WOODLANDS OF MINNESOTA LANDOWNER HANDBOOK

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

About the Woodlands of Minnesota Series

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

This handbook is for people who own woods in the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines, labeled as 7 on the map.

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

Areas Covered by Handbook Series

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





Table of Contents

Introduction				
Part 1: East-Central Minnesota's Forests, Past and Present				
Chapter 1: The Forest Landscape Around You7				
Chapter 2: Why Your Woods Matter24				
Vocabulary				
Part 2: Planning for the Future of Forests				
Chapter 3: Goals for the Landscape, Caring for Your Woods				
Chapter 4: Choosing a Strategy 44				
Vocabulary				
Part 3: Putting It All Together, Managing Your Woods				
Chapter 5: Woodland Projects55				
Chapter 6: Next Steps73				
Chapter 7: Your Landowner Community80				
Vocabulary86				
Map: Ecological Subsections Within Minnesota				
Woods Workbook				

Introduction

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

Private woodlands provide important benefits such as clean air and water, scenic beauty, hunting, angling, birdwatching, and the raw materials to make paper and other wood products. Minnesota's landowners help enhance these benefits for themselves and others through active involvement in caring for the health of their woods. As a landowner in east-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 accomplish your goals.

How to Use This Handbook

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

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

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

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

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

Land Covered in This Handbook

This handbook is specifically designed for those who own forest land in the area of east-central Minnesota known by ecologists as the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines. These ecologically rich places are home to thousands of lakes, some remnant forests and wetlands, diverse wildlife, and an important migrating corridor for birds.

Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines subsections span 3,875,797 acres in all or parts of the following counties:

County	Total number of acres	Number of acres located in subsections	Percent of acres located in subsection	Percent of acres that make up subsection
Anoka	285,078	285,078	100%	7%
Benton	264,221	61,352	23%	2%
Blue Earth	489,731	84,798	17%	2%
Carver	240,450	240,450	100%	6%
Cass	1,544,170	7	0%	0%
Chisago	283,030	63,504	22%	2%
Crow Wing	739,801	12,711	2%	0%
Dakota	374,981	130,508	35%	3%
lsanti	288,733	187,010	65%	5%
Hennepin	338,101	338,101	100%	10%
Le Sueur	303,022	297,638	98%	8%
McLeod	323,361	166,507	51%	4%
Meeker	412,484	84,299	20%	2%
Mille Lacs	435,732	14,910	3%	0%
Morrison	737,783	120,448	16%	3%
Nicollet	298,537	11,774	4%	0%
Ramsey	108,739	108,739	100%	3%
Rice	329,914	187,549	57%	5%
Scott	235,508	235,508	100%	6%
Sherburne	288,266	282,597	98%	7%
Sibley	384,139	117,503	31%	3%
Stearns	889,283	62,723	7%	2%
Waseca	276,947	20,273	7%	1%
Washington	270,980	263,426	97%	7%
Wright	457,189	448,384	98%	12%

ANOKA SAND PLAIN, BIG WOODS, AND ST. PAUL-BALDWIN PLAINS AND MORAINES



PART 1 EAST-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 woods in the summer, you might be hard-pressed to pick out your own trees from the patchy sea of green below. Your property is one piece of a much larger landscape. A *landscape* consists of all land uses (forest, wetland, agriculture, urban) and ownerships (public, private, tribal) within a defined area that can cover millions of acres. Taking a good look at the forests in your surrounding landscape can teach you a lot about what you might expect to find in your own woods.

Describing Your Landscape

If someone asked you where your property is located, how would you answer? Often people use political boundaries to define their area such as "Anoka County" or "north of St. Paul." Sometimes they use nearby natural features as reference points such as "just off Lake Waconia" or "in the Mississippi River valley." Based on the soils, climate, water, and plants in this region, ecologists call this area the *Anoka Sand Plain*, *Big Woods*, and *St. Paul-Baldwin Plains and Moraines* subsections. But before we get into current classifications, let's take a trip back in time.



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

Historic Land Cover and Current Land Use

The Mississippi River forms the western boundary of the Anoka Sand Plain. A broad, flat, sandy *lake plain* dominates the majority of this area and forms the eastern and northern boundaries. Topography is level to gently rolling. Historically, the predominant vegetation was oak savanna and upland prairies surrounded by wetlands. Jack pine was present along the northern edge.

This subsection stretches across the northern Twin Cities area, including St. Cloud to the west and North Branch to the east, and has the second fastest-growing population in the state. Urban development has eliminated peatlands, prairies, and savannas. Some of the best examples of dry oak savanna in the state occur here.

The Minnesota River runs through the middle of the once predominatelyforested Big Woods subsection. Topography is gently to moderately rolling. The dominant landscape feature is circular, level-topped hills bounded by smooth side slopes. Broad level areas between the hills are interspersed with closed depressions containing lakes and peat bogs. Many of the lakes and wetlands are groundwater-controlled with no inlets or outlets. Before European settlement, common tree species were red oak, sugar maple, basswood, and American elm.

Today most of this subsection is farmed, and only a small fraction of the original "Big Woods" remains. More than 75 percent of this subsection is cropland, with an additional five to 10 percent pasture. Forested areas are widely separated from each other. The Twin Cities area continues to expand into this area. Both farming and urbanizations have led to dramatic changes in habitat. Water quality is also a conservation concern in the agricultural landscape.

The St. Paul Baldwin Plains and Moraines subsection and encompasses much of the eastern half of the Twin Cities area, including St. Paul and its suburbs. The Mississippi river flows through the center and the St. Croix River forms the eastern boundary. Both rivers are important to wildlife, especially migrating birds. Oak and aspen savanna dominated before European settlement. Tallgrass prairie and maple-basswood forests were also common. Large *moraines* and *outwash plains* dominate this subsection.

Urban land uses rule this subsection, although small, forested areas remain, especially in parts of northern Washington County. Rapid development diminishes the opportunity to conserve habitat. Protection of existing wetlands is important for flood control and filtering of stormwater runoff. Water quality remains a significant concern.

The total annual precipitation of these subsections ranges from 27 to 31 inches, with growing season precipitation ranging from 12 to 13 inches. Growing season length ranges from 136 days in the north to 156 days in the south.

Many recreational opportunities exist in these subsections, especially along large rivers and public parks and natural spaces.

LAND COVER: PAST AND PRESENT



How We Classify Forests Today

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

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



MINNESOTA BIOMES

Prairie Grasslands

Ecological Classification System

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

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

This handbook focuses on three ecological subsections: Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines.

