as deer, grouse, or wood ducks. 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.

Your land needs some key features to make it attractive to wildlife: food, water, shelter, and space. Trees and shrubs that produce nuts and soft fruits are an important source of wildlife food for many species. Acorns are especially popular among deer, squirrels, and some birds. Small native trees and shrubs, such as dogwood, juneberry, prickly ash, and chokecherry, produce soft fruits that are eaten by many creatures including songbirds, wood ducks, foxes, and black bears. Certain animals, such as grouse, prefer buds and flowers of aspen. Some landowners also choose to develop **wildlife openings** to attract wildlife. (Learn how to create wildlife openings and choose vegetation for wildlife in Chapter 5.) Wildlife can generally find their own water sources, given suitable habitat.

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.

Dead trees—or **snags**— provide shelter and food for a variety of wildlife species. Brush piles and understory trees and shrubs can provide protected areas for birds and small mammals. Maintaining large, connected woodland patches provides space and attracts wildlife that cannot live near forest edges. Maintaining wooded **corridors** between smaller patches of woods provides shelter for wildlife passing between them. Finally, preserving any wetlands, bogs, or swamps on your property provides shelter, food, and water for many types of creatures.

A dead tree—or snag—provides shelter for wildlife.

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

Theme 2: Recreation

Perhaps you want to use your woods as a place to hunt, hike, watch wildlife, snowmobile, or do some other form of recreation. If recreation is your theme, make sure your management strategy includes increasing access to key places on your property. Where trees have become too crowded, strategically thinning your woods can help you travel through it and improve the health and quality of the remaining trees. Also, removing invasive plants can improve your recreational experience and the health of your woodland. 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, 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.[19] Chapter 5 provides more information on how to do this.

Learning how to identify your woodland's native and invasive trees and plants helps you learn more about your land, and is a fun activity in any season. To learn more, visit **mndnr.gov/woodlands**.

> "A nice trail system changes your life. If your woods is just full of brush, sure it's hard to get out there. A trail doesn't take that much to make. It doesn't have to be beautiful. Just cut the brush and get through it. Get out there and walk. Do whatever your passion is. Right now I'm looking for honey mushrooms. Or collect pine cones. Go take a walk in your woods and be appreciative."
>
> — Marcia Rapatz, Cushing

Michael Lynch

PlayCleanGo

While important for recreation, trails also provide pathways for invasive species to infiltrate 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

Play Clean Go™
STOP INVASIVE SPECIES IN YOUR TRACKS.

Theme 3: Income

Your woodland is an investment that, if properly cared for, can provide economic returns for generations to come. One way to generate income from your woods is through harvesting timber. To get the most out of your woodland's timber-producing capability, you want to do **timber stand improvement** activities. Timber stand improvement helps your forest grow faster, become healthier, and allow you to profit from harvest sooner and more frequently. Depending on your land and your specific goals, these improvements may involve tree planting, thinning out lower quality or overcrowded trees, pruning trees, and protecting trees from damage. (See Chapter 5 for tips.)

Your woods may also provide "nontimber" forest products, and some have established markets such as maple syrup. Although commercial producers generally prefer sap from sugar maple trees, you can also make syrup from red maple, silver maple, and boxelder. Maple syrup is relatively easy to make, requires only minimal initial equipment investment, and is a great outdoor activity for those late winter days when the night temperatures are below freezing and the day temperatures are above freezing.[20] You could also collect seeds or cones and sell them to the Department of Natural Resources, the USDA Forest Service, or private nurseries for growing seedlings. The University of Minnesota Extension Service's *Minnesota Harvester Handbook* provides many more examples.

> "Cutting aspen was successful. That profit got invested into bringing electricity into the cabin, along with water, well, and septic. It helped pay for the taxes too."
>
> — Duane Stiegen, Fergus Falls

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 your forest provides public benefits, public funds are available to help you pay for some of the costs incurred from improving your woods. These programs are discussed in Chapter 6.

Oaks and other hardwoods can be harvested and thinned, which can strengthen your forest's health and resiliency.

Combination Approach: Multiple Benefits

Often, management themes 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 farm or improving the water quality in your woodland creek. Every management activity has pros and cons, but 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 wildfire danger.

"We've tried restoring oak. Then when we started maple syruping we went back to keeping more maple. Owning and caring for land is a huge evolution in how you think about it."

—Doug Ploof,
Little Falls

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. If you need more information (rare plants and animals, trees to harvest, property taxes), Chapter 4 will help answer those questions.

Chapter 4: Choosing a Strategy

Chess players know that good strategy is the key to winning the game. Like chess, managing a woodland 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 woodland, 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.

Who to Know: Key Players

Your key players are people you can contact to help you reach your goals. There are many agencies and organizations in Minnesota that can help.

Professional Foresters: These people can help you plan your strategy through property visits and project implementation.

- *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 4.2 million acres of public forestland, and are also

A forester and landowner discuss possibilities to manage a privately owned forest.

available to assist Minnesota's private landowners with woodland decisions and projects. Specifically, the DNR's Cooperative Forest Management program is a centralized hub of information that can 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, contact your local DNR Forestry office at **mndnr.gov/areas/forestry**.

- *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, one for each county (a few counties have two). **maswcd.org**
- *Private Consulting and Industry Foresters*—There are private, independent consulting foresters and foresters who are employed by timber harvesting companies. The Minnesota Association of Consulting Foresters can help you find a trained, experienced consulting forester in your area. **web.paulbunyan.net/norfor/index.htm**

Information and Education: These organizations provide printed materials, online resources, classes, workshops, field days, and other professional advice. They can sometimes help you access funding, which is discussed in Chapter 6.

- *University of Minnesota Extension Service*—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. MFA administers the "Call Before You Cut" program, which encourages landowners to call a hotline before harvesting their timber and get free information that includes lists of foresters, certified loggers, and other resources. **minnesotaforestry.org**
- *Minnesota Logger Education Program (MLEP)*—MLEP educates loggers on sustainable forestry practices. MLEP also certifies loggers who meet certain performance standards as Minnesota Master Loggers, which allows timber harvested by these loggers from private lands to be marketed as certified wood. **mlep.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.

What to Do: Create Your Strategy

There are a few basic steps you should take as you develop your woodland management strategy. Keep in mind that these may involve working with a natural resource professional.

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

2. **Have a management plan prepared.** The DNR's Forest Stewardship Program helps landowners finalize goals and prepare a professional, voluntary **management plan** for their woodland. A management plan (also known as a **Woodland Stewardship Plan** when written by a certified plan writer), 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. However, at this stage you may be interested in something simpler. Ask your forester about having a brief or streamlined management plan prepared for your land, using the ideas that you have recorded in your Woods Workbook.

"Communicate with these people. Investigate your woods with them. Have them come out to the property. Have the DNR forester walk through the woods. That's what I did."

— Dave Jacobson, Sauk Centre

Leslie Robertson/NASF

A professional forester checks in with a Minnesota Master Logger on a timber harvest.

3. **Decide how the work will get done.** A "project" may include activities such as tree planting, timber 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 is often great exercise).

> "If you do any kind of timber sale on your property, monitor it and be there. Whenever you hire someone to bulldoze or cut something, make sure you're there. Frequent the spot, look over the cut, discuss anything that concerns you."
>
> — Doug Ploof, Little Falls

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

- The Minnesota Logger Education Program has a free, online directory of its trained members including a list of Minnesota Master Loggers. **mlep.org**
- The Minnesota Association of Consulting Foresters has a similar directory of professional foresters, along with descriptions of their experience and service areas. **web.paulbunyan.net/norfor/index.htm**
- Your local DNR Forestry office also has lists of contractors for your surrounding area. **mndnr.gov/areas/forestry**
- You might also 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 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: Dave Jacobson—Sauk Centre, Minn.

Hardwood Hills

Dave Jacobson's 160-acre farm has been in his family ever since his grandparents arrived from Sweden to homestead the land in 1885. Dave's parents moved to the farm with their young family during the Great Depression in 1935 when Dave was only 2½ years old. The family managed to eke out a living during those hard times and keep the farm, which Dave purchased in 1970. In 1992, after he retired, Dave decided to make some big changes.

Dave's farm is located along the western edge of the Hardwood Hills, where the region begins to transition into oak savanna and prairie. "We're right in the junction of the big deciduous forest. Conifers start just north of me, and then the prairies are over here. It's a juncture of all three." Recognizing his land's ecological potential, Dave decided to restore his farm into a variety of natural ecosystems. Shortly after moving back to the property, Dave called a meeting at his home to discuss his vision. "I contacted the U.S. Fish and Wildlife Service, the DNR, county agencies, and anyone else who I thought may be interested in this idea." Many

were skeptical—they had heard this story before. But one person latched onto the idea, "You know, I think you're serious about this," he'd said. Over the next 10 years, Dave proved just how serious.

Working with the Fish and Wildlife Service and the DNR, Dave slowly converted his agricultural fields back to native central Minnesota vegetation—restoring former wetlands, planting prairie and savannas, and expanding his pre-existing woodlot. His land includes six ecosystems: tallgrass prairie, shortgrass prairie, 30 wetlands, a 25-acre woodlot, conifer savanna, and oak savanna. It was no small task. Dave did much of the labor himself, though sometimes his family helped. "I fooled my oldest brother and his son into helping me when they were on vacation here from Oklahoma to go fishing," he jokes. Dave also had some financial help with his project. In addition to providing advice and information, the agencies Dave worked with provided cost-share funds to cover part of the expense for his new trees, and for seeds and soil preparation work for his prairie grass restorations. He encourages others to seek out these opportunities as well. "Contact every possible resource for funding on every level: national, state, and county," he says. "Would I have done it without those funds? I think so, but it would have taken me twice as long and it would have cost me twice as much."

Dave's land is now an educational tool. School children of all ages frequently come for field trips to tour the "friendly forest," as he calls it, and his restored wetlands and prairie. Dave wanted to make sure that future generations could visit the land too, so in 1996 he acquired a conservation easement with the Minnesota Land Trust. The sign posted near Dave's home neatly summarizes his hopes and dreams for his land: Protected Forever. "My top goal is to make sure that this property stays this way forever," he says. "This is my footprint. This will be something other than a name on a tombstone—it represents my lasting legacy." ◆

Misty Lemke—Long Prairie, Minn.

Hardwood Hills

On this particular afternoon in 2014, Misty Lemke, her husband Robby (aka Cubby), and their two young children had officially resided on their land for mere hours. Today was moving day. Someday her family's temporary residence in their spacious, newly built shed will be a funny memory once their house is fully constructed.

Though recent permanent residents, Misty and Cubby have worked diligently on their 55 acres near Long Prairie since the moment they purchased it in 2009. Right away, they acquired a Woodland Stewardship Plan through the DNR so they could enroll in the 2c Managed Forest Land tax relief program.

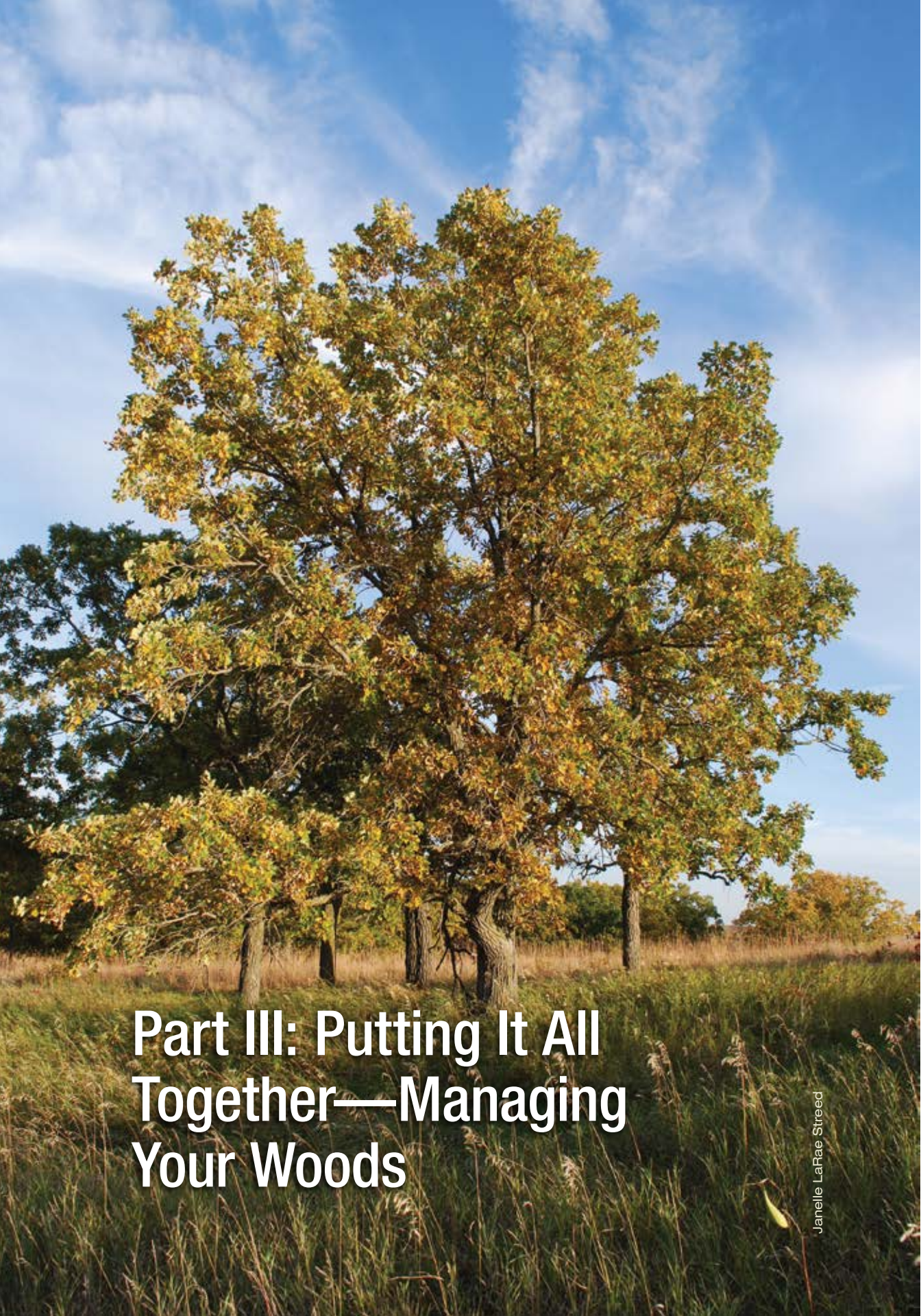
As new hobby farmers interested in environmental preservation, in 2010 they planted 20,000 trees in the agricultural fields using their tractor, a friend's borrowed planter, funding from the Natural Resource Conservation Service's (NRCS) Environmental Quality Incentives Program, and their bare hands. "I didn't wear gloves," Misty says ruefully. "When planting all those trees, your skin literally peels off. We both got poison ivy." Despite this hard lesson, the Lemke family thoroughly enjoyed the experience and were thrilled with the results. "It was a fun learning adventure for all of us. We were mindful of what the kids were learning and continually thinking about our family's footprint on our property." She also sees how their work makes a difference for their landscape. "The more trees that we can grow in this area, the more the water will be helped. That's quite beneficial in the Long Prairie watershed."