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

ECOLOGICAL CLASSIFICATION SYSTEM HIERARCHY







Level 3: Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines Subsections

Level 2: Sections in the Eastern Broadleaf Province





Level 4: Land-Type Associations in the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines Subsections



Native Plant Communities

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

The native plant community system describes an area's specific land types or *ecosystems*. A single community might cover a large area, or exist in scattered pockets. Sometimes very different native plant communities exist near each other. For example, trees and plants growing along a river may vary widely from those growing several hundred feet uphill. Native plant communities are also a useful tool for telling the story of your land's history. Forests are constantly changing under the influence of time between disturbances and other factors. The trees and other plants that emerge 20 years after a fire or windstorm will differ from those growing in the same area hundreds of years later. While these ecological subsections (Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines) contain many similar communities, there is variation 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 east-central Minnesota include Southern Terrace Forest, Central Mesic Hardwood Forest (*mesic* means between wet and dry), or Southern Rich Conifer Swamp. The DNR considers 5 out of 23 forested communities found in east-central Minnesota to be "imperiled," meaning they are rare or threatened within Minnesota. It is especially important to protect these imperiled communities from conversion to other land uses. Several local types of forested native plant communities are highlighted in Chapter 5.



Photo credit: Richard Gardner, Bugwood.org

Know Your Plants

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

Discover Your Watershed!

A watershed is the total area of land surrounding a body of water (such as a lake,



river, or stream) that drains water into that body. Watersheds can be

small or large. Small watersheds surrounding creeks and streams join to create larger watersheds surrounding major rivers. Ultimately, water in east-central Minnesota flows into the Mississippi River via numerous tributaries such as Minnesota and St. Louis. The actions you take on your land will affect the quality of water that flows into the Gulf of Mexico by way of the Mississippi. To learn more, visit mndnr.gov/woodlands

WATERSHEDS IN ANOKA SAND PLAIN, BIG WOODS, AND ST. PAUL-BALDWIN PLAINS AND MORAINES SUBSECTIONS





Photo credit: John Dykstra

Challenges in East-Central Minnesota

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

Habitat Loss

East-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 in greatest conservation need*. About 350 species are given this classification in Minnesota. Examples from the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines include trumpeter swans, bobolinks, Blanding's turtles, American badgers, and gopher snakes, and a rare species of mussel found only in the St. Croix River, a few of its tributaries, and the outlet of Lake Pepin on the Mississippi River.

The greatest threat to these species is *habitat* loss or degradation, which affects over 80 percent of the species of greatest conservation need within the three subsections. Residential and commercial development and the conversion of native landscapes to agriculture is the major cause of habitat loss and is an increasing issue as the urban landscape continues to expand.

HABITAT SPOTLIGHT

Oak Woodlands

Oak woodlands provide important habitat in your region for many wildlife species including red-shouldered hawks, northern barrens tiger beetles, eastern fox snakes, northern long-eared bats, red-headed woodpeckers, whip-poor-wills, eastern meadowlarks, and numerous invertebrate pollinators including many butterfly species. Oaks are a keystone species (a species in which the ecosystem is largely dependent on). This habitat has come under increasing pressure from invasive species, which threaten all components of this habitat type. Oak wilt is an example of an invasive disease, which can quickly kill the existing oak trees. Invasive plants such as garlic mustard and buckthorn compete with native forest plants, including tree seedlings, and negatively impact forest regeneration. Some of these invasive species are highlighted later in Section 1 and Section 5. Oak woodlands in your region are also under increasing pressure from residential development due to their proximity to the Twin Cities Metropolitan Area. If you own land in this habitat type, consider your role in managing your woods carefully to maintain this habitat on the landscape for the great diversity of resident and migratory species that rely on it. A specific type of this habitat in your region is highlighted in Section 5.

Photo credit: ColdSnap Photography





Declining Water Quality

Nearly 285,500 acres of lakes and rivers cover the Anoka Sand Plain, Big Woods, and St. Paul–Baldwin Plains and Moraines. 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 the runoff from all of these sources eventually collect in water bodies throughout the region, which harm fish and other wildlife, degrades drinking water, and damages recreational opportunities.

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

Invasive Species

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

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

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

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

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

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

Photo credit: Steven Katovich, Bugwood.org



"I've done a lot of buckthorn work. I don't have much of it here, and I try real hard to keep it down. In the winter when I'm cutting wood or hauling wood, I cut down the female trees"

-Skip Lee, Faribault



INTRUDER ALERT!

Invasive species are an increasing problem for east-central Minnesota. Here are examples of troublemakers to look for on your land.



Oak Wilt Oak wilt, a non-native fungal disease, kills thousands of oak in Minnesota each year, and is an increasing

problem in your region. The fungus spreads in two ways: 1) travelling underground from tree to tree through roots that have grown together—especially oaks growing in sandy soil; and 2) when sap-feeding beetles pick up oak wilt spores on recently killed oaks and drop them off on freshly wounded ones. The first method creates pockets of dead trees. After infection, red oak species (northern red, northern pin) die within 2 to 4 months. Bur oaks die within 1 to 7 years, and other white oaks (white, swamp white) may survive for several years.

The most common way to stop underground oak wilt spread is severing grafted roots between infected and non-infected trees with a vibratory plow blade or trencher. Prevent aboveground spread by not wounding oak trees (i.e., through pruning) from April through July when risk of infection is the highest. If wounds do occur during these months, immediately cover with pruning paint. Chip, burn, debark, or process the wood into lumber before spring when infected trees are cut down. If using as firewood, split, stack, and cover infected wood with thick plastic from April through July, with the edges buried to prevent beetle entrance.

Options to control and deal with infected wood at mndnr.gov/woodlands



European Buckthorn European buckthorn is a tree that grows as a weedy shrub in North

America. In Minnesota both common and glossy buckthorn are highly invasive. Originally, both species were brought to the United States to be sold as ornamental hedges. However, buckthorn easily escaped cultivation and popped up on disturbed patches of land and in the woods, forming dense thickets that shade out native plants. Birds spread the plant by eating its small, black berries and excreting the seeds. Although nurseries stopped selling buckthorn many decades ago, the plant has become established across much of the United State and Canada.

If ignored, buckthorn can take over your woods. Buckthorn greens up earlier and stays green longer than most native shrubs. With a longer growing season, buckthorn not only grows faster than native plants, it also creates an unnatural layer of shade that stifles many native species growing underneath. Deer avoid eating buckthorn, and it has almost no natural predators or diseases in Minnesota. These combined factors mean little slows the plant down, except action on your part. Buckthorn can be controlled by hand-pulling small plants and cutting larger plants, followed by stump removal or chemical treatment.

A Changing Climate

Climate scientists predict that as global temperature continues to increase, it will significantly affect Minnesota's climate within the next several decades. Minnesota will experience warmer year-round temperatures—with winter warming faster than other seasons—and changes to rainfall patterns, with more precipitation in the form of big downpours. In fact, the Twin Cities Metropolitan area is already experiencing these changes. Historical climate records show that average low winter temperatures have increased by almost 6 degrees Fahrenheit since 1895. Annual precipitation has increased in this region by an average of 5 inches over the course of the historical record—which is approximately a 19 percent increase.



FUTURE CLIMATE PREDICTION

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

When selecting trees for your woods, consider the future climate. By 2060, it is predicated that the climate of central Minnesota will most resemble that of present-day central lowa and eastern Nebraska.

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



Photo credit: Steven Katovich, Bugwood.org

Drier Summers, More Insect Damage

Pine bark beetle is a native insect that evolved with Minnesota's pine trees. As Minnesota's climate changes, the delicate balance between these species developed over thousands of years may be getting skewed in favor of the beetle. Pine trees normally defend themselves against this wood-boring insect by drowning them in sap; but if a tree is water-stressed, it is unable to use this defense. Periodic, small-scale outbreaks of this species are part of the natural cycle of pine forests. However, scientists believe the potential increased frequency of severe droughts from climate change will lead to larger-scale and more intense beetle outbreaks. The last time such a severe outbreak occurred was after the extreme 1988 drought.



Flooding of forests along waterbodies will occur more frequently as the size and intensity of rain events increases.

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

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

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

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

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



Climate Change Response Framework

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

Chapter 2: Why Your Woods Matter

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

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

Benefits of Forests to You and Your Community

Wood and Pulp

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



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

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



Photo credit: Woodchuck USA

Wood: A Local Industry

Forest-based industries are important contributors to east-central Minnesota's economy. These businesses provide over 15,000 local jobs in logging, forest consulting, and a variety of wood product manufacturing industries. One major manufacturing employer in the Twin Cities Metropolitan Area is Woodchuck USA, which employs about 40 people at their St. Paul facility. They plant a tree for every product they sell through their "Buy One. Plant One" program, including planting trees in Minnesota. Having a healthy forest economy in Minnesota 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 end up in the homes of your family and neighbors—all while supporting local jobs. Learn more about Woodchuck USA at www.woodchuckusa.com

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 blackberries, raspberries, strawberries, gooseberries, and chokecherries, just to name a few. Wild hazelnuts are a fall favorite of wildlife and people too, and they can be roasted and eaten like commercial filberts. As winter fades and the tree sap begins to flow, maples can be tapped for making sweet, sticky maple syrup.





Forests will absorb carbon dioxide and capture pollutants released by the Koch Refinery.

Forest Ecosystem Services

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

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

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

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

FOREST FORAGER SPOTLIGHT

Jim Jirick—Kilkenny, Minn. BIG WOODS



"I've always been a gatherer," says Jim Jirick, an organic farmer with 400 acres of cropland, pasture, woodland, native prairie, and wetland in Kilkenny, Minnesota. "Whether it was mushroom or fish, or hunting—any of that kind of stuff. I've always been a person that wants to go out

and gather." Jim and his wife Jackie purchased the land from Jim's family after his grandfather passed away. "It was kinda' my playground growing up," says Jim. The property's biggest selling point for Jim was the 80-acre mature maple-basswood woods. "I wanted the Big Wood. I've always wanted that woods." However, with a family to raise and money being tight, Jim knew that his woods needed to pay for itself.

As part of the solution to his income needs, Jim sought help from some fellow gatherers: honeybees. Jim was familiar with beekeeping from his youth. "My grandfather raised bees when I was a kid," Jim recalls. "I think I was 12 when I first can remember working with bees. I would take honey to school and sell it to teachers." Jim gave up beekeeping once he was old enough to get other jobs, but had the opportunity to pick it up again years later when a retiring beekeeper offered to sell Jim his bees and supplies, and to mentor him. That was about 25 years ago. Today, Jim's bees produce over 1,000 pounds of honey each year, which he sells through various local markets.

Jim keeps some of his hives right next to his woods. There they can feed on the basswood trees during their early summer bloom. "Basswood is one of the premiere honeys out there," says Jim. Nectar from basswood flowers produce a tangy, dark gold honey. According to Jim, the flavor is stronger than the more common sweet clover honey. "It's real good. It's got a good honey flavor to it." The bees may forage on other woodland plants as well such as dogwood, ironwood, willow, and ground-dwelling woodland flowers. Jim recommends that new beekeepers find a local mentor. "It's a nice network. Everybody kind of helps each other." He also suggests taking a beekeeping class such as the three-day course he took at the University of Minnesota. "I learned what I'd been doing wrong for 30 years with the bees," he chuckles. Jim says he had trouble keeping his bees alive, a problem he and many beekeepers still have today. Modern honeybees are suffering from a variety



of problems, including invasive mites, bacterial infections, and pesticide poisoning. "The further you can put your bees from a conventional agricultural field, the better," Jim warns, in reference to the potential use of neonicotinoids, a class of pesticides known to kill bees. Fortunately for bees, these problems are receiving more attention lately, leading to more funding and research into solutions. "There's just been a lot more public awareness of what's going on," Jim says.

Jim notes that all the buzz about bees has been good for beekeepers too—the price and demand for honey has increased dramatically in the last few years. "I think there's more people becoming aware of the local honey, versus the honey that's imported from other countries." Jim enjoys eating honey himself, "I eat it when I'm out in the woods caring for the bees. That's the best time, right off the hive too!"

Skip Lee-Faribault, Minn. BIG WOODS



"I made it just past the house down at the corner, and about eight or nine deer came out," says Skip Lee, recalling his first visit to the 75-acre property near Faribault that he has owned for over two decades. The property had a nice vibe. "It felt good. The peace and



calm that you don't get through too many things, except through nature."

Skip is a retired Minneapolis firefighter who now spends his time working for Harley Davidson, volunteering at the nearby River Bend Nature Center, and enjoying his woods. In addition to hunting, he likes snowshoeing and snapping photographs of flowers and wildlife. Skip has a hard time picking his

favorite local critter, but mentions he has a soft spot for wild turkeys. "They're so hilarious when they run. They run like a cartoon, where their body goes and then their head catches up. And my daughter and I just laugh about that all the time."

On cold spring days, Skip can be found working away at another favorite woodland activity: maple syruping. "My sugar shack is about 50 yards away," he says, gesturing toward his kitchen window. "There's a maple tree out here that a squirrel usually nibbles off a couple of branches, and when I see them start to drip, then I know the sap is running." Skip learned the art of syrup-making 20 years ago from a good friend and long-time resident of the area. Skip was eager to learn the craft: "I needed to know how it was done. I wanted to watch, I wanted to participate." Though intrigued by the process, Skip was initially less-than-enthusiastic about the product. "The first time I tasted it, it was like 'Oh, I've been working for this nasty stuff? Ugh! Give me Mrs. Butterworth!"" he laughs loudly. His tastes have since changed. He now takes a flask of his homemade syrup with him whenever he travels, to not settle for the artificial stuff in breakfast joints!