Since their big tree planting, the Lemkes have spent time protecting the young trees from wildlife and mowing encroaching grasses. They also began to manage their existing woods, cutting dead and over-mature trees to make way for new growth, and removing invasive European buckthorn.

With full-time jobs and volunteer work, it's sometimes tricky to find time. "It's weekends, nights, and spare time" Misty says. "We do it when we can. It's tough juggling our responsibilities, but every little improvement helps." Despite the challenges, Misty is glad that they started owning and managing their woodlands early. "There are cost-share programs through the NRCS and other improvement assistance programs to explore." She thinks about sitting on the porch viewing the woods of the future, and smiles. "By planting early in our lives, in our later years we'll be able to enjoy our woods."

"By planting early in our lives, in our later years we'll be able to enjoy our woods."

Despite busy schedules, what is their secret to success? "We have our DNR forester, Jason Kern, on speed dial," she says. "He has been fantastic and helped us so much. If we have questions he's just a phone call away." The Lemkes know their projects will take time. "We're fully committed to a lifetime of work on our dream property, but the results will be OUR results." ◆



Part III: Putting It All Together—Managing Your Woods

Janelle LaRae Streed

A wide variety of resources can help you develop a strategy to manage your woodlands. This chapter provides you with a few ideas to develop and execute your first project.

Tools and Budget

First, you need to prepare your toolbox. This involves more than just sharpening your chain saw! The most powerful tool at your disposal is knowledge. Visit **mndnr.gov/woodlands** for resources that can help.

Other tools you may wish to gather include aerial photographs of your property, soils information, mechanical equipment, names and contact information of resource professionals or other landowners who can help, and a management or project plan. Online planning tools such as the American Forest Foundation's "My Land Plan" can also help.

You also need to determine your budget, which 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 64-67.

"I carry clippers with me all the time. It's unbelievable the number of trees I've pruned. I see a diseased branch on white pine and take it off. You've got your clippers with you, you take care of it. You don't have time to come back."

— Doug Ploof, Little Falls

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. Visit mndnr.gov/woodlands.


Michael Lynch

Choosing a Work Project

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

"Make sure your field is prepared correctly for planting trees. If you've disturbed it too much the year before, expect thistles. Make sure you've taken care of your gophers. There's a lot of prep work. You can't just drop the planter in the ground and expect the trees to take off. Expect to maintain the fields for years and years."

—Todd Holmer, Frazee

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 nonnative grasses or crops, wildlife openings use native vegetation and are therefore more suitable to meet the needs of native wildlife.

Wildlife openings are small clearings in your woodland—ranging from ½ to 5 acres, but usually 1 acre or smaller in size—that mimic the type of openings created by natural disturbances such as fire 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 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, which is mid-May through early August. A natural resource professional can help you decide which method(s) work best and the best location for the opening.

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

When choosing the location of your wildlife opening, it may not be necessary to clear new areas if you have existing openings that can be improved by planting or regenerating native species. Pre-existing openings may include yards, old pastures, edges between forest and agricultural fields, and open areas near lakeshore. You might also consider improving an existing food plot. Using pre-existing openings can prevent unnecessary fragmentation of your woods.

Native Plant Community Spotlight: Southern Dry-Mesic Oak Woodland

This bur- and northern pin oak-dominated plant community is common on undulating sand flats, hummocky moraines, and river bluffs throughout the Hardwood Hills. It is typically found on fine sand or sand-gravel soils of south- or west-facing slopes. Historically, fires approaching from the western prairies occurred approximately every 9 years, which kept this community in a fluctuating mosaic between forest and brushland habitat with scattered areas of prairie. The development of modern fire suppression and conversion to agriculture has led to the loss of this mosaic of oak openings. The canopy of this community often contains open-grown northern pin oak and bur oak trees with spreading branches and a dense shrub layer of prickly ash, chokecherry, American hazelnut, gray dogwood, prickly gooseberry, and downy arrowwood.

To keep this native plant community healthy, consider doing management activities that mimic the frequent mild to severe fires that once shaped this ecosystem. You might consider a strategy of creating openings to maintain an interrupted canopy and perform prescribed burning in these openings when possible.

Option 2, recreation focus: Controlling invasive plants

Nonnative species can be a big problem for forests when they displace native species. Invasive plants can crowd the understory of your woods or proliferate along your trails, making recreational access difficult. The first and least costly step you can take to combat any invasive species—plant, insect, or disease—is to prevent them. Here are some steps you can take:[21]

- Identify invasive species and clues about their presence.
- Avoid spreading seeds, insects, and microbes (found in wood or soil) to new areas by cleaning boots, tires, pets, and equipment between uses.
- 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.
- Detect new outbreaks of invasive species early and eradicate them quickly.

"We have invasive species that are really worrisome. Almost weekly I'm dealing with European buckthorn, honeysuckle, or some other invasive plant that I have to keep ahead of before it goes to seed. Migrating birds, and other people who don't manage their land is what leads to invasives."

— Doug Ploof, Little Falls

If you have confirmed that there are invasive plants in your woods, taking steps to control these pests is a good first woodland management project. Catching an infestation early can be critical to successful eradication. The best time to tackle removing an invasive plant is when it's present, but not yet well-established in your woods. Once an invasive plant becomes well-established, eradication is more difficult, but you can still manage the problem and give your native plants a chance to compete with the invader.

Woody invasive plants in your region include common buckthorn, several species of Eurasian bush honeysuckle, and weedy invaders such as leafy spurge, spotted knapweed, and several species of nonnative thistle. Another plant to watch out for is garlic mustard, which is a prolific understory plant with clusters of small, four-petaled white flowers and a garlicky scent to its leaves. While it is present, it's not yet prevalent in your region. Garlic mustard has already invaded other parts of Minnesota and the United States. If you spot garlic mustard, act quickly to remove it. If it becomes established in your woods, it will become highly problematic. Visit **mndnr.gov/woodlands** to help you identify these and other invaders that might be present in your region, as well as tips for distinguishing invasive from native species.

A variety of methods are used to control invasive plants.

- *Hand-pulling:* Small seedlings can be pulled up by hand in the spring when the soil is moist, taking care to remove the entire root so the plant does not resprout.

- *Insects:* In a few cases, scientists have identified insects that selectively attack particular invasive plants. **Biological controls**, such as some insects, 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.[22] Both weevils are needed to control knapweed. For information on applying biological controls on your property, contact your county agricultural inspector or the Minnesota Department of Agriculture.


Spotted knapweed invades many areas in the Hardwood Hills region.

- *Herbicide:* The stems of large woody plants can be cut at the base and treated with the appropriate herbicide to prevent resprouting. For small-diameter trees, herbicide can be sprayed on the bark around the lower portion of the plant's stem. You can also spray

the leaves of invasive woody plants, preferably after native plants have lost their leaves and gone dormant. This works well for young sprouts and seedlings. Infestations of weedy plants may be controlled with spot herbicide treatments. As always, be sure you're treating the correct plant and take care to protect native plants. Before applying any herbicides, it is best to talk to your forester to make sure you select the most effective treatment and the best product for your site. Finally, wear protective clothing and always follow instructions on the product label when applying herbicides—it's the law.

- *Fire: Prescribed burning* can be effective at killing seedlings and resprouted plants. Burns need to be repeated every few years to keep new invasions from taking hold. 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.

Arrest the Pest: 888-545-6684

The Minnesota Department of Agriculture has a hotline for reporting newly detected invasive plants and insects. 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, you may need to 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 gray dogwood, downy arrowwood, American hazelnut, juneberry, chokecherry, and gooseberry. Native **forbs** in your region are many, and might include early meadow rue, zigzag

Adding dye to your herbicide helps keep track of which plants you have treated.


Fire can be a great management tool if you get a permit and take appropriate precautions.

45

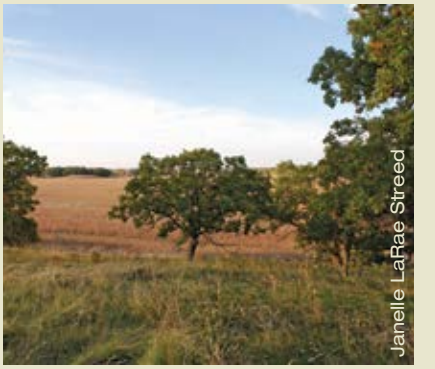
"The trees change so much after you cut the dead and diseased out. It's amazing how the little trees take off."

—Misty Lemke, Long Prairie

goldenrod, large-flowered bellwort, wild geranium, Virginia waterleaf, and bloodroot. More information about choosing native plants is on **mndnr.gov/woodlands** and **mndnr.gov/plants**.

Unfortunately, new invasive plants are constantly popping up in areas where they have not been spotted before, and troublesome invaders are always changing. Collect up-to-date information about the forest invaders including insects and diseases that you need to look out for in your woods. Projects that increase the diversity of plant species and ages will help strengthen your woodland's resiliency.

Native Plant Community Spotlight: Southern Dry Savanna


Janelle LaRae Streed

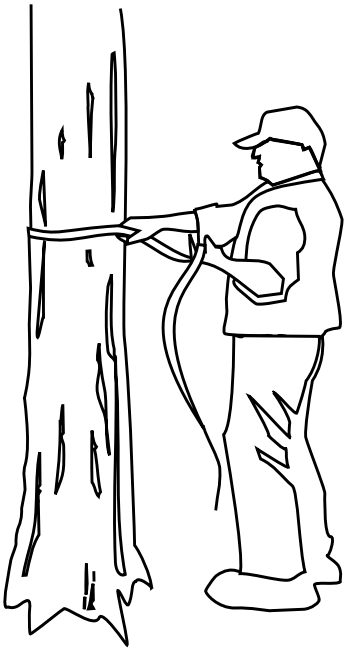
This unique native plant community is considered "critically imperiled" based on its rarity and threats facing the remaining examples. These savannas formed in dry areas where streams, lakes, and steep hillsides protected them from the intense prairie fires. Under these conditions fires occurred frequently enough to prevent trees and shrubs from dominating, but allowed fire-tolerant tree species to become established. These trees occur as dispersed individuals with an open-grown form (wide-spreading branches) or in scattered small clumps with total tree cover between 25 and 50 percent. Bur oak is the most common tree in these savannas but northern pin oak is also usually present. The species composition of the ground layer depends on soils and topography, however little bluestem and porcupine grass usually dominate, and big bluestem and Indian grass are usually present and often common. Woodland forbs and grasses are also often present.

Because of the rarity of this native plant community, efforts should be made to keep it as healthy and resilient as possible. You can help protect this unique ecosystem by monitoring the understory and edges of your savanna for invasive shrubs such as buckthorn, honeysuckle, multiflora rose, and Russian olive—and taking fast action to control them through applying herbicide, removing by hand or other means, and prescribed fire.

Option 3, income focus: Harvesting firewood

If you enjoy keeping the hearth crackling throughout the long Minnesota winter, a timber stand improvement harvest will give you abundant firewood from your property.

Harvesting firewood on your property saves money. To maintain a forest that will stay healthy, produce income, and look good, choose your firewood trees strategically.[23] Mark 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 been infested by disease or insects, as they will likely not survive to be part of your future forest. You may also choose to harvest dead trees, but remember that you may wish to leave some of these for wildlife habitat.
- *Low timber quality*—Choose trees that are crooked, damaged, or have trunks that fork close to the ground. Choose species that are less desired by timber markets. These trees will not fetch high prices if you choose to harvest your future forest.

Don't Move Firewood!

You may be tempted to transport firewood from your land to another location for storage or use. Resist the urge! Remember, moving firewood from one area 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. Note that some Minnesota counties have quarantines that prohibit moving firewood and violations can result in hefty fines.

"Everyone I know works hard and is busy. But if you can just pick up a chain saw once a week and run a tank of gas either cutting brush, thinning, or taking out some trees for firewood, it's worth it. Just pick up a tool you're comfortable with, and do it."

—Marcia Rapatz, Cushing

- *Crowded high quality trees*—If the trees in your woodland 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.

Logs harvested from dead or dying trees may contain insects or fungi that can harm remaining trees, and some insects are attracted to recently harvested logs from healthy trees. To prevent these organisms from spreading, it is best to harvest and process your firewood in cold weather. Split, stack, and cure the wood on site for 2 years before moving it to another area.

Be Firewise

Protect your home, barn, and other structures from wildfire by removing flammable materials such as trees, overhanging branches, brush, and firewood that are growing or placed too close to walls. Maintain at least 10 feet of cleared area to prevent fire from jumping between trees and homes. Reducing fuels in the wooded area 100 feet beyond each structure will reduce the intensity of an approaching wildfire. Mow grasses, reduce underbrush, and prune remaining trees up to 6 to 10 feet, or one-third of the tree height. www.firewise.org

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 trees to harvest. Visit **mndnr.gov/woodlands** for information.