Today Skip makes his syrup in an evaporator, which speeds up the process and produces a cleaner syrup. However, sometimes he misses the smoky flavor of the syrup he and his friend boiled in open pans over crackling firewood. When he makes enough, Skip sells his syrup; but he always keeps enough for himself and his daughter. He began making syrup in 1996, the year his daughter was born. He remembers racing out of the house and shouting to his friend who was collecting sap, "Rudy! She just said it's time! We're leaving!" Perhaps it is because she was born during syrup season, but Skip's daughter has always loved the sweet treat. "When she was little, she used to sneak out of the house and come up to the sugar shack and scare the bejeebies out of me! 10:30, 11 o'clock, this little, teeny girl in jammies and slippers is standing out at your syrup shack." Skip would ladle hot syrup into his daughter's waiting espresso cup and tell her bedtime stories while it cooled. It is clearly a happy memory for him. "My daughter, she wants to keep the property. She enjoys coming out," he says fondly, adding with one of his characteristic hearty laughs, "except for the wood ticks and the mosquitoes!"

Part 1 Vocabulary

Anoka Sand Plain

A *subsection* of the *Ecological Classification System* in east-central Minnesota consisting of a flat, sandy lake plain with level to rolling hills that was historically dominated by oak savanna and upland prairies surrounded by wetlands. It covers 1,199,711 acres and encompasses parts of Anoka, Benton, Chisago, Crow Wing, Hennepin, Isanti, Morrison, Ramsey, Sherburne, Stearns, Washington, and Wright counties.

Big Woods

A *subsection* of the *Ecological Classification System* in east-central Minnesota consists of gently to moderately rolling topography with lakes and wetlands controlled by groundwater and once coincided with large blocks of deciduous woods dominated by red oak, sugar maple, basswood, and American elm. It covers 2,211,753 acres and encompasses all or part of Blue Earth, Carver, Dakota, Hennepin, Le Sueur, McLeod, Meeker, Rice, Sibley, Stearns, Waseca, and Wright counties.

Biomass

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

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*.

Eastern Broadleaf Forest

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

Ecological Classification System

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

Ecosystem

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

Ecosystem service

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

Greenhouse gas

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

Habitat

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

Invasive species

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

Lake plain

A lake basin that has filled with sediment.

Landscape

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

Land-type association

Units within the *Ecological Classification System 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.

Mesic

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

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 glacial debris.

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 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.

Outwash plain

A large, flat area of sorted and often stratified sediment (sand, gravel) that is deposited by glacial-meltwater streams.

Province

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

Section

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

Species in greatest conservation need

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

St. Paul-Baldwin Plains and Moraines

A *subsection* of the *Ecological Classification System* in east-central Minnesota Encompasses parts of Anoka, Chisago, Dakota, Hennepin, Ramsey, Rice, and Washington counties. It covers 463,563 acres and is covered by a large moraine and areas of outwash plain where oak and aspen savanna, and areas of tallgrass prairie and maple-basswood forest, were once common.

Subsection

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

Till

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

Watershed

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

PART 2 PLANNING FOR THE FUTURE OF FORESTS

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

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

Private landowners like you own about 78.5 percent of the forested land in the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines. Therefore, your decisions and the decisions of all woodland owners in the region have a big impact on the health and beauty of east-central Minnesota.

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



Tree tubes help prevent deer browse on oak seedlings.

Photo credit: Eli Sagor



Managing Your Woods

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

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

The Big Picture—Thinking From a Landscape Perspective

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

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

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


"I worry about disease and climate change affecting trees at a large scale. I'm not as worried about individual trees, but I want to maintain the forested nature and try to make it as healthy as possible." —Matt Zabel, Lake Elmo



Goals for the Landscape

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

The MFRC developed goals for the northern and southern parts of the Anoka Sand Plain, Big Woods, and St. Paul-Baldwin Plains and Moraines through large-scale forest planning efforts. These goals show a long-term vision of what future forests in this area could look like while providing for wildlife, the local economy, and society.

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



- **Protect water quality.** Forests and water are linked intimately. Forests regulate the flow of water across the land, filter drinking water, and prevent erosion. Protecting forests nears wetlands, seasonal ponds, natural shorelines, and streams is key to protecting local water quality.
- 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 adapted to the growing conditions of your land and maintaining a balance of young and old forest on the landscape.
- Manage for wildlife and habitat. Your region has at least 1,106 wildlife species. 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.

What Are Your Goals?

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



Biodiversity Counts

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



Many woodland owners own land for wildlife habitat.

Setting Goals for Your Woodland Using the "Woods Workbook"

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

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

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

Choosing a Management Theme

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

Theme 1: Wildlife Habitat

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

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

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

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

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

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

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

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.



"Everyone we've talked to recommends thinking through goals and what you want to get out of your woods. For us, it's purely recreational. So, we want to maintain the woods and make it healthier."

-Matt Zabel, Lake Elmo



Theme 2: Recreation

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

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



PlayCleanGo

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

Theme 3: Healthy Woods

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

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

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

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



Theme 4: Income

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



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

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

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

Combination Approach: Multiple Benefits

Management themes may overlap, and you want to incorporate elements of most or all of them into your approach. You might have different goals for different areas of your woods, or perhaps your goals do not fit into one of these categories. Examples might include planting a shelterbelt around your home or improving the water quality in your lakeshore. 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.

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

Chapter 4: Choosing a Strategy

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

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



Photo credit: Leslie Robertson/NASF



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

Who to Know: Key Players

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

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

 University of Minnesota Extension—The University of Minnesota delivers practical, research-based education programs and information to landowners. Extension also manages the MyMinnesotaWoods website and other free electronic communications for landowners. extension.umn.edu/natural-resources/my-minnesota-woods

 Minnesota Forestry Association (MFA)—MFA is an organization for private woodland owners that offers educational opportunities and other services. Their "Call Before You Cut" hotline directs woodland owners to free information before a harvest including lists of foresters, certified loggers, and a variety of other resources. minnesotaforestry.org



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

"I was surprised at the detail of the recommendations in the Forest Stewardship Plan. More detail than I'm going to be able to follow. It's more than I'm going to be able to do, but it gives me options so I can pick and choose what I want to do."

-Peter Jensen, Princeton

A woods walk with a forester is a good first woodland management step. Photo credit: Leslie Robertson/NASF

What to Do: Create Your Strategy

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

- 1. **Get advice.** Schedule a time for a professional forester to visit your property and walk through your woods with you. A forester will help you learn more about your woods' potential for wildlife management, timber harvest, and recreation, and identify invasive species, areas in need of thinning or restoration, and important natural features. This process can help you plan your strategy and choose specific projects you want to do in your woods.
 - Minnesota Department of Natural Resources (DNR)—The DNR is a state agency that helps take care of Minnesota's natural resources. DNR foresters protect and manage 5 million acres of public forest land and assist Minnesota's private landowners with woodland decisions and projects. The DNR can also direct you to many other resources and people, including other agencies and private sector consultants. Local DNR Forestry offices often have long-standing relationships with a network of private foresters and loggers. If you decide to have a plan written for your property or a timber harvest performed, locate your closest forester at mndnr.gov/woodlands/cfm-map.html
 - **Private Consulting Foresters**—Private, independent consulting foresters help woodland owners meet their goals by writing stewardship plans, developing project plans, setting up timber harvests, and much more. **mnacf.org**

- Soil and Water Conservation Districts (SWCDs)—SWCDs are local government agencies that help private landowners manage their natural resources. Some SWCDs have foresters who can visit your woods and provide advice. There are 90 SWCDs in Minnesota, at least one for each county. maswcd.org
- Industry Foresters—Employed by timber harvesting companies, they can set up a timber sale and write a stewardship plan.
- 2. Have a management plan prepared. The DNR's Forest Stewardship Program helps woodland owners finalize goals and prepare a professional, voluntary management plan for their woods. A management plan (also known as a *Woodland Stewardship Plan*), is a nonbinding, written document that lists your land's potential, what you want to accomplish, and specific actions you can take to accomplish those goals within a given timeframe. Woodland Stewardship Plans are discussed in Chapter 6. If you want something simpler, your forester can also create a brief or streamlined management plan using the ideas that you have recorded in your Woods Workbook.
- 3. Decide how the work will get done. A "project" may include activities such as tree planting, woodland stand improvement, invasive species removal, wildlife habitat improvement, development of recreational trails, or timber harvesting. When planning how the work will get done, consider your available time and budget. Doing the work yourself is one option. This saves money, but requires more time investment. Many landowners enjoy doing their own management activities, as it provides an opportunity to be out in their woods and get great exercise.



"I picked the bid with the best price and least impact on the land. They had 5 acres of 8-foot long logs in the field up there. The next season when my brother came out to hunt, he said 'I thought you had a bunch of trees cut down.' That's how nice it looked. All he noticed was a few extra brush piles."



Photo credit: Leslie Robertson/NASF

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

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

Part 2 covered some of the goals for the forested landscape of which your land is a part, how your own goals intersect with these landscape goals, and how to develop a strategy for doing the work necessary to reach your woodland goals. Part 3 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

Peter Jensen–Princeton, Minn.

A strange sound drifted from somewhere just beyond Dr. Peter Jensen's house on his property in Princeton—a cacophony of honks and screeches that sounded like a car alarm going off. "Sandhill cranes," says Peter. "They were right up here yesterday, there's two of them. They'll come up and eat the grass."

Peter and his family began purchasing their 192 acres of sandy woodlands, wetlands, and pasture in the late 1980s. They have been hard at work ever since, planting trees, making lumber, and all the steps in between. Peter describes one large planting of 11,000 pine trees they put in 14 years ago,





noting how much they've grown. "It's so clear under there now because they're getting big, and you can walk under them," says Peter, adding he enjoys this quiet retreat under the pine boughs. The sawmill and solar kiln sitting in their fields are relatively recent additions. "Since we were cutting down all these trees in order to manage the forest, we thought 'Well, we'll make lumber."

Peter has had a few professional harvests performed in his woods, including one 10-acre selective oak harvest done with Percheron horses. The low-impact nature of horse logging appealed to him. "And just the romanticism, I guess," he says with a laugh. The logger was skilled at directional felling—landing trees in very specific places—and used a portable sawmill to turn the logs into lumber right on the property. Peter was impressed with how clean and non-damaging the process was. "It's the best way to not disturb your woods. The mechanical loggers use a large machine to cut the tree and drag it out, or they cut it down with a chainsaw and drag it out with a skidder. Which means you need big trails through the woods. The horses don't disturb the woods. So that's the biggest advantage." Peter has also had mechanical harvests done for larger timber volumes, including one just last year. "The fella' that did the logging for us last fall is an artist," he notes appreciatively. While Peter's recent harvest went well, he has had problems in the past. He recommends landowners take the time to seek out references for their contractors. "Look at something they've done before. It's tedious to do something like that, but once the trees are down or the trees they leave are damaged, you've got no recourse. So, I think there are responsible horse loggers, there are responsible mechanical loggers, but you should always talk to somebody who's used that person, and see if they were happy with what they did," he says. "And see the land if you can," he adds.

Peter also suggests that landowners who are interested in woodland management get a Woodland Stewardship Plan. "I'm not a big studier," he admits. "I just like to go out and do it. I would just assume not read about it. That's where the Forest Stewardship Program is really useful for me, because it gathers all the stuff together so I don't have to go doing research here and there. And then you've got a reference person that you can always call. I think that's very valuable. I'd rather ask a person the question," he explains. "To me, it's a shortcut. Ask somebody that knows."



Part 2 Vocabulary

Corridor

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

Fragmentation

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

Management plan

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

Patch

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

Snag

A dead, decaying tree that provides habitat for wildlife.

Timber stand improvement

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

Understory

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

Woodland management

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

Woodland stand improvement

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

Woodland Stewardship Plan

A management plan written by a certified plan writer.



PART 3 PUTTING IT ALL TOGETHER-MANAGING YOUR WOODS

Chapter 5: Woodland Projects

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

Tools

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

Important tools include:

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

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

Budget

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



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.

Choose a Work Project

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

Option 1, Wildlife Habitat Focus: Creating a Wildlife Opening

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

Wildlife openings are clearings in your woods-ranging from half an acre to 5 acres-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

"One thing I'd like to do is recreate some oak savanna with some of the open areas. I've got a couple of alfalfa fields that are old, and what I'm thinking is instead of reforesting them entirely is to plant oaks in clumps."

-Peter Jensen, Princeton

Wildlife openings with scattered oaks will benefit wild turkeys. Photo credit: Albert Lavallee, National Wild Turkey Federation

nesting season for birds (mid-May through early August). A natural resource professional can help you decide where to place the openings and best methods for creating them.