Native Plant Community Spotlight: Central Mesic Hardwood Forest

This native plant community is found almost exclusively in the Hardwood Hills where the soils are well-drained and loamy on rolling to hummocky moraines. The canopy of this plant community is typically dominated by sugar maple and basswood, often with paper birch and less frequently with quaking aspen, northern red oak, bur oak, American elm, or ironwood. Plants growing in the ground layer vary and species richness is considerably lower than in other central and southern mesic hardwood forest communities in Minnesota. Important species include large-flowered bellwort and Pennsylvania sedge.

Catastrophic disturbances were historically rare. More commonly, smaller disturbances that created smaller gaps resulted in a mix of shrub, sub-canopy, and canopy layers. Tailoring your firewood harvesting strategy to create small gaps (single trees or small clusters) in your woods will allow some of the abundant maple saplings to develop and give your forest more vertical diversity. If you want to add more diverse species to your forest, consider developing additional medium to large gaps up to an acre that may encourage oaks and birches to grow. Similar to the effects of fire in the past, either strategy helps create diverse age groups among your trees, which creates better wildlife habitat and helps your woods resist environmental stress.

Option 4, combination focus: Lakeshore restoration

Forests play a critical role in maintaining the health and beauty of west-central Minnesota's many lakes. If you own lakeshore property and are interested in a "combination approach" to your woodland management strategy, a lakeshore restoration project may be a good fit. Maintaining healthy lakeshore provides 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.

There are several steps you might take to improve the quality of your shoreline.

- *Stabilize the soil bank*—If the shore 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 perennial forbs and grasses is one way to secure the bank. Visit **mndnr.gov/woodlands** for tips on selecting native plants for your county and methods to protect your young trees from deer and rabbit browsing.
- *Control invasive plants*—Aggressive invasive species, such as reed canary grass and purple loosestrife, plague the shores of lakes and other water bodies in your area. Controlling invasive plants helps native plants compete for space.

"We try to limit the amount of chemicals we use. By restoring wetlands we can remove a lot of the excess nutrients out of the water. We are environmentally conscious of any harvesting we have to do near water."
— Doug Ploof, Little Falls

Native shoreline vegetation can help reduce runnoff, create important wildlife habitat, and add visual appeal to your property.

- *Create wildlife habitat structures*—If the area has few snags and downed logs, you might consider installing some habitat structures for wildlife such as tree boxes for wood ducks or floating nest platforms for other waterfowl.

Specific recommendations for a lakeshore restoration project vary depending on the condition of your shore, 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 lakeshore and find tips to increase ecosystem health along your water's edge. For grant funding and general planning assistance, check with your local county soil and water conservation district, watershed district, lake association, or with a DNR fisheries habitat specialist for more information.

Native Plant Community Spotlight: Lakeshore

Lakeshore is prevalent in west-central Minnesota. Shores may be sandy or muddy and could contain a variety of terrestrial and aquatic plants depending on the season and current water level. Just above the normal water level you may find shrubs and forbs such as sandbar willow, spotted touch-me-not, and swamp milkweed. Below the normal water level you may find broad-leaved cattail, an assortment of sedges and rushes, and floating plants like water lilies and pondweeds.

A variety of ecosystems, from upland forest to lowland swamp, surround these lakes. While proper management along the shore can protect it from wave damage, how land is managed near shorelines also plays a key role in erosion control. Forests help filter runoff and hold soil in place, whereas agriculture and lawns can add soil, fertilizer, and pesticides to the runoff that flows into lakes. It is important to consider the impacts that all land use and management activities have on your lake, even beyond the shores.

Once you have chosen your project, record it in your Woods Workbook. Write your expected timeline and the contact information of any professionals with whom you are working. Next, consider breaking your project into concrete steps and record these as well. As you progress, keep track of observed changes and accomplishments. You might also consider taking "before" and "after" photographs of your woods. Be proud of your work! Becoming an active woodland manager benefits you, your family, society, and nature—so you will have earned some bragging rights.

Chapter 6: Next Steps

If you want to take the next step to actively manage your woodland, there are programs and resources that can help you develop an in-depth property plan, use sustainable practices, save money, and protect your land long-term.

"Have a realistic goal and plan and communicate. Start small, and see if that's really what you want to do. Make a plan and write it down."
— Dave Jacobson, Sauk Centre

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** that is 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 qualify for one of these programs, a landowner must have at least 20 qualifying acres of land, which includes at least 10 acres that are currently wooded or will be converted to woodland or woody vegetation. Those with registered Woodland Stewardship Plans may also qualify for other benefits including access to cost-share funding to support some of the forestry recommendations outlined in their plans.

Landowners with a registered Woodland Stewardship Plan qualify for benefits such as cost-share funding.

Many entities provide plan-writing services: 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 get a Woodland Stewardship Plan, visit **www.myminnesotawoods.umn.edu/minnesota-stewardship-plan-preparers**. This website, which is updated by the University of Minnesota's Sustainable Forestry Education Cooperative, lists certified plan writers.

To write your plan, a forester visits your property, walks through your woods with you, discusses your goals, and makes notes about your woodland's current status and its 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 elements such as forest diversity and health observations, 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 these recommendations.

Management Plan Options for Landowners with Less Than 20 Acres

Managing smaller woodlots is becoming more important every year as large wooded plots become subdivided into smaller ownerships. All woodland owners, regardless of acreage, can contact a DNR forester or other professional to schedule a woods walk and get a streamlined management plan or a plan 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 contains research-based guidelines for activities such as timber 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**.

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. You can request a free paper copy of the field guide from the Minnesota Forest Resources Council by email. **mfrc.info@state.mn.us**

Financial Assistance

Because private woodland management provides many benefits to nature and society, public financial assistance is available. You can also visit **mndnr.gov/woodlands** for other resources. These programs are always changing, so be sure to visit the website or ask your local forester for the most up-to-date information.

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 for woodland management activities performed by landowners who have a Woodland Stewardship Plan registered with the DNR.

County

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

Minnesota State Forest Nursery

The Minnesota State Forest Nursery sells native, bareroot seedlings that are grown from seeds collected in Minnesota. Seed source locations are noted and tracked. Seedlings are shipped to the same region from where the seeds were collected. This way the seedlings are well-adapted to local growing conditions and have a better chance to survive. Seedling sales begin in mid-August and seedlings are shipped for planting in the spring. More information is available at **mndnr.gov/forestry/nursery**.

Tax and incentive programs:

Federal

- *Reforestation tax credit*—If you treat your woods like an investment or a business, you may be 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 7 years.

"It's our woods. I feel that we need to take care of it. And it's fun!"

—Misty Lemke, Long Prairie

State

- *Sustainable Forest Incentive Act (SFIA)*—The SFIA was passed in 2001. Landowners receive a fixed annual payment per acre of land enrolled in the program. As of this printing, the payment per acre is $7. 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 is a property tax designation that offers woodland owners a reduced rate of 0.65 percent on actively managed woodland. 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 woodland that produces agricultural products (maple syrup, biomass) or is adjacent to a landowner's farm land.