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

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

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Dry-Mesic Oak Woodland

This forest community is very common on the excessively drained sand and gravel soils of the Anoka Sand Plain and St. Paul-Baldwin Plains and Moraines subsections. The canopy of this community is often interrupted to continuous (50–100% cover) and is typically dominated by northern pin, northern red, and white oak, with lesser amounts of bur oak and red maple. Red maple is also common in the subcanopy and shrub layers along with chokecherry, American hazelnut, gray dogwood, and prickly ash. Pointed-leaved tick trefoil, Clayton's sweet cicely, hog peanut, starflower, Canada mayflower, wild geranium, lady fern, interrupted fern, and Pennsylvania sedge are commonly present in the ground-layer.

The older canopy trees in this community often have open, spreading branches, indicating they likely grew in more open conditions than currently exists on the site. Frequent fires that once affected this community as mild surface fires roughly every 10 years and catastrophic fires about every 110 years caused these open conditions. The development of modern fire suppression has led to the loss of this mosaic of oak openings and closing of the forest canopy. To keep this native plant community healthy, you should consider management activities that mimic the frequent mild to severe fires that once shaped this ecosystem. You might consider a strategy of creating openings such as harvesting or girdling trees to maintain an interrupted canopy with open growing conditions and perform prescribed burning in the openings when possible. Be sure to avoid harvesting, pruning, or injuring oak trees from April through July when the risk of oak wilt infections is high.



Option 2, Recreation Focus: Controlling Invasive Plants

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

Here are some steps you can take:

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

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

Woody and weedy invasive plants in your region include:

- Common buckthorn
- Several species of non-native honeysuckle
- Common tansy
- Spotted knapweed
- Non-native thistles, especially Canada thistle

Watch for garlic mustard, which is a prolific understory plant that is present but not yet prevalent in your area. Look in May for plants about a foot tall having clusters of small four-petaled white flowers and garlicky scented leaves. Additionally, garlic mustard releases compounds from its roots that prohibit other seeds from germinating. If you spot garlic mustard, act quickly to remove before it becomes established and degrades your woods.

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



Garlic mustard can prevent germination of tree and shrub seeds. Photo credit: Steve Katorich, Bugwood.org

A variety of methods are used to control invasive plants.

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

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



Goats eating buckthorn.

Arrest the Pest

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

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

After you remove an invasive species, plant native species to fill the void, otherwise new invaders may quickly return to the disturbed area. Native trees and shrubs that could replace buckthorn and honeysuckle include highbush cranberry, nannyberry, pagoda dogwood, American hazelnut, common elderberry, and native bush honeysuckle. Native *forbs* in your region include bloodroot, wild ginger, Virginia waterleaf, early meadow rue, and lady fern. More information about choosing native plants is on mndnr.gov/woodlands and mndnr.gov/plants

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



Fire can be used to control some invasive species. Always take precautions and get a permit.

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Floodplain Forest

Floodplain forests are found in the bottomlands adjacent to the Mississippi, Minnesota, and St. Croix rivers and their larger tributaries. These deciduous forests are dry most of the year but exposed to seasonal flooding that saturates the soil and deposits piles of silt, sand, and debris. Silver maples typically dominate the canopy, often occurring in nearly pure stands, along with occasional green ash, cottonwood, and American elm. Woody climbers such as wild grape, climbing poison ivy, and moonseed are often present, but the understory layers are often sparse due to the effects of spring inundation and floodwater scouring. As the summer progresses, the ground-layer becomes more developed and contains a number of annual or flood-tolerant perennial species such as false nettle, Ontario aster, Virginia wild rye, and dense patches of wood nettle.

Despite the seasonal flooding, a number of invasive species have become abundant in these lowland forests, including creeping Charlie, garlic mustard, and reed canary grass. Reed canary grass is especially aggressive in these lowland communities and impedes the establishment of tree seedlings, leading to limited forest regeneration. Monitoring the understory and edges of your woodland for these invasive plants—and taking fast action to control them—can help protect this biologically unique ecosystem.



"It's kind of fun, where you see a tree that you want to foster surrounded by other trees that you don't want. And to release the smaller trees. It's very enjoyable, I think that's very rewarding. Because when you go back a year later, you can see where we've opened things up for pretty trees to grow."

-Peter Jensen, Princeton



Removing smaller trees reduces competition by opening up the canopy.

Option 3, Healthy Woods Focus: Harvesting Firewood

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

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

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



"I just enjoy cutting firewood because you're doing so many things at one time. You're cleaning up the woods. You're doing something that's just emotionally satisfying. It's

-Peter Jensen, Princeton

Don't Move Firewood!

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

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

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

NATIVE PLANT COMMUNITY SPOTLIGHT

Southern Mesic Maple-Basswood Forest

This mesic forest community was once common on the Big Woods subsection's rich, well-drained, loamy soils and has been greatly reduced by land use changes since European settlement. It is currently considered "imperiled" based on threats facing the remaining examples. It is typically dominated by sugar maple, with lesser amounts of basswood, northern red oak, red elm, and American elm. The forest floor is often covered with *ephemeral* flowers such as cut-leaved toothwort and Dutchman's breeches in the spring before the canopy trees leaf out. Other important ground-layer species include Virginia waterleaf, bloodroot, yellow violet, large-flowered bellwort, wild leek, blue cohosh, and early meadow-rue. The shrub and subcanopy layers are rare to interrupted (5-75% cover) depending on available light filtering though the canopy. They include sugar maple, bitternut hickory, basswood, ironwood, prickly gooseberry, and chokecherry.

Catastrophic disturbances were historically rare in this community, while small disturbances that created a mix of canopy layers were far more common. Tailoring your firewood harvesting strategy to create small gaps—removing single trees or small clusters in your woods—will allow some of the sugar maple, elm, and basswood saplings to develop and create a mix of tree ages, which gives your forest more vertical diversity. Other species such as northern red oak, bitternut hickory, and big-toothed aspen need full sunlight to reach maturity so creating some medium to large gaps—up to an acre—in your woods will encourage these species. Whether you choose to create small or large gaps, you will help create diverse age groups among your trees, similar to historic disturbances, which will create better wildlife habitat and help your woods be more resistant to environmental stress.





Option 4, Income Focus: Having a Timber Harvest

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

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

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

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

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

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

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

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

NATIVE PLANT COMMUNITY SPOTLIGHT

Central Mesic Hardwood Forest

This hardwood forest community is relatively common in east-central and central Minnesota. The continuous canopy (greater than 75% cover) is usually dominated by basswood, northern red oak, and sugar maple, with smaller amounts of green ash, paper birch, red maple, bur oak, and quaking aspen. Chokecherry, pagoda dogwood, prickly gooseberry, and beaked hazel, along with sugar maple, ironwood, basswood, and northern red oak seedlings and saplings can be found in the shrub-layer. Common species in the ground-layer are early meadow-rue, lady fern, large-flowered bellwort, large-leaved aster, and wild sarsaparilla.

Since oaks are a desirable species for mills, focus your work on removing trees around high-quality oaks to reduce competition. Be sure to not to injure oak trees from April through July when the risk of oak wilt infection in high. Additionally, prior to a harvest, control buckthorn and other invasive plants. If not performing a clear-cut, avoid removing the biggest and best trees during a harvest. Retaining and encouraging the growth of a diversity of trees, especially trees such as bitternut hickory, sugar and red maple, basswood, northern red oak, white oak, and bur oak, which provide wildlife habitat and makes your woods more resilient to climate change.





Firewise properties can better withstand wildfires.

Be Firewise

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

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

firewise.org

Combination Focus: Lakeshore Restoration

Forests play a critical role in maintaining the health and beauty of east-central Minnesota's many lakes. If you own lakeshore property, a lakeshore restoration project will provide habitat for birds, fish, and other wildlife. It also improves recreational opportunities by maintaining good water quality and can potentially increase the value of your land by improving visual quality.

You can take several steps to improve the quality of your shoreline.

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

Specific recommendations for lakeshore restoration projects 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 grants 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.



Leaving logs in lakes and rivers creates wildlife habitat.

NATIVE PLANT COMMUNITY SPOTLIGHT

Lakeshore

Lakeshore is prevalent in east-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 would find shrubs and forbs such as sandbar willow, 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 provides important protection from waves, land use and vegetation management in the surrounding areas also play key roles in erosion control. Forests help filter runoff and hold soil in place. Land uses such as agriculture and lawns may contribute soil and other inputs like fertilizer and pesticides to runoff flowing into lakes. Consider the impacts that all land use and management activities have on your lake, even beyond the shores.



Next steps:

Photo credit: Minnesota Pollution Control Agency

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


Chapter 6: Next Steps

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

Getting a Woodland Stewardship Plan

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



Plan-writing services include the DNR, private consulting foresters, industry foresters, some county Soil and Water Conservation Districts, and certain environmental organizations. Costs for plan-writing services vary by provider. To locate a certified plan writer, visit mndnr.gov/foreststewardship/index.html



"I think it's important to have somebody look at the land. The Forest Stewardship Plan is incredible. The amount of information is incredible."

-Peter Jensen, Princeton

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

Management Plan Options for Landowners With Less Than 20 Acres

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

Voluntary Guidelines

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



After a harvest, logs are placed across a skid trail to prevent erosion.

Minnesota Forest Management Guidelines: Quick Reference Field Guide

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



Financial Assistance

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

Cost-Share Programs:

Federal

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

State

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

County

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

Tax and Incentive Programs:

Federal

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

State

- Sustainable Forest Incentive Act (SFIA)—Passed in 2001, landowners who enroll their land in the program receive a fixed annual payment per acre. Requirements include a minimum enrollment of 20 qualifying acres, an 8-year minimum commitment, and a Woodland Stewardship Plan that was written in the last 10 years, is registered with the DNR, and includes a schedule of planned activities.
- 2c Managed Forest Land-Created in 2008, 2c is a property tax designation that offers woodland owners a property tax 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 woodlands that produce agricultural products (maple syrup, biomass) or is adjacent to a landowner's farmland.

Minnesota State Forest Nursery

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





"When the farm was up for sale, my brothers were concerned that, 'Somebody's going to eventually divide that all up and it'll be houses.' And it did bother me. So I looked at this Forest Legacy Program and I enrolled in it. So now it'll be that way forever."

-Jim Jirick, Kilkenny

Conservation easements keep forests as forests.

Conservation Easements

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

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

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

Organizations Offering Conservation Easement Programs:

- Agricultural Conservation Easement Program (ACEP)—Administered by the Natural Resources Conservation Service (NRCS), ACEP protects agricultural and nonindustrial private woodlands from development through agricultural conservation easements. The easements can be temporary (30 years) or permanent. The program also offers wetland conservation easements that are purchased and then maintained by NRCS. Easement plans are required.
- Forest Legacy Program (FLP) and Minnesota Forests for the Future (MFF)—The DNR administers the FLP and MFF programs to prevent the conversion of forests to nonforest uses. Working forests provide an array of public benefits including habitat, clean water, recreational opportunities, timber, and other forest products. The FLP is a national program administered in partnership with the USDA Forest Service, while the MFF is strictly a Minnesota easement program. Both programs are intended to conserve and protect private forests that provide economical, recreational, and environmental benefits to the state and its citizens. Conservation easements are permanent and easement rights are either purchased or donated.
- Reinvest in Minnesota (RIM)—RIM is administered by the Minnesota Board of Water and Soil Resources and local soil and water conservation districts. The program focuses on restoring wetlands and sensitive agricultural lands such as those along rivers. An easement plan is mandatory. The landowner is responsible for maintaining any conservation projects in the plan, but the program can provide financial assistance. Conservation easement rights are purchased. Most easements are permanent, but some may be temporary (20 years or more).
- Nonprofit organizations—Some nonprofit organizations purchase or accept donated conservation easements on land that fits certain criteria. Examples include Minnesota Land Trust, Ducks Unlimited/Wetlands America Trust, and The Nature Conservancy.

Visit mndnr.gov/woodlands for more information.



Transferring Land to the Next Generation

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

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

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

Chapter 7: Your Landowner Community

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

Minnesota Forestry Association (MFA)

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

Minnesota Women's Woodland Network

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



Photo credit: Barb Spears

University of Minnesota Extension Woodland Owner Programs

The University of Minnesota Extension teaches landowners how to best steward their land and improve forest health in their community. See **extension.umn.edu/natural-resources/my-minnesota-woods**

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

Urban and Community Forestry Organizations

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

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

Minnesota Forest Resources Council (MFRC) Landscape Committees

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

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

Landowners bring important on-the-ground perspectives to these committees. The northern portion of our region is represented by the East Central Committee, while the southern portion is represented by the Southeast Committee. These committees meets quarterly and is open to the public. mn.gov/frc/regional-landscape-committees.html



MFRC LANDSCAPE REGIONS

"I went to a Tree Farm meeting and when I was driving home I thought, 'Now that is a very different kind of person. Because they're not thinking about next year. They're thinking about 20 years, 50 years, 100 years."" —Peter Jensen, Princeton



Minnesota Tree Farm

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

Walnut Council

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

Landowner Cooperatives

Woodland owner cooperatives provide services to members such as education, equipment-sharing, and access to markets. Examples in your area include MFA's East Metro Woodland Owners, MFA Metro Chapter, and Rice County Forestry Committee.