Conservation Easements

Some landowners want to make sure that their land will never be developed or converted to another use by selling or donating a **conservation easement**. Conservation easements serve a variety of conservation purposes and are generally intended to protect important features of a property. They are voluntary, legal agreements by the landowner to give up some of the rights associated with their property such as the right to develop, divide, mine, or farm the land to protect the land, water, habitat, and other conservation features. Conservation easements vary, depending on the host organization and the landowner's specifications. Perpetual conservation easements are intended to last forever. Term easements are for a specified length of time. Since the agreements are tied to the land and not the owner, the property will be kept 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. Easements can last 20 or 30 years, 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 to one of these organizations.

Here are some examples of organizations that have conservation easement programs. Visit **mndnr.gov/woodlands** for more information.

- *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 FLP and MFF programs are administered by the DNR to protect 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 economic, 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 state 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).


Ed Zlonis

- *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.

Transferring Land to the Next Generation

If you want to keep your woodland 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 land and can be used to manage the 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 the property will be forcefully sold upon demand of one of the heirs—known as "avoidance of partition" in legal terms. Rather, the land is titled in the name of the company, which is divided into units of membership, similar to the way a corporation is divided into shares. Using this model, 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. Passing land on in this way—as annual gifts below a certain maximum value—can help landowners potentially decrease the estate taxes associated with high-value property.[24]

> "Between my brothers and me, we each have one-third interest in the property: 100 units each. If the land wasn't in an LLC and something happened to us, such as someone foreclosing, the bank could force us to sell our land. Forming an LLC gives us some cushion if things go wrong."
>
> —Duane Stiegen, Fergus Falls

Importantly, LLCs offer opportunities to engage the next generation to care and manage the land during your lifetime, and may provide a good platform to pass on your goals and values for the land as well as the property itself. 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)

The MFA is a private, member-funded woodland owner organization and 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 is a landowner organization that focuses on engaging women, a historically underserved population in the woodland owner community, in woodland management. The organization hosts gatherings and courses designed to provide a comfortable environment for Minnesota's women woodland owners to learn management skills and connect with professionals and other landowners. **mnwwn.org**

"Just meeting other landowners and having discussions with them, you learn how other people do things. You can bounce ideas off of them, see what they've done on their property, and get a visual of what you can do on yours."

— Doug Ploof, Little Falls

University of Minnesota Extension Service Woodland Owner Programs

The University of Minnesota Extension Service has long served as a resource for Minnesota's landowners. Extension offers a wide variety of educational opportunities for landowners ranging from conferences and workshops to citizen science and volunteer programs. **myminnesotawoods.org**

- *Minnesota Family Woodland Conference*—These two-day conferences, held in multiple locations around the state, provide workshops, field tours, and presentations from experts on a variety of topics designed to support landowners.
- *Forest Pest First Detector*—This program provides an opportunity for forest health-savvy citizens to receive specific training on Minnesota's most threatening forest invasive species and to become leaders in their communities in early detection of these woodland pests.

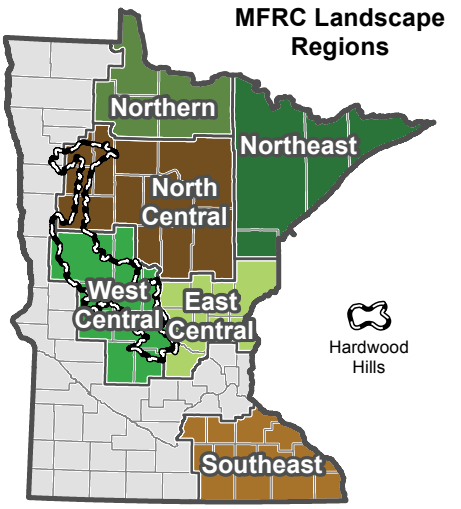
Urban and Community Forestry Organizations

If you want to help protect the trees that grow in urban and community areas, consider these organizations.

- *Minnesota Shade Tree Advisory Committee (MnSTAC)*— MnSTAC is a nationally recognized organization that was created in 1974 at the recommendation of Governor Wendell Anderson. The committee works with policy makers and community leaders to identify legislative priorities and lead 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 that recognizes communities with tree management plans and programs, and encourages action and public education around sustainable community forests. Nearly 100 cities in Minnesota participate in the program, including Detroit Lakes, St. Cloud, Fergus Falls, Sauk Centre, and Wadena. To see if your city has a Tree City USA designation, visit **arborday.org/treecityusa**.
- *Tree Care Advisors*—Tree Care Advisors are a group of citizen volunteers trained in basic tree care skills by the University of Minnesota's Department of Forest Resources. The program connects trained volunteers with volunteer opportunities. Many advisors become strong advocates for how their community cares for its trees. The Tree Care Advisor website has a searchable directory of volunteer advisors who can answer questions and assist in local tree management and outreach projects. **mntca.org/tree-care-advisor**

Minnesota Forest Resources Council (MFRC) Landscape Committees

The MFRC is a state-appointed council established by Minnesota statute that exists "to promote long-term sustainable management of Minnesota's forests." The council consists of 17 members who represent different forest-related interests in the state including timber, conservation, and private woodland owners. A small staff manages several different programs to support the council including a program focused on landscape-level management. The Landscape Program provides support and guidance to six regional Landscape Committees that span the forested areas of the state.



The Landscape Committees are made up of 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 conduct 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. Most of your region is covered by the West Central Committee. The North Central Committee covers the northern portion of the Hardwood Hills subsection in Becker, Mahnomen, Clearwater, and Polk counties. Most committees meet quarterly and meetings are open to the public. **mn.gov/frc/regional-landscape-committees.html**

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 forests from disease and grazing, protecting soil and water quality, growing productive forests, and maintaining biodiversity and wildlife habitat. Applicants must have at least 10 acres of woodland and a management plan for their property. Membership is free and includes benefits such as free technical advice from volunteer foresters during inspections and opportunities to network with other landowners and educators through workshops, field days, seminars, and an annual national convention. **mntreefarm.org**

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 black walnut trees for nuts and timber. You can get information about growing other fine hardwood tree species such as black cherry, hickory, and sugar maple. Dues-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 include the Central Minnesota Small Woodlot Owners' Association and the Northwoods Forestry Cooperative, whose motto is "To promote sound woodland management and assist members in wood products marketing."

"The Central Minnesota Small Woodland Owners' Association was started to help woodlot owners sell timber without getting taken advantage of."

— Doug Ploof, Little Falls

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, such as foresters, loggers, and scientists, who may help you throughout your woodland-owning journey.

Landowner Leader

Spotlight: Greg Nolan and Marcia Rapatz—Cushing, Minn.

Hardwood Hills

Some people fantasize about moving out to the country and living off of the land. For Greg Nolan and Marcia Rapatz, this dream is a way of life. "Our property supplies all our needs," says Marcia of their 80 acres near Cushing, Minnesota. They have a solar-powered home that was built with wood from their land, a composting toilet that reduces their water consumption, an extensive fruit and vegetable garden, a pasture where they raise grass-fed cattle, and about 50 acres of diligently managed woodland.

"I think the committee is a good vehicle for policy, because we can have a direct line to the governor."

Greg and Marcia also run a land-based business, Snowy Pines Reforestation, through which they sell their produce at farmer's markets, perform a variety of forestry services, and produce lumber for fine hardwood flooring. "Part of what we're trying to do is to sequester carbon," says Greg, noting that he's read about the need to care for the atmosphere through reducing greenhouse gas emissions ever since he was in high school. "The one and only rule is we want to leave this property better than

Hardwood flooring boards were dried in a solar-powered kiln.

when we got it," says Marcia, describing their primary goal for the land. "Taking care of this little piece of land that we're so lucky to live on creates benefits for us now, but also for generations to come."

As small business owners and passionate stewards of the land, the couple has found a variety of ways to get involved in their community through forestry such as supplying local schools and churches with free trees to plant. Greg has also been involved in multiple local planning efforts including the Todd County Comprehensive Plan and the Forest Landscape Plan created by the Minnesota Forest Resources Council's West Central Landscape Committee. "I am a long-range planner—I do trees," he says. Greg currently serves as vice chair of the West Central Landscape Committee, representing private landowners and local forestry businesses. The membership consists of private landowners, current or retired government agency employees, and people from the local soil and water conservation district. Occasional guest speakers include economic developers or employees from other natural resource agencies.

Greg has been involved in other various projects with the committee such as organizing tree planting events and exploring local wood processing markets. He sees several benefits from involvement such as connecting with retired foresters and other landowner community leaders, and even local legislators who sometimes attend. He notes, "I think the committee is a good vehicle for policy, because we can have a direct line to the governor." He also appreciates how the committee helps connect him to the big picture while letting him share his ideas. "We could take care of large swaths of land if we would just change the way we think. That's why I keep trying. I like to have a voice." ◆

Woods Workbook

You can fill out this workbook online at mndnr.gov/woodlands.

1. About your 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 in?

☐ Hardwood Hills ☐ Other: _____

What major watershed is my land in? _____

What minor watershed is my land in? _____

2. Evaluate your 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 or young?
- 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 woodland 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.

3. Identify what interests you about your woodland

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

- ☐ Game wildlife
- ☐ Nongame 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.)
- ☐ _____
- ☐ _____
- ☐ _____

4. Identify your top three topics

5. Write your 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 contains wildlife openings to support more wild turkeys."

Goal 1: _____

_____

Goal 2: _____

_____

Goal 3: _____

_____

Other goals: _____

_____

6. Describe a work project

First, choose a goal you want to tackle. Your goal may involve setting up a work project. If you don't know what kind of work needs to be done to reach your goal, ask a forester. It's also a good idea to get a project plan from a forester.

Example: If your goal is to "Ensure my property contains wildlife openings to support more wild turkeys," then your project may be to "Locate existing openings and enhance them by removing trees and planting native species of plants that turkeys eat."

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

_____

_____

_____

7. 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: _____

_____

8. Pull it together

For each work project, use this 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.

Work Project (describe)					Year	
Steps (describe)	Date/ Season[1]	Tools needed[2]	Partners/ Contacts[3]	Budget estimates		Notes
				My contribution	Financial assistance	
1						
2						
3						
4						
5						

[1] Date/season considerations.

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—2015; Enhance wildlife openings—2016; Incorporate as an LLC—2017; etc.

[2] Tools needed might include aerial photos, chain saws, management plan, project plan, shovels, shrubs, etc. You may want to note where you might get these tools.

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

Remember to take before and after photos!

Glossary

allelopathy – A biological phenomenon by which an organism produces one or more biochemicals that inhibit the growth, survival, and reproduction of other organisms.

biomass – Living and recently dead material that can be used as fuel or for industrial production. Woody biomass includes logging residue (nonmerchantable tops and limbs left over from a commercial timber harvest, nonmerchantable small-diameter trees and stems, dead standing trees, and down logs), primary and secondary mill residue, dedicated energy crops, urban forest-clearing material, land-clearing material, and brushland material.

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

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*.

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

corridors – 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.

drift – Material, such as boulders, gravel, sand, silt, or clay, removed from one area by glaciers and deposited in another. Drift includes material deposited directly by glacial ice, such as *till*, as well as material deposited indirectly by water such as outwash or lake sediments.

drumlin – An extended, oval hill or ridge of compacted sediment deposited and shaped by a glacier. Drumlins are typically about 30 meters (98 feet) high and are longer than they are wide. They have one steep and one gentle slope along their longest axis, which is parallel to the direction of the glacier's movement. The steepest slope faces the direction from which the glacier originated, and the gentler slope faces the direction in which the glacier was advancing.

duff – The partly decayed matter on the forest floor.

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

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 – The complex of a community of organisms and their environment that functions as an ecological unit.

ecosystem service – The benefits that people obtain from ecosystems. Ecosystems provide hundreds of services such as soil formation, nutrient cycling, decomposition of wastes, regulating climate, purifying air and water, and recreational experiences.

food plots – Small areas planted to annual or perennial agricultural crops to provide a supplemental food source for wildlife. They have less value to native wildlife than *wildlife openings*.

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

fragmentation – The splitting or isolating of *patches* of similar habitat.

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.

Hardwood Hills – A subsection of the *Ecological Classification System* in west-central Minnesota defined at the western and southern boundary by the Alexandria Moraine Complex, and at the eastern boundary based on general landform boundaries and the separation of lands dominated by northern hardwoods from lands dominated by conifer or aspen-birch forest. The subsection encompasses large portions of Becker, Douglas, Mahnomen, Morrison, Otter Tail, Polk, Stearns, and Todd counties.

hummocky – A landscape dominated by rounded hills without large expanses of level land. This results from the uneven deposition of drift from a stationary melting glacier.

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

kettle lake – A glacial feature formed when large blocks of ice are left behind as glaciers melt and become buried in glacial sediment (*till*). Eventually the ice melts leaving behind a large depression which fills with water forming a kettle lake.

landscape – All land uses (such as forests, agriculture, urban) and ownerships (public, private, tribal) within a defined area that can cover thousands or millions of acres.

land-type association – Units within *subsections* 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.

loam – Rich soil composed of a mixture of sand, clay, silt, and decaying organic material.

management plan – A nonbinding, written document, usually written by a professional forester, 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. Also called a *Woodland Stewardship Plan.*

mesic – Referring to intermediate soil moisture in which moisture is not limiting to plant growth during the growing season and soils are not saturated except following rain or spring snowmelt.

Minnesota and Northeast Iowa Morainal Section – An *Ecological Classification System section* in west-central Minnesota that includes the *Hardwood Hills Subsection*.

moraine – *Till* deposited at the terminus or edge of a glacier, appearing on the modern landscape as ranges of high hills and usually composed of unsorted materials.

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 homogenous forest units that differ from the surrounding habitat at an *ecosystem* scale.

peat – Organic material that has accumulated in a water-saturated environment as a result of incomplete decomposition due to anaerobic (oxygen-free) conditions and low temperatures.