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

LANDOWNER LEADERS SPOTLIGHT

Matt and Jessica Zabel—Lake Elmo, Minn. ST. PAUL-BALDWIN PLAINS AND MORAINES

Matt and Jessica Zabel were starting to think they might never find their dream property. What they really wanted was a piece of woods their three young children could play in, that was also close to Matt's job in the Twin Cities. However, the right spot, at the right price, eluded them. Then in January of 2014, they saw a listing for an 11-acre parcel in Lake Elmo that fit all of their criteria. "It was one of those negative 40 degree days when people were throwing the pots of boiling water out the window and it was freezing instantly," Jessica says ruefully, "and we for some reason decided we were going to go look at a house, and trudge through 3 feet of snow to go look at the trees."



The frigid trek was worth it. The Zabels immediately fell in love with the land and its towering red pines. Furthermore, the property was under a conservation easement with Minnesota Land Trust. This meant the land could never be further developed, which lowered the real estate value and made the property more affordable for the young couple. It also fit their personal land ethic. "The more trees the better, as far as we were concerned," says Jessica. After finding this special place, the Zabels wanted to learn how to care for it. Again, they had trouble finding what they needed: "someone who could walk the whole property, identify every tree and its condition, and what it needs or doesn't need," says Matt. "Someone to give us guidance and come up with a land management plan," adds Jessica.

As luck would have it, their answer arrived in the mail. A letter from the Minnesota Forestry Association (MFA) advertising a new program for woodland owners called "Boots



on Your Ground." The program offers landowners two hours with a professional forester at a discounted rate. "It was kind of a no-brainer. It just seemed really like a great value," says Matt. The Zabels signed up for the program and soon met with Barb Spears, a private forester. "She brought a bunch of materials with her—brochures and pamphlets about trees, different plant species and animals, invasive stuff, and diseases," says Matt. After visiting their land and talking to them about their goals, Barb connected them with a logger who specializes in small parcels, so they can thin their crowded pine stand. After sifting through a lot of information that only seemed to apply to landowners with larger parcels, the Zabels were grateful that MFA's program provided such a good fit for their needs. "It seemed like the right organization geared towards people like me," says Matt.

Matt and Jessica look forward to further involvement with MFA, as their busy schedule allows. Matt has already taken a "Lumber for Woodworkers" course with the organization. "We do some woodworking projects ourselves, and the idea of using material from here is really appealing." Additionally, Barb introduced Jessica to the local Metro Area chapter of the Minnesota Women's Woodland Network. Jessica looks forward to sharing knowledge with other women woodland owners. "Living out in the country and having this rural experience isn't very common in my social network. I have other parents to talk to about 'mom stuff' but I don't have a network of people that are out here living among the trees."

Most of all, the couple looks forward to enjoying their woods with their children. Matt mentions their 5-year-old son and 3-year-old twin daughters are becoming more adventurous in their woods: "This year they've really started playing more in the woods, which I think is fun to see." Jessica wants their kids to grow up with the sort of outdoor experiences she remembers from summer camps in her youth. "It's sort of like we're living in our own little private summer camp," she says with a smile, "And we get to be here all the time."

To learn more about the Minnesota Forestry Association/Boots on Your Ground program and the Metro Area Minnesota Women's Woodland Network, please visit www.minnesotaforestry.org and www.mnwwn.org

Part 3 Vocabulary

Biological control

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

Conservation easement

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

Ephemeral

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

Food plot

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

Forb

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

Prescribed burning

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

Wildlife opening

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

Ecological Subsections Within Minnesota

- 1. Agassiz Lowlands
- 2. Littlefork-Vermilion Uplands
- 3. Border Lakes
- 4. Nashwauk Uplands
- 5. Laurentian Uplands
- 6. Toimi Uplands
- 7. North Shore Highlands
- 8. Pine Moraines-Outwash Plains
- 9. Chippewa Plains
- 10. Tamarack Lowlands
- 11. St. Louis Moraines
- 12. Hardwood Hills
- 13. Mille Lacs Uplands

- 14. Glacial Lake Superior Plain
- 15. St. Croix Moraine
- 16. Big Woods
- 17. Anoka Sand Plain
- 18. St. Paul-Baldwin Plains and Moraines
- 19. Oak Savanna
- 20. Rochester Plateau
- 21. Blufflands
- 22. Minnesota River Prairie
- 23. Red River Prairie
- 24. Aspen Parklands
- 25. Coteau Moraines
- 26. Inner Coteau



Woods Workbook

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

About my property

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

How many acres do I have?
Is my property in multiple parcels? If so, how many?
What county or counties is my property located in?
What Ecological Classification System subsection is my land located in?
What major watershed is my land in?
What minor watershed is my land in?

Evaluating my property

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

- 1. What kinds of trees are there? Are they old, young, or a mix of ages?
- 2. 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?
- 3. Are there 'islands' of woods surrounded by open land or is all of my woodland connected?
- 4. What is the understory like? Is it thick with shrubs and brush or is it open?
- 5. What wildlife is there?
- 6. Are there any invasive species? Which species? Where are they located?
- 7. Are there any ponds, wetlands, swamps, springs, or streams within my woods or nearby?
- 8. What is the terrain like? Is it hilly or flat?

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

Identifying what interests me about my woods

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

Topics:



Identifying my management theme

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

My goals

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

Goal 1:	 	 	
Goal 2:	 	 	
 Goal 3:	 	 	
Other goals:			

Consult a professional forester

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

Describe a work project

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

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

Identify action steps

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

Step 1:	 	 	
Step 2:	 	 	
Step 3:	 	 	
Step 4:	 	 	
Step 5:	 	 	

Pull it together

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

ACTION STEP CONSIDERATIONS:

Date/Season

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

Tools needed

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

Partners/Contacts

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

ACTION STEP WORK PROJECT		
Work project name and descri	ption:	
Year:		
Steps (describe):		
Date/season:		
Tools needed:		
Partners/contacts:		
Budgot ostimatos:		
My contribution:		
Financial assistance:		
Notes:		

Acknowledgments

Special thanks to the landowners who contributed their time and wisdom: Jim Jirick, Skip Lee, Peter Jensen, and Matt and Jessica Zabel

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This publication was funded primarily through the DNR and the USDA Forest Service, State and Private Forestry.

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woodlands of minnesota LANDOWNER handbook



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

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

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

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 woods so that your dreams can become reality. Your choices will leave a mark on your future woods.

What will your woodland owning legacy be?



This handbook series is a collaborative project of the Minnesota Department of Natural Resources' Division of Forestry and the Minnesota Forest Resources Council with funding from the USDA Forest Service.

mndnr.gov/woodlands