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

province – Units of land defined using major climate zones, native vegetation, and biomes such as prairies, deciduous forest, or boreal forests. There are four provinces in Minnesota.

section – Units within *provinces* that are defined by origin of glacial deposits, regional elevation, distribution of plants, and regional climate. Minnesota has 10 sections, five of which are within the *Eastern Broadleaf Forest Province*.

snag – A dead, decaying tree that provides habitat for wildlife.

species of 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 *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*. This handbook covers one of those subsections—the *Hardwood Hills*.

till – Unsorted material deposited directly by a glacier. Till consists of clay, sand, gravel, or boulders mixed in any proportion.

timber stand improvement – A practice in which the quality of a residual forest stand is improved by removing less desirable trees, vines, and occasionally large shrubs to achieve the desired stocking of the best-quality trees. Loggers and foresters also refer to these activities as "forest stand improvement" or "woodland stand improvement."

topography – The arrangement of surface features such as hills and streams in a given area of the earth.

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

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.

wildlife opening – A small area 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 less opportunity for invasive plants to become introduced, 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. Technical definition: The application of technical forestry principles and practices and business techniques (such as accounting and cost-benefit analysis) to the management of a woodland. Also called "forest management."

Woodland Stewardship Plan – A *management plan* that is written by a certified plan writer and registered with the DNR.

Endnotes

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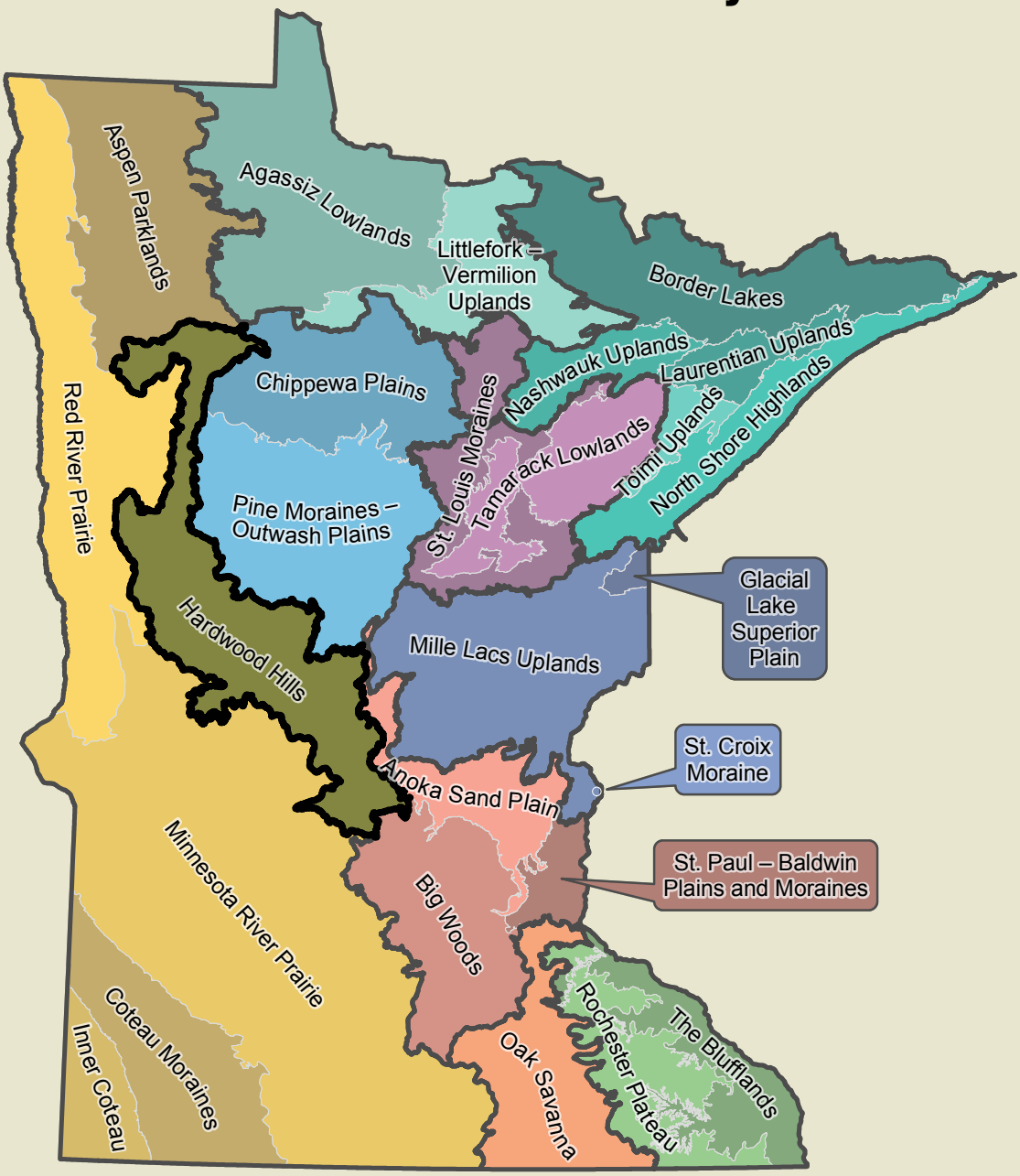
County Land Within the Hardwood Hills Subsection

County	Total County Acres	Acres of County Within Subsection	Percent of Subsection Within County	Where Subsection is Located Within County
Becker	925,073	263,798	7.5	North to south band through west-central and extending into the southwest corner
Beltrami	1,954,962	2,831	0.1	Small spur extending east into southwest edge
Clay	674,378	32,569	0.9	Southeast edge
Clearwater	659,017	109,893	3.1	Spur extending east across central portion
Douglas	460,946	296,762	8.5	Majority of county except southwest and southeast corners
Grant	368,568	5,548	0.2	Northeast corner
Kandiyohi	551,880	4,373	0.1	Small spur extending west into northeast edge
Mahnomen	373,535	132,746	3.8	East half
Meeker	412,484	75,036	2.1	North edge
Morrison	737,783	200,355	5.7	Southwest corner
Norman	561,592	24,905	0.7	Northeast corner
Otter Tail	1,423,973	972,688	27.8	Large portion of county in a band running from the northwest to the southeast
Polk	1,279,481	294,675	8.4	East half
Pope	458,955	1,277	0.0	Small spurs extending south into the north-central edge
Stearns	889,283	522,283	14.9	Eastern two-thirds
Todd	626,774	546,282	15.6	Majority of county except southwest and southeast corners
Wadena	347,609	2,120	0.1	Small spurs extending north into the south edge
Wright	457,189	8,805	0.3	Small spur extending southeast into northwest corner
Totals	**N/A**	**3,496,946**	**100.0**	

Subsections and Landowner Handbook Areas Within Minnesota's Ecological Classification System



If you own woodland in west-central Minnesota, your decisions can impact the future of this rich, unique forest landscape.

This handbook is a foundation for taking care of your woods and connecting your property to the larger landscape. It helps you identify what you have, plan for what you want to see in the future, understand what you can do to keep your woods healthy, and consider strategies for accomplishing these actions. From learning about plant communities to connecting with local foresters and sources of funding, this book shows you how to get a management plan written just for your "back-forty" so that your dreams can become a reality.

Your choices will leave a mark on your future woodlands. What will your landowning legacy be?

mndnr.gov/woodlands

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MNDNR

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

Minnesota Forest Resources Council